



LogCheck User Manual

October 2022

www.floutsoftware.com

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Chapter 1

Introduction to *LogCheck*

By the end of this chapter you will be able to:

- Understand what *LogCheck* does.
- Understand the *LogCheck* user interface philosophy.
- Understand the features of *LogCheck*.

1.1 What does *LogCheck* do?

LogCheck is a Windows-based system for the management of coal exploration downhole data. It has been designed and written by experienced coal geologists who understand their colleagues' needs. It includes facilities for:

- data entry, validation, plotting and reporting of hole header (location information), drilling, water flow, downhole geological and geotechnical (rock mass unit, defect and point load) data,
- plotting of downhole geophysical data,
- import and export of dictionaries and data to and from geological databases and modelling packages, such as Acquire, Geobank, MineScape (GDB), Vulcan and Minex,
- production of various audits and summaries, including summaries of: data currently stored for each hole; dictionary code usage; drilling meterage; seams, horizons and samples in each hole; contents of downhole geophysical (LAS) files; rock mass unit characteristics and point load indices.

It complements geological database and modelling packages such as Acquire, Geobank, MineScape (GDB), Vulcan and Minex by providing a system which:

- has comprehensive validation facilities,
- is easy to learn with a user interface similar to other Windows programs such as Excel and thus easily picked up by short term geological contractors employed during drilling programs,
- does not tie up an expensive mining package licence for data entry,
- enables the plotting, in numerous different formats, of any of the data variables stored in it.

1.2 History of *LogCheck*

LogCheck evolved from a DOS-based system called LogBase. This was first developed in 1995 to facilitate the entry and validation of lithology data by coal geologists. It then expanded into generating graphics and providing entry and validation of geotechnical data.

In 2002, the system was rewritten into the Microsoft Windows environment and renamed *LogCheck*. It currently has over 300 users at over 100 sites, chiefly in Australia, but also in Indonesia, Russia and Mongolia.

1.3 *LogCheck*'s User Interface Philosophy

LogCheck has a relatively simple user interface, making it appropriate for use by short-term contracting staff who are not on site long enough to warrant lengthy tuition.

The simplicity of *LogCheck*'s user interface is based on an "object oriented approach". This is one of the current buzz words in computing. In *LogCheck*'s case, it means that there is always a particular set of data open (the "object" in computer jargon) and *LogCheck*'s menus change according to the current data to reflect the actions (the "methods" in computer jargon) that can be performed on that data.

Apart from offering options for all these actions, the menus also provide options to create a new data table for a new hole or open another data set.

1.4 LogCheck Data Types

LogCheck data types fall into seven general categories:

1. Dictionary data: valid codes and their meanings. A dictionary is required for each hole data type (see below). Dictionaries can be imported, entered, modified, printed, exported and plotted as a legend.
2. Project data: including the project title to appear on reports and plots; company logo for reports, survey coordinate grid type, rectangular coordinate limits for the project.
3. Drill Site data: including proposed hole purpose and location, landholder, environmental authority, conduct & compensation agreement, cultural heritage, site preparation and rehabilitation.
4. Hole data: a separate file is created for each data type for each hole. Current available data types include:

Headers	Rock Mass Units (RMU)
Cementing	Defects
Casing	Acoustic Scanner Analysis
Geologists	Point Loads
Drilling	Geotechnical Laboratory Tests
Geology	
Water Flows	Coal Quality Results
Downhole Geophysics (Las)	Composite Constituents
Sample Dispatch	
Rehabilitation	

Hole data can be imported, entered, modified, printed, plotted and exported. The only exception is that downhole geophysical data cannot be entered or modified, only imported from Las files.

5. Daily Activities data: a record for the day of sites rehabilitated, safety procedures implemented, general comments and planned operations for the next day.
6. Audit, Summary and Statistical data: includes Project Audits, Hole Audits, Hole Summaries, Drilling Summaries, Seam Summaries, Sample Summaries etc.

This data is generated from the hole data and can be viewed, exported and printed. It can only be modified by editing the original hole data.

7. Program Control data: used by the program when opening or plotting data. It includes definitions for:

Hole Sets	Hole Plans	Clean Composites
Hole Intervals	Downhole Plots	CQ Test Specifications
Graphical Editor	Plot Colour Scales	
Las Formula	Plot Legends	
	Histograms	

This data can only be entered and modified.

1.4.1 Data Audits

LogCheck generates a number of data audits that are useful for checking your data. These include the following audits:

- **Dictionary** listing for each code in the dictionary, the number of times it has been used in the data and the names of the first and last holes in which it has been used;
- **Codes** listing every instance in the data where a specified code has been used;
- **Projects** listing for each project, the number of holes stored in *LogCheck* for each data type;
- **Holes** listing the final depth (or blank if no data present) for each data type for each hole;
- **Uncorrelated Coals** listing for each hole, every seam in the hole and between these any occurrences of coal not yet assigned a seam name;
- **Unsampled Coals** listing for each hole, any coals that do not have sample numbers assigned to them;
- **Unsampled Seams** listing for each hole, any intervals within seams that do not have a sample number assigned to them.
- **Horizons** showing for each hole, the depth of each horizon, such as base of weathering;
- **Strats** listing for each hole, the thickness of each stratigraphic unit encountered in it;
- **Seams** listing for each hole, the thickness of each seam encountered in it;
- **Plies** listing for each hole, the thickness of each ply encountered in it;
- **Coal Quality** listing for each hole, for each of Ply and Composite sample types, for each of Raw, Sized/Washed and Clean Coal Composites the number of samples whose results have been entered into *LogCheck* for each of the following tests:

Mass	HGI	Dilatometer
Density	Ultimates	Gray-King
Moisture	Sulphurs	Sapozhnikov
Proximates	Ash Analysis	Rheology
Energy	Ash Fusability	Trace Elements
Impurities	Physical Properties	Petrography
CSN	Gieseler	Carbonisation
		Reflectance

- **Clean Coal Composite Types** listing for each hole, for each of Ply and Composite sample types, how many samples of each defined Clean Coal Composite Type have results in the database;
- **Las Files** listing for each Las file its: hole name (WELL), top (STRT) and bottom (STOP) depths, reading spacing (STEP), logging company (SRVC), logging date (DATE) and recorded geophysical variables.

1.4.2 Data Summaries

LogCheck generates data summaries that are useful for checking data, passing information to other people or computer packages such as modelling systems. These summaries include:

- **Holes** displaying for each selected hole, its:

Site Id	Casing	Las Files received
Hole Type and Purposes	Logging Geologists	Standing Water Level
Survey Data	Horizons and Seams	Cementing
Drilling Summary	Geophysical Tools Run	Rehabilitation

- **Drilling** listing for each Drilling Company, Rig No and Rig Type in each selected hole: the start and end date of drilling and the number of metres of each drilling type;
- **Seam/Horizon Picks** listing for each horizon, stratigraphic, seam and/or ply in each selected hole its from and to depths and thicknesses;
- **Seams/Plys** listing for each seam or ply in each selected hole, its:

From Depth	Coal Mass
To Depth	Over/Interburden Thickness
Total Thickness	Stripping Ratio
Coal Thickness	Cumulative Coal Thickness
Parting Thickness	Cumulative Coal Mass
Core Loss Thickness	Cumulative Over/Interburden Thickness
Linear Recovery	Cumulative Stripping Ratio
Average Coal Density	Lithology Summary

- **Samples** listing for each Individual or Composite sample in each selected hole, its:

Purpose	Ply at top
Sample Number	Ply at base
From Depth	Drilling Date
To Depth	Core Size
Thickness	Sample Density
Coal Thickness	Theoretical Mass
Core Loss Thickness	Dispatch Mass
Linear Recovery	Volumetric Recovery
Seam at top	Lithology Summary
Seam at base	

- **Seam/Ply Composites** listing for each seam or ply in each selected hole, its:

Seam/Ply Name	Linear Recovery
From Depth	Sample Number at top
To Depth	Sample Number at bottom
Thickness	Basis
Core Loss Thickness	

and whatever test results the user has selected to list. The user can also select to generate the composite values by calculating them from Individual Ply results, Composite results or from Composite results plus Individual results where no Composite Results exist;

- **Rock Mass Units** listing for each geologist defined Rock Mass Unit (RMU) in each selected hole, its RMU data:

RMU Type	Bed Spacing
Weathering	Bedding Dip Angle
Alteration	Moisture Sensitivity
Estimated Strength	Plasticity

and the following values calculated directly from the recorded data for each RMU:

Rock Quality Designator (RQD)	Average UCS from Average Axial Index
Average Fracture Spacing	Average UCS from Sonic Log
Fracture Frequency	Average UCS from Lab Tests
Average Diametral Index	Unit Rating Component Ratings
Average Axial Index	Unit Rating

- **Drill Run RQDs** listing for each core run in each selected hole: its Rock Quality Designator (RQD) calculated directly from the Defect data stored in the database;
- **Defect Spacings** listing for each defect in each selected hole: the thickness between it and the previous defect;

- **Fracture Frequency** listing for each defect in each selected hole: the fracture frequency value for halfway between it and the previous defect to halfway between it and the following defect;
- **Point Load Indices** listing for each test sample in each selected hole: the calculated point load index.

1.4.3 Statistics

LogCheck generates statistical reports for the following:

- **Coded Data Frequencies** listing for each specified dictionary variable for each selected hole, its frequency of occurrence or total thickness. For example, the number of times each lithology occurs in the hole or its total thickness for the hole;
- **Interval Thickness Statistics** listing for each selected hole: the mean, standard deviation, minimum and maximum thickness of the coal intervals in the hole;
- **Las Variable Statistics**, listing for each selected geophysical variable in each selected hole, its: units, no of values, no of missing values, minimum, maximum, mean, standard deviation and various percentile values.

1.5 LogCheck facilities

LogCheck includes facilities for:

- data entry and editing,
- data listings,
- graphical editing,
- data plotting,

1.5.1 Data Entry & Editing

LogCheck supports a number of widely used data sheet formats or can be tailored to match the client's specific needs. Data can be imported from CoalLog Data Transfer, Geobank, Acquire, MineScape (GDB), Vulcan, Minex or Excel .csv files or entered directly. No matter which method is chosen to enter data, it is fully validated before it is accepted into the system. This includes checking that depths are in sequence, compulsory fields such as lithotype are entered, percentages of lithologies add up to 100% and mnemonic codes are contained in the dictionary.

The data editor includes facilities to:

- display the data in grid (like a spreadsheet) or forms (single page per record) format,
- hide certain fields when not required,
- display the core photo covering the current record,
- select codes from a menu of valid codes,
- edit English comments using a word processing style editor,
- automatically copy down values of user specified fields onto new lines,
- insert, delete and undelete records,
- copy a field from the last previous row where it has been entered
- search and replace fields,
- add or subtract a constant value to a set of depths,
- expand or contract a set of depths to account for core loss/expansion,
- calculate statistics for any selected column.

For Geology data, it also includes facilities to:

- split a lithological unit into two units,
- copy to the current row, all the values from the row with the same LithoType as the current row.

For audits, summaries and statistics it also includes facilities to:

- filter the results
- sort the results

An example of Geology data displayed in the *LogCheck* editor:

The screenshot shows the LogCheck editor window with the following data table:

CalcThick	Depth	Seam	Ply	Horiz	SP	SampNum	Geo	BT	IS	PC	Li	LQ	Sh	Hu	Co	A1	Lithotype
0.66	293.56						JCI	DW			SS	FM	L	G	C	QZ	SI
0.17	293.73						JCI	DW			SS	FM	L	G	C	QZ	SI
0.92	294.65						JCI	DW			SS	MM	L	G	C	QZ	TO
0.15	294.80				QP	003130	JCI	DW			SS	MM	L	G	C	QZ	SI
0.15	294.95				QP	003130	JCI	DW			SS	MM	L	G	C	QZ	TO
0.02	294.97	WK2	WK2A		QP	003131	JCI	DW			CO	SY				XX	AI
0.07	295.04	WK2	WK2A		QP	003131	JCI	DW			KL						AL
0.07	295.11	WK2	WK2A		QP	003131	JCI	DW			CO	SY					AN
0.79	295.90	WK2	WK2A		QP	003126	JCI	DW			CO	CU					AV
0.77	296.67	WK2	WK2B		QP	003127	JCI	DW			CO	CU					BC
0.78	297.45	WK2	WK2B		QP	003128	JCI	DW			CO	CU					BI
0.19	297.64	WK2	WK2B		QP	003129	JCI	DW			CO	CU					BO
0.16	297.80				QP	003129	JCI	DW			SS	FF	E		G	AB	BR
0.14	297.94				QP	003132	JCI	DW			SS	FF	L		G	AB	BS
0.16	298.10				QP	003132	JCI	DW			SS	FF	L		G	AB	BU
0.24	298.34				QP	003132	JCI	DW			SS	FF	E	K	G	AB	BV

The right pane shows a list of lithotypes with a search bar and navigation buttons. The list includes: CO Coal, SD Siderite, SS Sandstone, ST Siltstone, XT Carbonaceous Siltstone, AI Acid/Felsic Intrusive, AL Alluvium, AN Andesite, AV Acid/Felsic Volcanic, BC Brown Coal, BI Basic/Mafic Intrusive, BO Boulders, BR Breccia, BS Basalt, BU Basement Undifferentiated, BV Basic/Mafic Volcanic, BW Burnt Wood / Charcoal, CA Calcite, CB Carbonate, CC Calcrete, CG Conglomerate, CH Chert, CK Chalk, CL Clay, CO Coal, CS Claystone, CV Colluvium.


1.5.2 Data Listings

Site and Hole data can be listed in its original format or as reports with codes converted to full English descriptions. In either case, the listings can be produced as PDF, text or CSV files for importing to other software such as Excel or Word. They can be generated for part of a hole, a single hole, a set of holes or all holes in the project.

An example of a coded data report that has been generated as a PDF file:

geoCheck GEOLOGICAL DATA SPECIALISTS		AVOCA Lithology Log														Hole AVC032 Page 3 of 3																			
							Lithology Descriptor										Geotechnical				Mechanical		Sedimentology				Minerals								
Calculated Thickness	Interval Base Depth	Seam Name	Ply Name	Horizon Name	Sample Type	Sample Number	% Lithotype	Lithotype	Lithology Qualifier	Shape	Size	Colour	Adjective #1	Adjective #2	Adjective #3	Adjective #4	Inter relationship	Weathering	Estimated Strength	Bedding Spacing	Bedding Type	Bedding Intact	Bedding Spacing	Bedding Dip Angle	Core State	Mechanical State	Texture	Basal Contact	Sedimentary Feature #1	Sedimentary Feature #2	Bedding Dip Angle	Mineral/Fossil	Mineral/Fossil Type	Mineral/Fossil Amount	
2.89	237.00						SS	FM	L			G						W																	
3.00	240.00						SS	FM	L			G	PA	SA	BN			W																	
6.25	246.25						SS	FM	L			G	CL	LM	TO			W																	
1.29	247.54	MAU					CO					K						W																	
4.46	252.00						SS	FM	L			G	SA	BN				W			VN														
4.11	256.11						SS	FM	L			G	SA	BN	XC	LM		W																	
0.74	256.85	MAL					CO					K						W																	
5.15	262.00						SS	FM	L			G						W																	
subangular matrix																																			
2.00	264.00						SS	FM	L			D	G	SA	LM	TO		W																	
4.00	268.00						SS	FM	L			D	G	SA	LM	TO		W																	

An example of a geology report that has been listed as a PDF file:

 GEOLOGICAL DATA SPECIALISTS		AVOCA Lithology Log		Hole AVC032
				Page 3 of 4
Depth	Thickness	Sample Number	Lithology	
207.53	4.53		SILTSTONE: medium brownish grey, minor carbonaceous bands rare sandy laminae, fresh, medium strength rock.	
			————— <i>Top of Warkworth 1 Seam</i> —————	
207.91	0.38		COAL: black, fresh, medium strength rock.	
208.00	0.09		CLAYSTONE: coaly, fresh, medium strength rock.	
208.20	0.20		COAL: black, fresh, very low strength rock.	
			————— <i>Base of Warkworth 1 Seam</i> —————	
			————— <i>Geological Thickness: 0.67 metres</i> —————	
216.00	7.80		SILTSTONE: dark grey, clayey laminae throughout, fresh, medium strength rock.	
219.00	3.00		SILTSTONE: medium grey, sandy laminae abundant grains throughout, fresh, medium strength rock.	
220.47	1.47		SANDSTONE, fine grained: light grey, sporadic silty lenses, fresh, medium strength rock.	
			————— <i>Top of Warkworth 2 Seam</i> —————	
223.42	2.95		COAL: fresh, very low strength rock.	
			————— <i>Base of Warkworth 2 Seam</i> —————	
			————— <i>Geological Thickness: 2.95 metres</i> —————	

Daily Activities can only be exported by printing either directly to a printer or a PDF file generator.

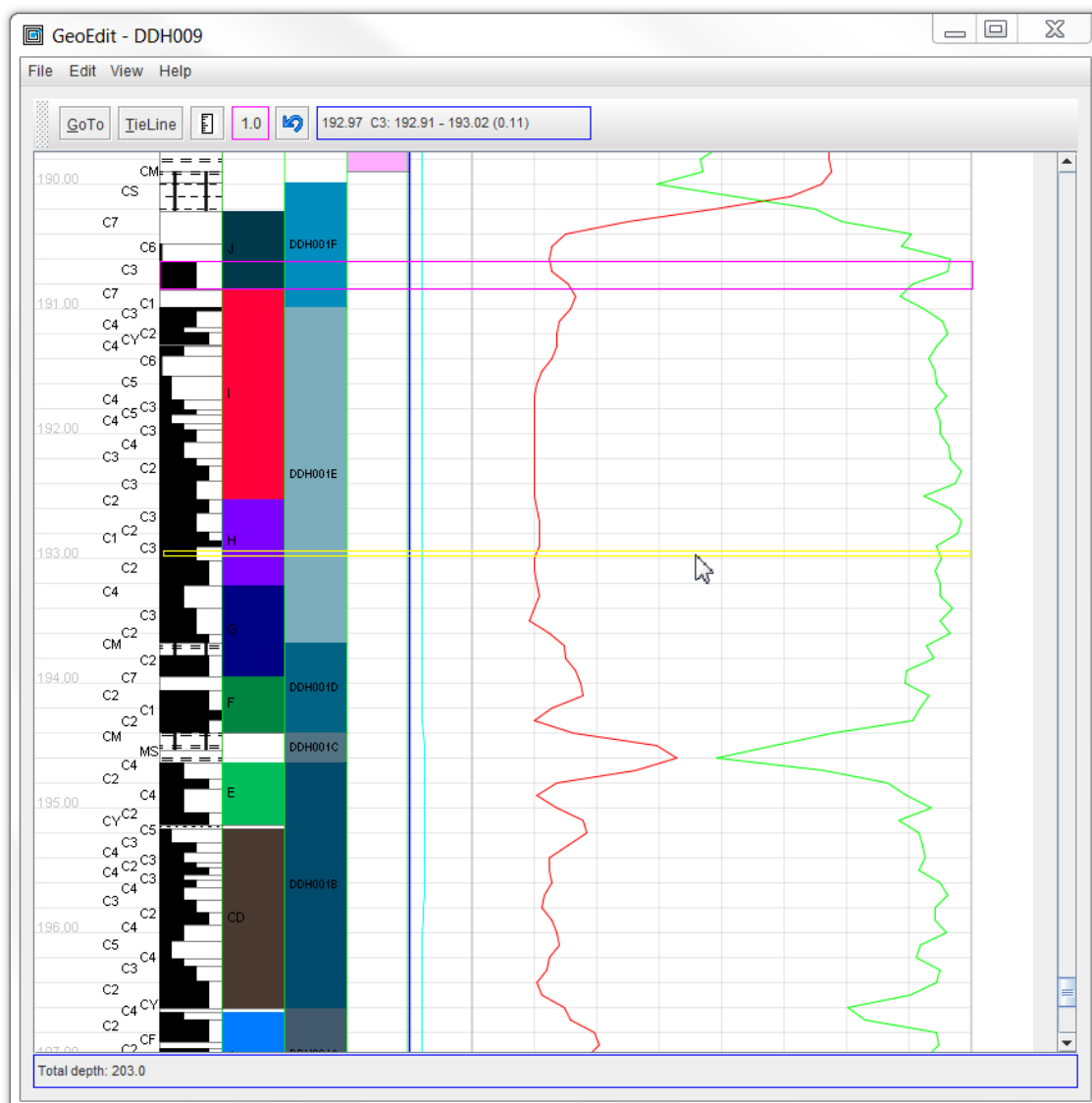
Hole Summaries can only be exported by printing either directly to a printer or a PDF file generator.
All other data summaries can be listed as either text or csv files.

1.5.3 Graphical Editing

The Graphical Editor (GeoEdit) is used for graphically displaying hole data and aligning depths of lithologies with the downhole geophysics. GeoEdit reads data from a hole log generated from *LogCheck*, and displays the lithology, seam, ply, sample number, mechanical state and geophysics in a graphical format. The main editing operations are:

- Moving the From depth of an interval(s) either further up or down the hole,
- Inserting a new interval at the top, bottom or within existing units,
- Expanding or contracting units, either by a single group or a set of tielines,
- Renaming a lithology, seam, ply or sample number.

It maintains a history of edits done during the current session and allows edits to be undone back to the start of the session. Also, the first time that the geology data for a given hole is modified and saved in GeoEdit, a raw copy of the data is saved in the folder RawGeology. An example of a hole displayed in GeoEdit is:



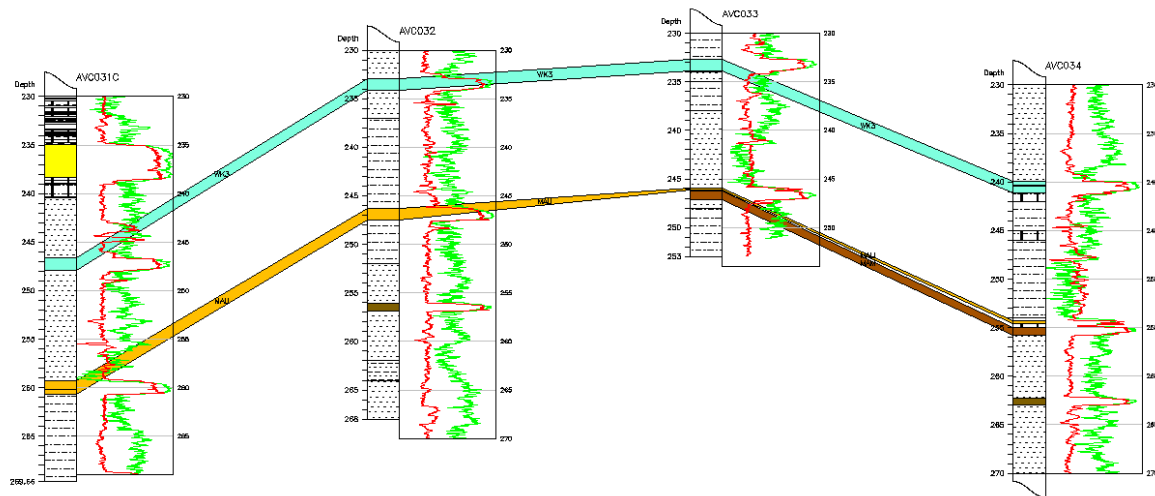
1.5.4 Data Plotting

Plots are generated as industry standard DXF files which can be displayed, edited and/or plotted from most CAD packages, such as AutoCAD's TrueView, which is available for free. TrueView can be used to view or output plots, however, it does not have the ability to edit them. *LogCheck* produces four types of plots:

- drill hole location plans which can also show seam information such as coal thickness, parting thickness and strip ratios;
- downhole plots of any combination of geological, geotechnical and/or geophysical data for part of a hole, a single hole or a set of holes along a section;
- histograms that graph the frequency of occurrence of a variable;
- box and whisker plots showing the ranges and average values of geophysical data within each hole.

In the case of downhole plots, lithological data can be displayed as patterns using the supplied symbol set or you can design your own. Defects can be displayed as planar, stepped or curvy angled lines. Their dip and orientation can be also be displayed as tadpole plots. Coded data can be displayed as codes (optionally staggered horizontally based on their value), English descriptions or histograms (say, for rock strength). Numeric data can be displayed as traces (lines joining point to point), histograms or numbers. You can either use one of *LogCheck*'s standard sheet layouts for plotting downhole data or design your own.

An example of a plot generated by *LogCheck* and displayed in TrueView is shown below:



1.6 Glossary of Computer Terms

The following chapters assume that you are familiar with database terminology, including:

- **ASCII Text:** ASCII is a code for representing English characters as numbers, with each letter assigned a number from 0 to 127. For example, the ASCII code for upper case A is 65.
- **Column:** A column on the screen showing the value of a field over a number of records.
- **CSV File:** A CSV (comma separated values) file consists of a text file where data values are separated by commas; it is used for transferring data between applications.
- **Database:** A set of inter-related tables that is held in persistent storage. For example, the *LogCheck* database of drill hole data.
- **DBMS:** A database management system is the software that maintains the data in a database.
- **Field:** A discrete value in a record, for example the lithology for an individual interval of a particular hole.
- **File:** A container for storing data on a computer's disk drive, for example, the geology data for a drill hole is held in a single file.
- **File Type:** The extension on the end of a file name that indicates to the computer's operating system the kind of data stored in the file. For example, a file extension of .dbf indicates that it is a dBase database file.
- **Folder/Directory** A file structure that stores other files, for example, C:\Logdata.
The terms folder and directory are interchangeable.
- **Index:** An ancillary data structure to a table that sorts the record in the table, for example, each dictionary has an index file attached to it so that it can be displayed in order.
- **Primary key:** A field in a table that uniquely identifies each record, for example, the sample number on a set of proximate analysis results.
- **Query:** A subset of a table that satisfies a set of criteria.
- **Record:** Composed of a related group of fields. For example, all the proximate analysis results for a single sample.
- **Row:** A record as displayed on the screen.
- **Tab delimited file:** A text file where data values are separated by tabs.
- **Table:** Stores information about an entity, such as a drill hole, in a structure that is composed of records containing fields.
- **Validation rules:** Specify the criteria that are acceptable before data is entered in a field.
- **Variable:** A cell in computer memory that can store a single value.

1.7 Acronyms

AMG	Australian Mapping Grid
ASCII	American Standard Code for Information Interchange
LAS	Log ASCII Standard
MGA	Mapping Grid of Australia
RMR	Rock Mass Rating
RMU	Rock Mass Unit
RQD	Rock Quality Designator
UCS	Uniaxial Compressive Strength.

Chapter 2

Getting Started with *LogCheck*

By the end of this chapter you will be able to:

- Install and start *LogCheck*.
- Install Multiple Versions of *LogCheck* on a single computer.
- Install optional components.
- Set up the *LogCheck* data directory.
- Install a dictionary.
- Set up a new project.
- Set the project details data.
- Enter hole data.

2.1 Introduction

This chapter explains how to install *LogCheck* software and commence using it. The steps involved are:

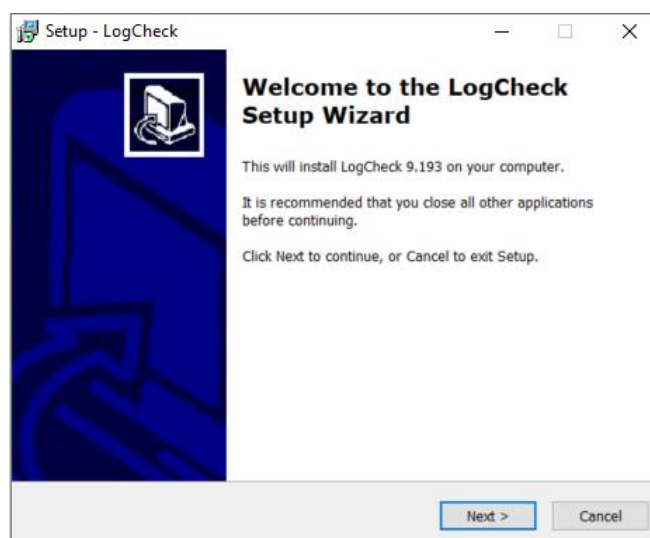
- install the *LogCheck* software, and optionally the graphical editor (GeoEdit), which requires the Java runtime,
- start *LogCheck*,
- setup the *LogCheck* data directory,
- setup a project,
- setup a dictionary,
- enter hole data.

2.2 Installing and Starting *LogCheck*

LogCheck installation file is around 26MB and is distributed over the internet using file distribution software such as HighTail. This sends the receiver an email that has a link to a web address from which the *LogCheck* install file can be downloaded.

The installation file for *LogCheck* has a name in the form *lcn.nnndataformat.exe* where *n.nnn* is the release number and *dataformat* is the particular format used for recording geological data in that copy of *LogCheck*. For example, the installation file *lc6.002CoalLog.exe* will install release 6.002 of *LogCheck* and uses a CoalLog format for the data.

To install *LogCheck* double click on the installation file and the window at right will appear:



Windows will then appear prompting for:

- where to store the program,
- where to include it on the start menu and
- if you would like an icon for it on the desktop.

It is preferable but not necessary to choose the defaults when prompted for this information. Once installed, to start *LogCheck*, double click on the icon (as shown on right) on your desktop.



2.3 Installing Multiple Versions of *LogCheck* on a Single Computer

Users such as consultants with a number of clients with different data formats may need to have multiple versions of *LogCheck* installed on their computer. To install a second copy of *LogCheck*, first determine the directory where the current version is installed. If the default was chosen during the installation process this will be `c:\Program Files (x86)\LogCheck` for the 64-bit version of Windows, and `C:\Program Files\LogCheck` for the 32-bit version of Windows.

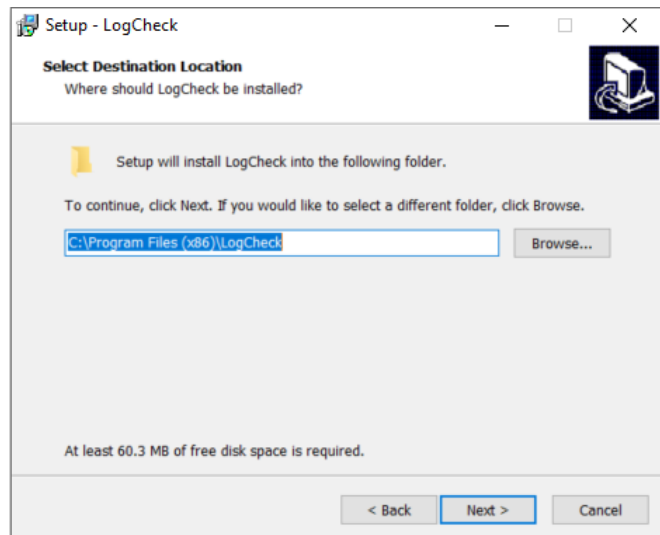
Now when installing the second version of *LogCheck* and the window to the right appears:

Enter a different directory name to the first, for example, if the first is called:

`C:\Program Files (x86)\LogCheck`

the second could be called:

`C:\Program Files (x86)\LogCheck CoalLog`



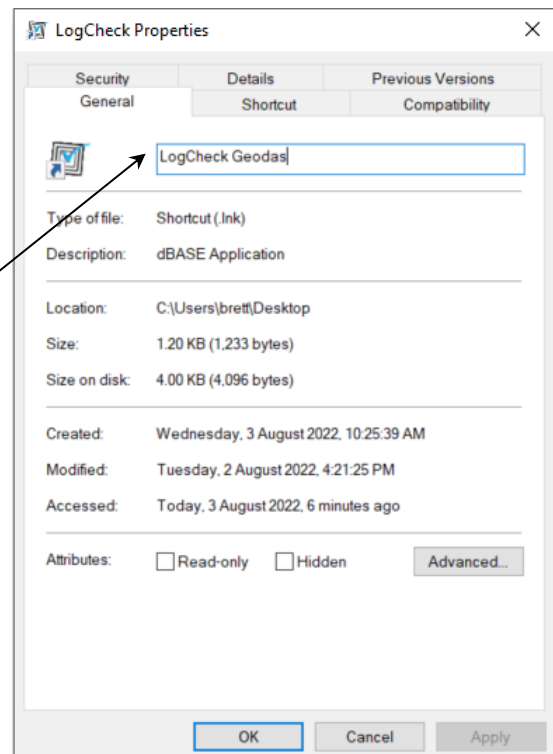
If this new directory name does not exist, the installation program will create it. Then progress through the installation windows by selecting the Next buttons.

On installing the second version of *LogCheck*, the desktop icon for the first version will be overwritten by the icon for the second version. To recreate a desktop icon for the first, perform the following steps:

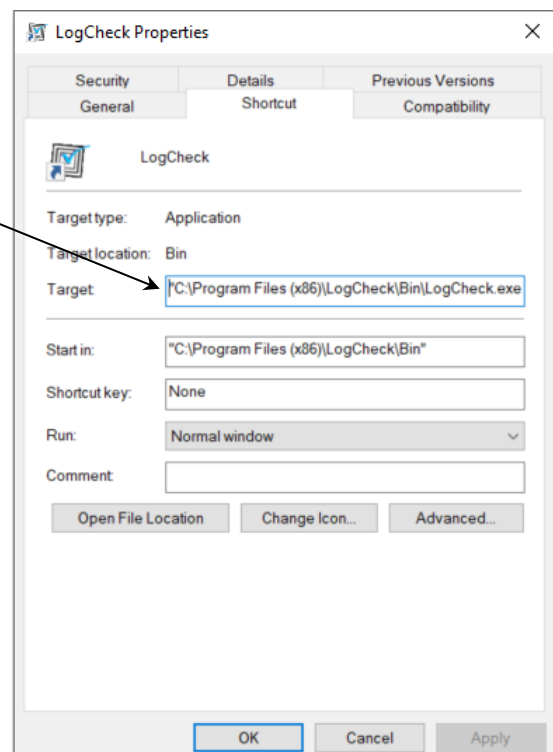
- 1) go to the desktop and single click with the right-hand mouse button on the *LogCheck* icon,
- 2) select Copy from the popup menu,
- 3) point the cursor to the place on the desktop where you want to place the second icon and then single click with the right-hand mouse button,
- 4) select Paste from the popup menu.

There will now be two *LogCheck* icons on the screen and both will start the second version of *LogCheck*. To set one to start the first version:

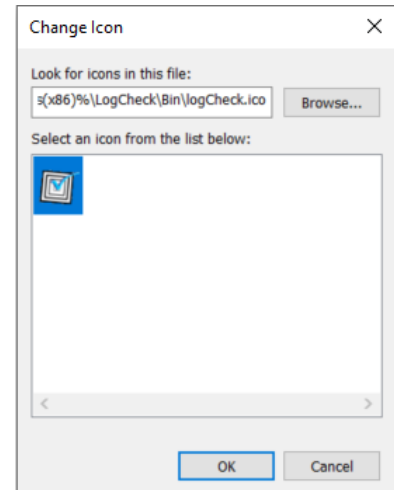
- 1) Select which icon should be modified to start the first version of *LogCheck* and single click on it with the right-hand mouse button,
- 2) Select Properties from the popup menu. An icon properties window like the one on the right will appear,
- 3) Select the General tab from the properties window and change the icon name in the top box to whatever is appropriate, for example *LogCheck Geodas*:



- 4) Select the Shortcut tab from the properties window and set the Target to the initial version of *LogCheck* including its full path name. If there are any blanks in the path or file name then the full path and file name need to be enclosed in double quotation marks:

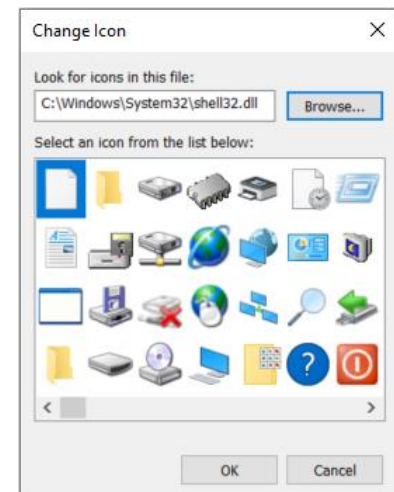


- 5) The icon can be changed by selecting the “Change Icon...” button. After which the window to the right appears:



A range of standard icons can be found by clicking the Browse button and then selecting Shell32.dll:

Select an appropriate icon from the displayed list and then click OK. Further icons can be found in the files moricons.dll and pifmgr.dll in the C:\Windows\System32 folder. If the name of the file in which icons can be found is changed the new ones are not displayed until clicking on the box containing the actual icons;



- 6) Once satisfied with the icon, its name and its target, click on the OK button on the *LogCheck* Properties window.

After making the appropriate changes to the icon for the first version, any changes to the icon type and name for the second version can be made using the same steps as described above.

2.4 Installation of Optional Components

2.4.1 Java Runtime Environment

If your licence includes the Graphical Editor which is called GeoEdit, you will need to have the Java runtime environment installed – this is often already installed on most computers.

To determine if Java is installed, open Windows Explorer and navigate to C:\Program Files. If there is a folder there named Java, then it has already been installed. If Java is not installed, a free download is available from:

<https://www.java.com/en/download/>

2.4.2 TrueView DXF file Viewer

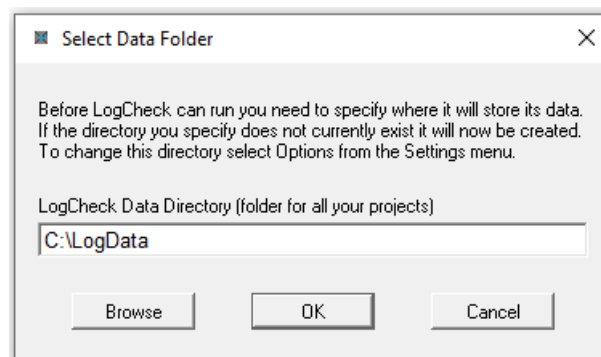
LogCheck generates its plots in AutoCAD Release 12 DXF format. These can be viewed and plotted to hard-copy or PDF files with AutoCAD's TrueView program. This can be downloaded for free from:

<https://www.autodesk.com.au/viewers>

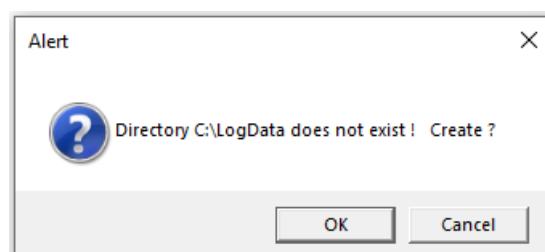
2.5 Setting up the *LogCheck* Data Directory

The first time that *LogCheck* starts after installation, the window to the right prompts for the name of the drive and directory where data is to be stored:

To accept the default, click the OK button. However, if the data is to be stored in another location, either type in the path, or click the Browse button to navigate to the required folder.



If the directory does not exist, it will be created:



It can later be changed to another directory by selecting Settings > Options from *LogCheck*'s menu. It is possible to have more than one such data directory but *LogCheck* will only see data in whichever one is the current one. Even when running multiple versions of *LogCheck* for different clients it is not necessary to set up multiple data directories as all projects can be stored in the one data directory. *LogCheck* though only sees those projects that were created using the currently running version.

Multiple data directories can be useful for setting up a folder for working data on one's local hard drive and one for finalised data one's server.

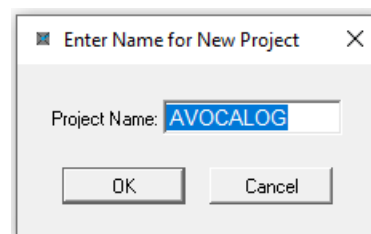
2.6 Setting up a New Project

Each project has a single directory that sits in the *LogCheck* Data Directory. All the data for a project sits in this project directory except for Las data which can optionally sit elsewhere.

Each project directory contains a subdirectory for each type of data stored for the project. These are created automatically by *LogCheck* as required. For example, when the first hole of Water Flow data is entered into *LogCheck* for a project, *LogCheck* automatically creates a subdirectory called WaterFlows in which the data is stored.

New project directories can only be created by *LogCheck* but once created can be renamed or deleted using Windows Explorer. To copy the data for a project to another computer running *LogCheck*, simply copy the project directory and all its subdirectories to the *LogCheck* Data Directory on the other computer. Be aware that within each project directory there is a file called *project.mem*. This file contains the details for the project. If it is renamed or deleted *LogCheck* no longer recognizes the directory as a *LogCheck* project directory.

If no projects exist in the *LogCheck* data directory when *LogCheck* is started then the user is prompted for a name for the initial project:



The name for a project directory is restricted to a maximum of eight characters and cannot contain blanks. Once the project has been created *LogCheck* displays its Project Details for editing.

Further new projects can be created at any time by selecting File > New > Project from *LogCheck*'s menu.

2.7 Project Details Data

Once a project is created the Project Details for the project becomes the current data set. An example of the Project Details for a project named AVOCALOG is:

LogCheck - [C:\LogData\AVOCALOG\PROJECT]

File Edit View Tools Settings Help

Project: AVOCALOG

Project Title for printing on Reports, Plots etc.

LAS File Directory

Company Logo for Project (*.bmp, *.ico, *.gif, *.jpg, *.jpeg, *.png, *.tif, *.tiff, *.wmf)

Geodetic Datum

- ☐ AGD84 as used for AMG84 coordinates
- ☒ GDA94 as used for MGA94 coordinates
- ☐ GDA2020 as used for MGA2020 coordinates
- ☐ WGS84 as used in Indonesia

Format for Survey Coordinates

- ☒ Grid
- ☐ Longitude/Latitude (decimal degrees)
- ☐ Longitude/Latitude (deg/min/sec)

Depth Units for editing Hole Data

- ☒ Metres
- ☐ Decimal Feet
- ☐ Feet and Inches

Project Limits

	Zone	Easting (MGA94)	Northing (MGA94)	Elevation
Minimum	0	-999999.99	-999999.99	-999.99
Maximum	60	999999.99	999999.99	9999.99

UCS from Sonic Transit Time Relationship

UCS = * e * t

where UCS = Uniaxial Compressive Strength in MPa
 t = sonic transit time in μ s/m

The following is a brief description of the project data (seen Chapter 4 of the *LogCheck* User Manual for more details):

- **Project Title:** The title for printing on reports, plots etc.
- **LAS File Directory:** Unlike all the other *LogCheck* data, LAS data can reside anywhere on the user's computer or attached network. If this field is blank, *LogCheck* looks for the LAS data in the folder named LAS within the project.
- **Company Logo:** The name of an image file for including in the top left corner of reports.
- **Geodetic Datum:** Geodetic Datum for displaying coordinates for this project.
- **Survey Format:** Specifies the survey coordinate format using the currently selected geodetic datum.
- **Depth Units:** Specifies the unit of measurement that is used for editing hole data. Even though it may be displayed and edited in Imperial units, all data is stored, reported, plotted and exported in metres.
- **Project Limits:** A rectangular set of limits against which survey coordinates are validated.
- **UCS:** Parameters specific to the project for converting sonic values for this project to UCS (Uniaxial Compressive Strength).

2.8 LogCheck Dictionaries

If a *LogCheck* data type includes coded data, that is all data types except Activities, Geologists, Rehab and UCS, then a dictionary of the codes is required before any data of that type can be entered into *LogCheck*. In addition, Geology data also needs a local seam dictionary. Each dictionary consists of two files with names of the form:

- *Data Type Dictionary.dbf*
- *Data Type Dictionary.mdx*.

For example, the geology dictionary files will be called:

- *Geology Dictionary.dbf* a dictionary of the categories, their codes and descriptions;
- *Geology Dictionary.mdx* an index into the dictionary of code names.

The following example shows the first few lines of the LithoType category of a Geology dictionary:

Code	Desc	Historical	Group	Before	After	Pattern	Pattern2	Colour	Fill	FillColour	BgColour	Comments
AI	Acid/Felsic Intrusive					IN3		241			241	
AL	Alluvium					AL3		51			51	
AN	Andesite					VR3		140			140	
AV	Acid/Felsic Volcanic					VR2		140			140	
BC	Brown Coal								BC			
BI	Basic/Mafic Intrusive					IN5		241			241	
BO	Boulders					BO1		40			40	
BR	Breccia					BR3		40			40	
BS	Basalt					VR4		140			140	
BU	Basement Undifferentiated					BU1	MM1	6			6	
BV	Basic/Mafic Volcanic					VR4		140			140	
BW	Burnt Wood / Charcoal					FW1			COCI			
CA	Calcite					CA1		131			131	
CB	Carbonate					LS3		131			131	
CC	Calcrete					CR1	C1	131			131	
CG	Conglomerate					CGPP		40			40	
CH	Chert					CH1		32			32	
CK	Chalk					CK1		131			131	
CL	Clay					CL1		254			254	
CO	Coal		COAL						CO			
CS	Claystone					CS1		254			254	
CV	Colluvium					CV		40			40	

LogCheck dictionaries contain the following columns (these are described in detail in Chapter 3 of the *LogCheck* User Manual):

- **Code** An abbreviation used by the geologist when entering data;
- **Desc** The full description that the code represents. This is what appears for the code in reports, and in plots where descriptions are being displayed;
- **Historical** A flag used with CoalLog data, a Y indicates an item that may only be used in historical data not current data;
- **Group** Groups certain dictionary entries. It is used for various purposes by various parts of *LogCheck*. For most dictionary categories it is not required but in the case of the Seam category in a Seam Dictionary, the group is required and can only have the values of SEAM or STRAT where SEAM a coal seam and STRAT a stratigraphic marker;
- **Before** A Y indicates that when the entry appears in a full English description, a comma should be included before the word, otherwise it is not included;
- **After** A Y indicates that when the entry appears in a full English description, a comma should be included after the word, otherwise it is not included;

- **Pattern** The name of the primary pattern that will be used for plotting;
- **Pattern2** The name of the secondary pattern for plotting – if specified, it is combined with the primary pattern;
- **Colour** An AutoCAD colour number – a number between 1 and 255 (see Appendix A of the *LogCheck* User Manual);
- **Fill** The name of the fill that will be used for plotting;
- **FillColour** An AutoCAD colour number that will be used for drawing the fill;
- **BgColour** An AutoCAD colour number that will be used for drawing the background;
- **Comments** Provided so that the user can enter reminder notes that they may need when doing dictionary housekeeping. This field is not used by *LogCheck*.

2.8.1 Where are Dictionaries Stored?

The CoalLog version of *LogCheck* includes the Standard CoalLog Dictionary as part of the program and this will be used automatically by the program unless the user has set up their own dictionary. These dictionaries are stored in the folder C:\Program Files (x86)\LogCheck\Dictionaries.

When *LogCheck* is searching for a dictionary for a particular data type it first looks in the directory for that data type within the current project. If it does not exist there, it then searches the directory called Dictionaries sitting in the *LogCheck* data directory. If it does not exist there it then looks for a system dictionary in C:\Program Files (x86)\LogCheck\Dictionaries.

For example, when looking for the geology dictionary for the project AVOCALOG it would look for:

C:\LogData\AVOCA\Geology\Geology Dictionary.dbf

and if the file does not exist there, it would look for:

C:\LogData\Dictionaries\Geology Dictionary.dbf.

and if the file does not exist there, it would look for:

C:\Program Files (x86)\LogCheck\Dictionaries\Geology Dictionary

This search procedure enables the user to have a single Geology (or any other data type) dictionary covering most projects but have a special dictionary for a particular project.

2.8.2 Setting up a Dictionary

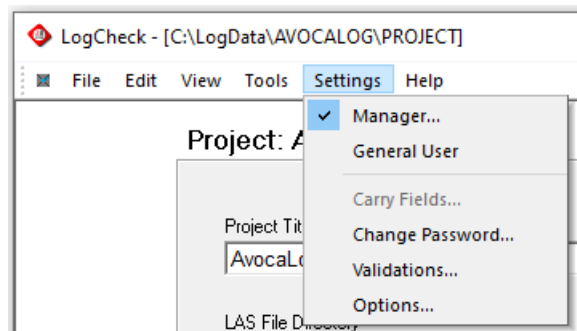
If not using CoalLog and thus not having a default system CoalLog dictionary, the simplest way to get started is to copy a *LogCheck* dictionary from somewhere else – for example, another project, or obtain one from GeoCheck Pty Ltd. Other ways to create a dictionary are described in Chapter 3 of the *LogCheck* User Manual.

2.8.3 Setting up a local Seams Dictionary

Whether using CoalLog or not, a local Seams Dictionary needs to be setup before being Horizons, Seams and Stratigraphic markers can be entered into Geology data. If none has been provided by your system administrator, the easiest way to do this is to copy the file:

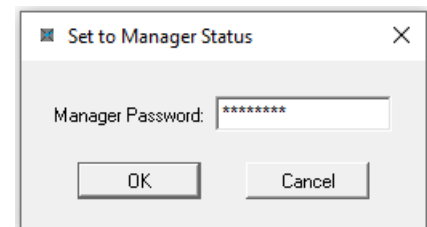
C:\Program Files (x86)\LogCheck\Dictionaries\Example Seams Dictionary.csv

to the Imports folder in the project and then edit it in Excel. Note that for the SEAM category, units must be entered in stratigraphic order. Next the edited dictionary CSV file needs to be imported into *LogCheck*, however, one has to be set to Manager to import or modify a dictionary. To set oneself to Manager, select Settings > Manager from the *LogCheck* menu:

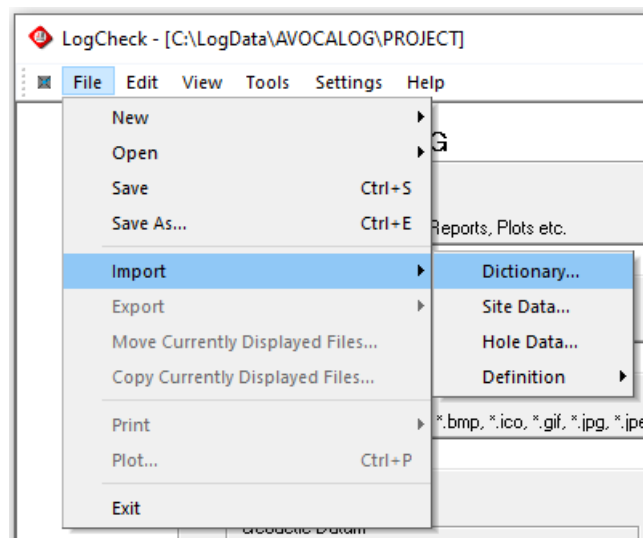


Next you will be prompted for the Manager password:

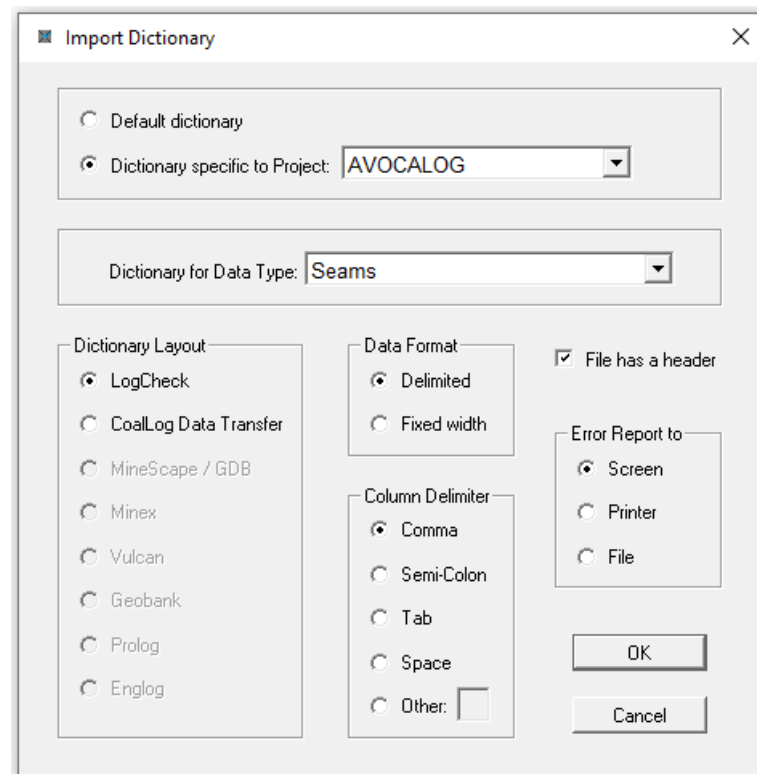
Unless, the Database Administrator has changed this, it will be logcheck (not case-sensitive).



Next, import the edited Seams Dictionary by selecting File > Import > Dictionary:

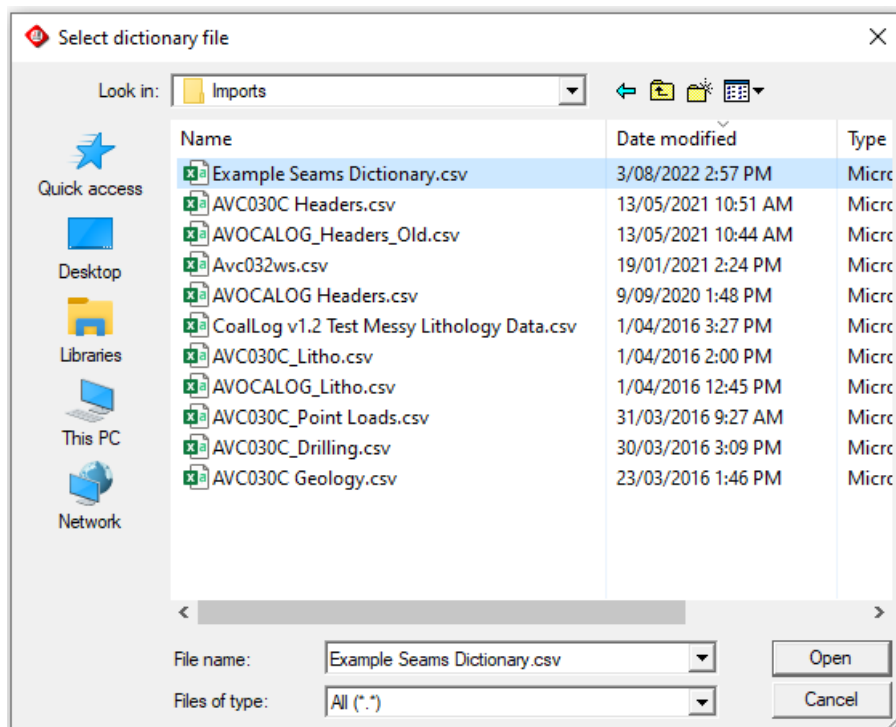


Next, the following window prompts for the Dictionary's details:



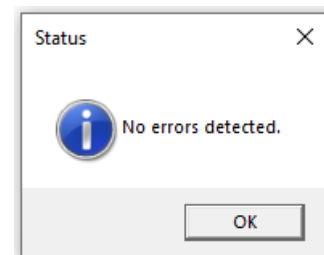
Select the options as shown above, except select your project name instead of AVOCALOG.

Next select your edited CSV file:

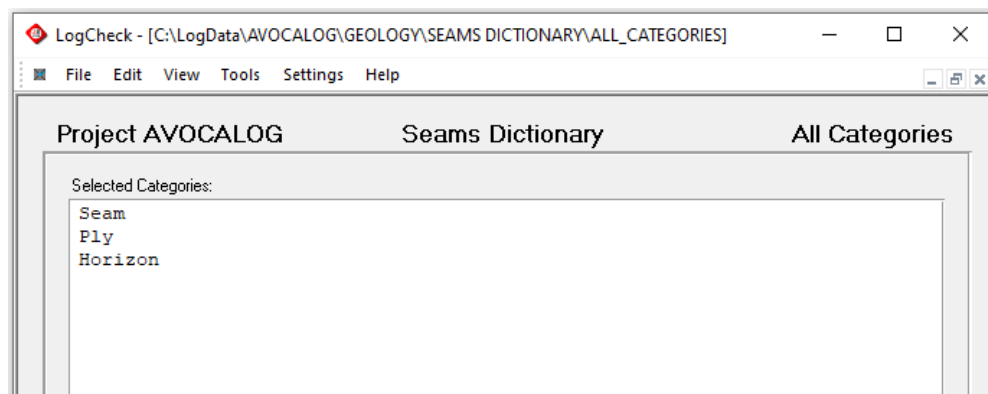


Next select the which columns in the CSV file match which fields in the dictionary:

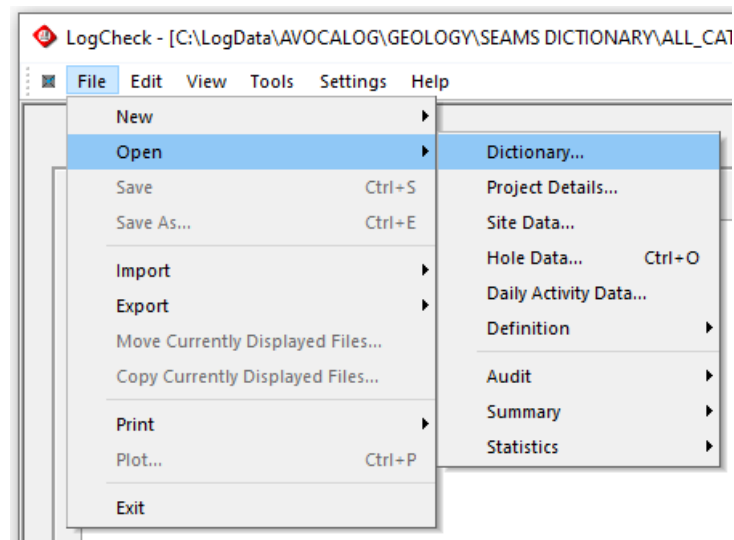
After which it will read the dictionary into *LogCheck* and then display the message:



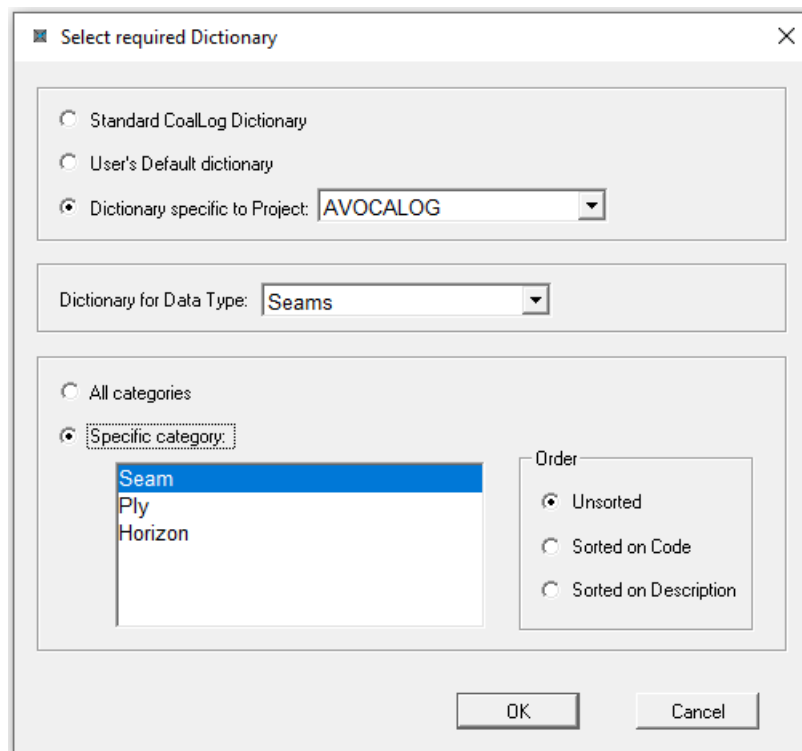
Lastly, *LogCheck* displays the following indicating that currently all the Seam Dictionary and All its Categories is now open:



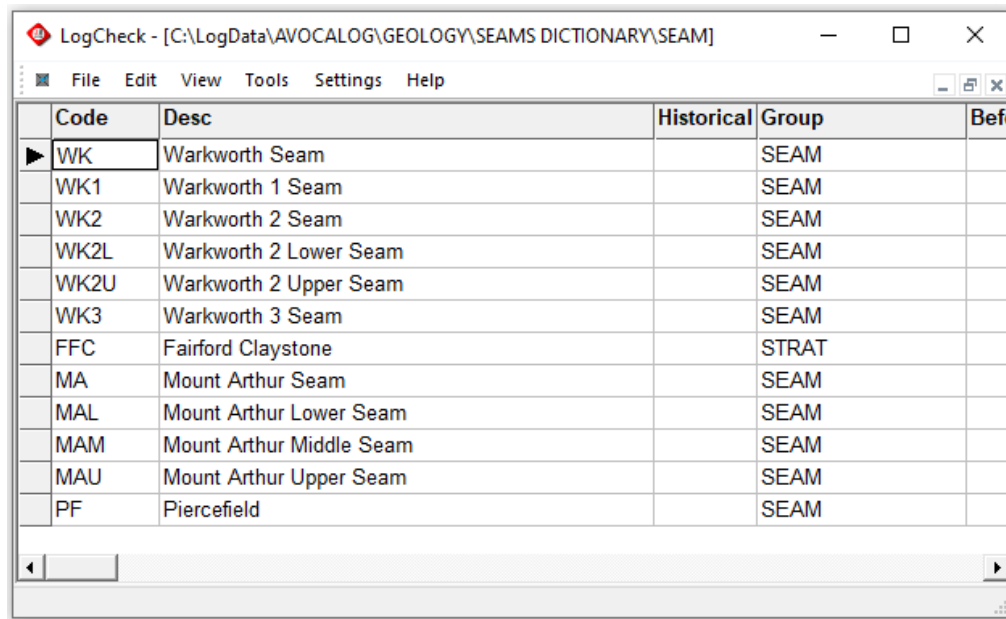
To see the Seams that have been entered, open just the Seam Category of the Seams Dictionary by selecting File > Open > Dictionary:



Next select the following options:



And the current available Seams and Stratigraphic markers are displayed:

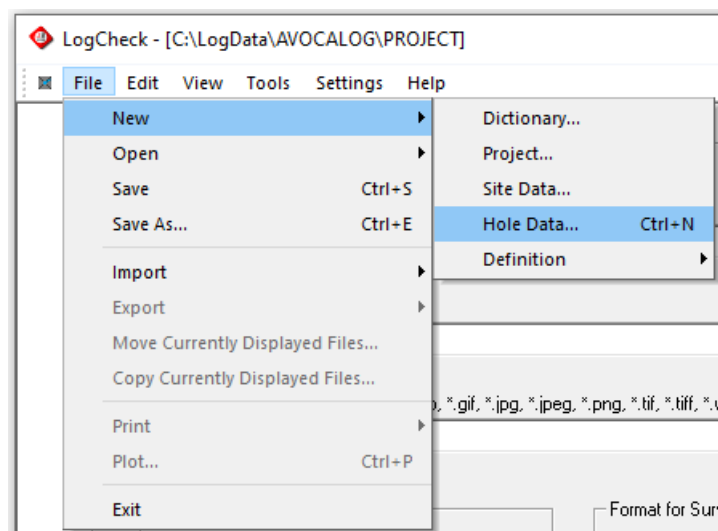


The screenshot shows the LogCheck application window with the title bar 'LogCheck - [C:\LogData\AVOCALOG\GEOLOGY\SEAMS DICTIONARY\SEAM]'. The menu bar includes File, Edit, View, Tools, Settings, and Help. The main area displays a table with the following data:

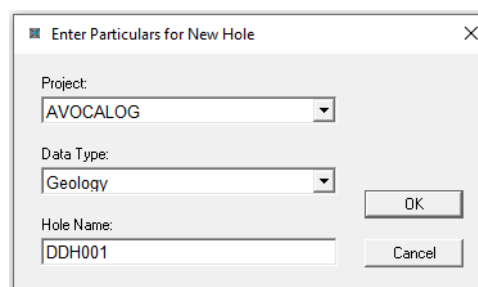
Code	Desc	Historical	Group	Bef
WK	Warkworth Seam		SEAM	
WK1	Warkworth 1 Seam		SEAM	
WK2	Warkworth 2 Seam		SEAM	
WK2L	Warkworth 2 Lower Seam		SEAM	
WK2U	Warkworth 2 Upper Seam		SEAM	
WK3	Warkworth 3 Seam		SEAM	
FFC	Fairford Claystone		STRAT	
MA	Mount Arthur Seam		SEAM	
MAL	Mount Arthur Lower Seam		SEAM	
MAM	Mount Arthur Middle Seam		SEAM	
MAU	Mount Arthur Upper Seam		SEAM	
PF	Piercefield		SEAM	

2.9 Creating New Data for a Hole

Once a dictionary has been created for a particular data type, such data can be entered into *LogCheck*. The first step in this process is to create a new table of this data type for the hole by selecting File > New > Hole Data from the *LogCheck* menu:



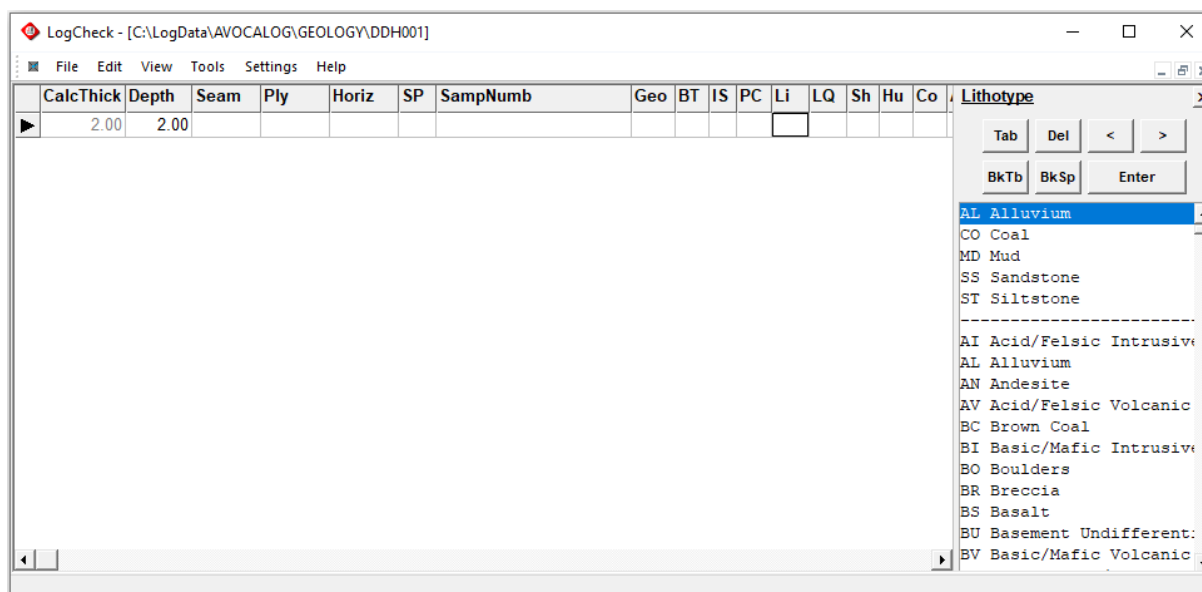
Then the window shown on the right will prompt for the Project, Data Type and the Hole Name for the new hole data.



On clicking OK, *LogCheck* will create the new table in the directory named after the data type and sitting in the project directory. It uses the hole name as its filename with a .DBF extension. Hole names in *LogCheck* are always upper case and cannot contain blanks. Hole names are generally restricted to a maximum of eight characters but can be up to sixteen characters if specifically requested.

In the above example, *LogCheck* creates two files named DDH001.dbf and DDH001.dbt in the folder Geology in the project AVOCALOG. The DBF file will contain the coded data for the hole and the DBT file the comments. If the data type directory Geology does not exist, *LogCheck* creates it.

Following creation of the table, it will then be opened in the *LogCheck* editor, as shown below:



In the above figure, the first depth of 2.00 m has been entered, and the cursor is currently in the Li (Lithotype) column. The Tab key moves the cursor to the next field, or the mouse can be used to select a column. For those data values that have an associated dictionary, the dictionary entries are displayed on the right-hand side of the editor – in this example, Lithotype entries are displayed. Pressing the down-arrow key commences a new row. The *LogCheck* editor is described in more detail in Chapter 7 of the *LogCheck* User Manual.

Hole data can be deleted, renamed or moved to another project or computer by using Windows Explorer. The filenames for a particular hole is the same for all data types, therefore care must be taken when moving files to ensure that they are placed in the correct directory for that data type in the destination project. For example, the geology data for hole DDH001 will be stored in a file named DDH001.dbf, in the Geology folder – the full path is as follows:

C:\LogData\AVOCALOG\Geology\DDH001.dbf

The header data for the same hole has the same name, DDH001.dbf and is stored in a file named DDH001.dbf, in the Headers folder – the full path is as follows:

C:\LogData\AVOCALOG\Headers\DDH001.dbf

It is essential that when deleting, renaming or moving files and whatever action that is performed on a DBF is also performed on the corresponding DBT file else the comments for the hole will be permanently lost.

Chapter 3

Management Tools

By the end of this chapter you will be able to:

- Switch from general user to Manager mode.
- Set the Manager password.
- Understand the three levels at which *LogCheck* validates data.
- Setup optional validations for geologist, drilling, geology, defect and point load data.
- Create a new dictionary from scratch.
- Copy a dictionary into a project.
- Import a dictionary into a project.
- Open a *LogCheck* dictionary in the Editor form.
- Understand the structure of a *LogCheck* dictionary.
- Understand the use of the Group column of a *LogCheck* dictionary.

3.1 Introduction

This chapter describes management tools such as setting validation levels and options, and maintaining the dictionaries for a project. To set validation levels and modify dictionaries, the user needs to first switch to Manager mode.

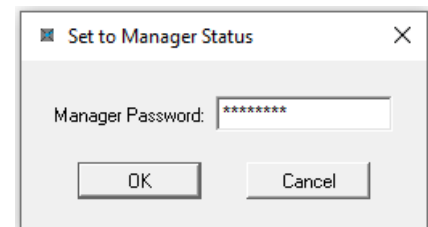
3.2 Manager Option

The Manager option of the Settings menu allows you to switch mode from General User mode to Manager mode. When in Manager mode you have privileges that allow the importing or modification of the dictionary, importing patterns and fills, customising data validations and changing the Manager password.

3.2.1 Switching to Manager Mode

Each time *LogCheck* starts it is in User mode. To change to Manager mode, select Settings > Manager from the *LogCheck* menu. A prompt for the manager password will then appear:

The default manager password is logcheck and is not case sensitive.

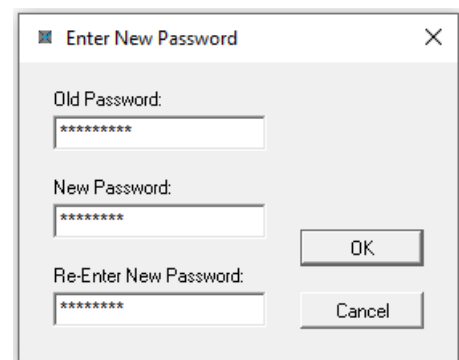


3.2.2 Changing the Manager Password

When in Manager mode the Settings menu displays an additional item, Change Password, that allows you to set a different Manager password.

The Change Password dialog is displayed on the right:

Enter the old password, enter the new password, then re-enter it to confirm that it is the same as in the previous field.



3.3 LogCheck Validation

Validation is a process that verifies that the data and procedures of a system adhere to its rules. Prevention of errors is better than curing them. Validation plays a crucial role in ensuring the accuracy and integrity of all *LogCheck* data.

Data entered into *LogCheck* is undergoes the same validation checks whether the data is imported from files or entered directly via the keyboard. There are three broad categories of validation in *LogCheck*:

1. Validations performed when a cell is modified:
 - Check data satisfies its fundamental type, such as validating that a number has the correct format for a number and that a date has a day, month and year in the correct order.
 - Enforce a minimum or maximum number of characters or digits in a text field. For example, the number of characters in a hole name is up to 8 characters.
 - Check the range of numeric values, for example, that dips are between 0 and 90 degrees.
 - Checking that coded data, such as LithoType, is valid by checking it against a dictionary.
2. Validations performed when the user moves between rows. These include checks that mandatory fields are all specified and checks on fields where the field's valid values depend on the values in one or more other fields on the same row. For example, in headers data that the hole completion date is not before the start date, or for drilling data that the core size is less than the hole size.
3. Validations performed when the user attempts to save their data. These include checks which require comparing fields between rows. For example, checking that each successive base depth is not less than the previous base depth or where two or more lithotypes are specified for a unit, each has a percentage and these add up to 100%.

Most validation checks in *LogCheck* are embedded in the software and cannot be turned off, however, there are a number of checks in categories 2 and 3 above which can be set by the manager.

3.4 User Specified Validation Settings

LogCheck is distributed with a default set of user specified validations settings but if required, a specific set of validations can be setup for each client and included with all copies sent to them.

User specified validation settings can be accessed from the menu by going to Settings > Validations. In order for this menu item to appear, you need to have changed to Manager mode, as it is not available for the General User. There are three levels of validation:

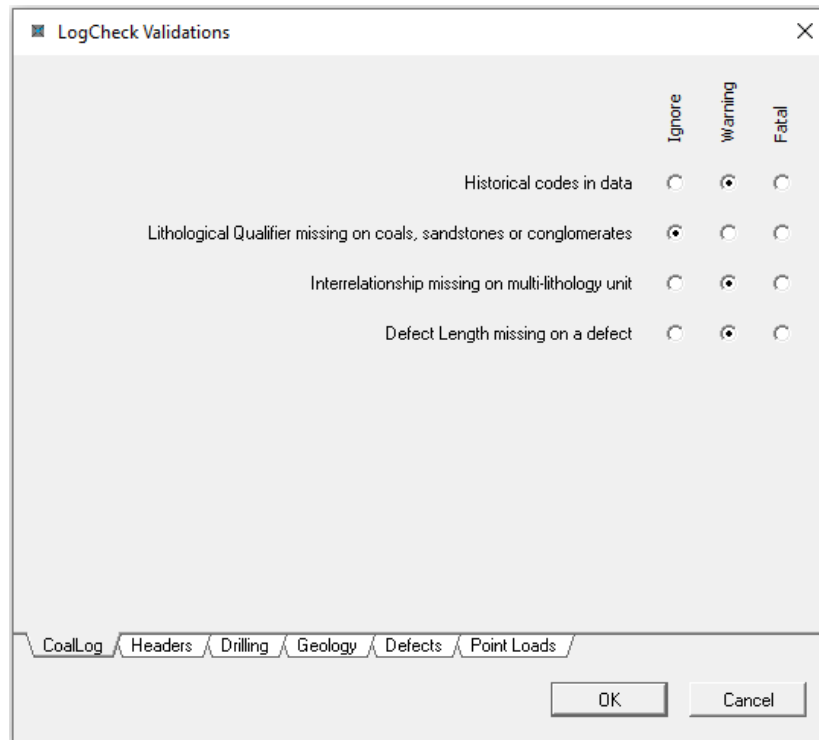
- **Ignore:** No action is taken;
- **Warning:** A warning message is posted – the user can ignore it;
- **Fatal:** An error message is displayed and the current data item cannot be saved;

User-specified validation settings are sub-divided into the categories:

- CoalLog (only included in CoalLog versions of *LogCheck*)
- Headers
- Drilling
- Geology
- Defects
- Point Loads

3.4.1 CoalLog Validation Settings

The user specified validation settings for CoalLog data are:



User specified CoalLog validations include checking for:

- Historical codes in the data. CoalLog has a number of valid codes called Historical Codes that may be used in historical data but should be avoided in currently collected data. These codes are shown in grey in the CoalLog dictionary. For example, for Lith Qualifiers for Coal:

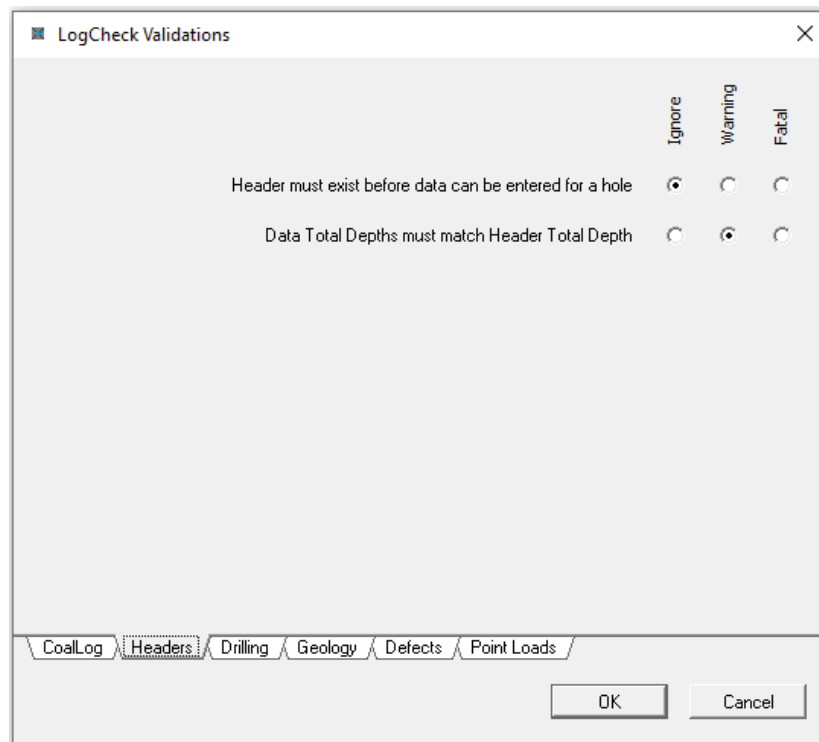
<u>Other Coal</u>	
undifferentiated	CU
heat affected	HA
coked	KC
cindered	CI
fusainous	FU
anthracite	AN
cannel (torbanite, bog)	CT
dull conchoidal	DC
inferior	IF

In this example, going forward cannel coal should be described as sapropelic (SP) and inferior coal should be described as one of Weathered Coal (CW), heat affected (HA) or stony (SY).

- Lithological Qualifier missing on coals, sandstones and conglomerates. It is preferable for all coals, sandstones and conglomerates to have a Lithological Qualifier but this may not be possible on historical data or logs of chips.
- Interrelationship missing on multi-lithology unit. It is preferable that wherever a unit in the Geology data includes more than one LithoType, the relationship between the LithoTypes should be specified but this may not be possible on historical data or logs of chips.
- Defect Length missing on a Defect. It is preferable that the length of core affected by a defect, that is defect length, be recorded for every defect but this may not be possible for historical data.

3.4.2 Header Validation Settings

The user specified validation settings for Headers are:

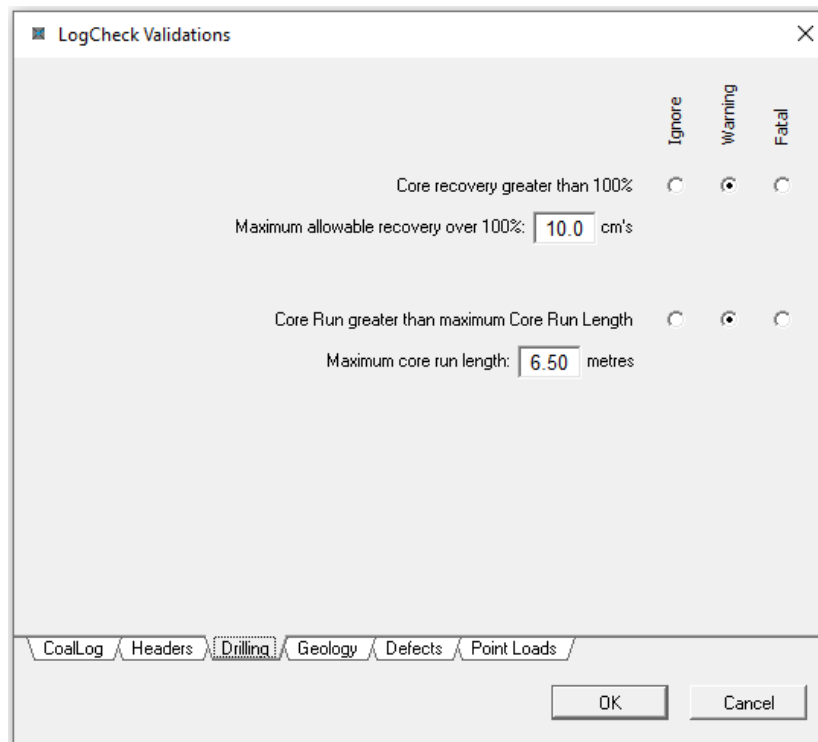


User specified header validations include checking that:

- Header must exist before data can be entered for a hole: for example, header data must be entered for a hole before a Geology table can be created for the hole.
- Data Total Depths must match Header Total Depth: For drilling, geologists, geology and RMU's in the defect data, the last base depth must be equal to the total depth entered in the header. For point load data, the last base depth must be less than or equal to the total depth entered in the header.

3.4.3 Drilling Validation Settings

The user specified validation settings for Drilling are:



The image shows a dialog box titled "LogCheck Validations" with a close button (X) in the top right corner. The dialog contains two validation settings, each with a radio button for severity (Ignore, Warning, Fatal) and a text input for a threshold value.

Setting 1: "Core recovery greater than 100%". The severity is set to "Warning" (radio button selected). The threshold is "10.0 cm's".

Setting 2: "Core Run greater than maximum Core Run Length". The severity is set to "Warning" (radio button selected). The threshold is "6.50 metres".

At the bottom, there is a tabbed interface with tabs for "CoalLog", "Headers", "Drilling" (which is selected), "Geology", "Defects", and "Point Loads". Below the tabs are "OK" and "Cancel" buttons.

User specified drilling validations include checks for:

- Core Recovery Greater than 100%. Generally, this will be set as a warning as setting it to Fatal would not allow for stick-up from the previous run. So that minor stick-up does not generate warnings, it is also possible to specify a Maximum allowable recovery over 100% in cms.
- Core Run greater than maximum Core Run Length. The user also specifies the maximum core run length to be used for the check. This is a useful check to ensure that the user has entered each separate core run.

3.4.4 Geology Validation Settings

The user specified validation settings for Geology are:

	Ignore	Warning	Fatal
Horizon occurs more than once in hole	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Seam occurs more than once in hole	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Seam not in stratigraphic order	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Sample Number used for more than one sample in hole	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Sample Number out of order	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sample Number on Core Loss	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unconsolidated LithoType below BHWE	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

For zero thickness units, lithology must be: ☒ Blank ☐ Non-Blank

Headers Drilling **Geology** Defects Point Loads

OK Cancel

User specified geology validations include checks for:

- Horizon occurs more than once in hole: generally you would expect horizons such as Base of Weathering or Base of Tertiary to only occur once in a hole;
- Seam occurs more than once in hole: a seam should only occur once in a hole, but it should generally be a warning rather than fatal, as seams may be repeated if there is reverse faulting in a hole;
- Seam not in stratigraphic order: to perform this validation, *LogCheck* looks at the sequence of seams as they exist in the Seam dictionary. Again, this should generally be a warning rather than fatal, as seams may be out of order if there is reverse faulting in the hole;
- Sample Number used for more than one sample in hole: a sample number should be only used for one contiguous set of units in a hole.

Examples of this type of error are:

- a) It appears that 1001 has been used for more than one sample but is probably the result of mis-keying 1001 as 101.

CO	1001
CO	101
CO	1001

- b) In this example, there are gaps in the sampling, but non-contiguous samples are given the same sample number. This situation may exist in historical data but is usually an error.

CO	1001
XM	
CO	1001

- Sample Number out of order: normally this will not be an error, but at some sites where sample books are used, this could denote a mis-keying.

sites

- Sample Number on Core Loss: there are two approaches here:

- a) some companies specify that a core loss should indicate a boundary between samples and thus does not have a sample number, in which case this should be set to Fatal.

CO	1001
KL	
CO	1002

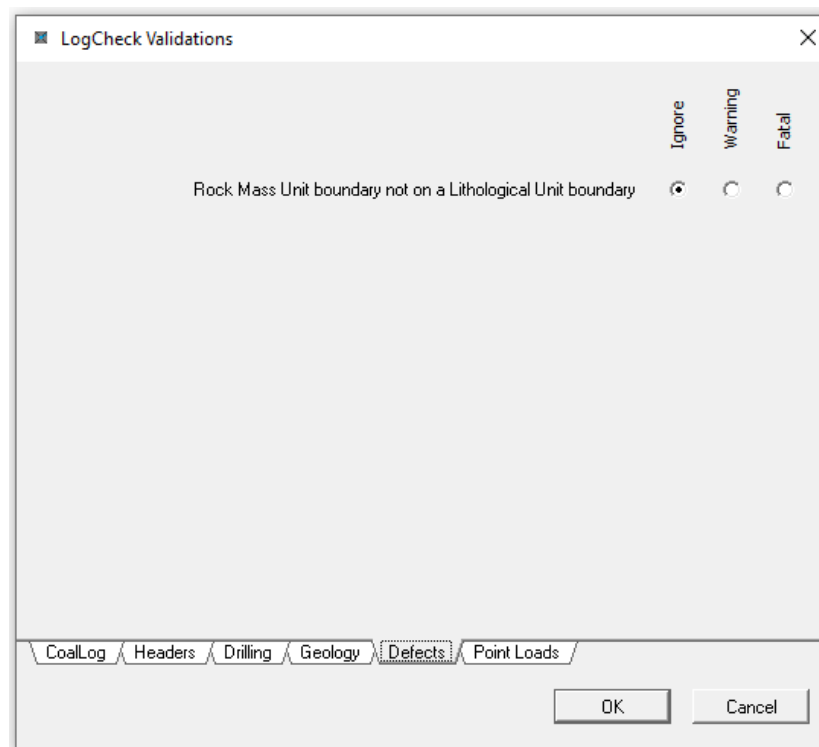
- b) whereas companies continue a sample number across a core loss in which case this test should be set to Ignore.

CO	1001
KL	1001
CO	1001

CoalLog does not allow zero thickness units but for all other version of *LogCheck* zero thickness units are used for horizons. However, various modelling packages have different conventions for LithoTypes on zero thickness units. In particular, Minescape does not accept data with LithoTypes on zero thickness units whereas Vulcan does not accept data without LithoTypes on zero thickness units. Therefore, in non-CoalLog versions of *LogCheck* there is an additional validation setting that is whether for zero thickness units whether LithoType must be blank or non-blank. Data not meeting this set criteria is not accepted into *LogCheck*.

3.4.5 Defects Validation Settings

The user specified validation settings for Defects are:



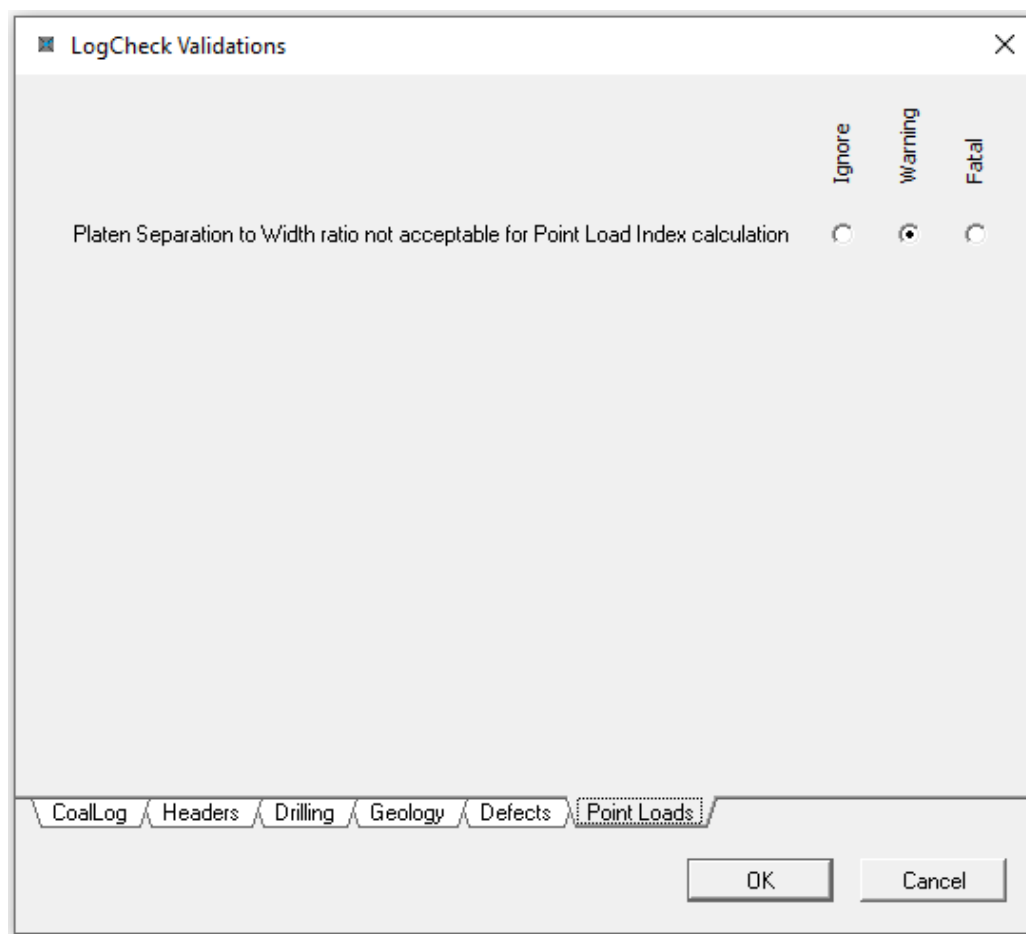
Rock Mass Unit boundary not on a Lithological Unit boundary. A rock mass unit (RMU) is not the same as a lithological unit. A RMU is a unit or set of units with a common set of geotechnical characteristics (strength, weathering, degree of fractures, plasticity, etc). The general convention is that

an RMU may contain multiple lithologies but a lithology may not contain multiple RMUs. In the rare case where a lithology unit does contain multiple RMUs then it should be broken up into separate lithology units. Therefore, all RMU boundaries should align to Lithology Unit Boundaries.

This check can also be used to try and ascertain if when the geology data for a hole was adjusted to the geophysics whether the defects data was also adjusted. If it has not been there will generally be numerous mismatches between the boundary depths. These will be indicated if this check is set to Warning or Fatal and the defect data rechecked by selecting Tools > Validate from the *LogCheck* menu.

3.4.6 Point Load Validation Settings

The user specified validation settings for Point Loads are:



Point Loads are generally collected in order to calculate a Point Load Index for each sample. However, there are only measurements where the Platen Separation to Width ratio lies within a specified range. This validation checks that the Point Load data entered will be able to be used for calculating a Point Load Index.

3.5 *LogCheck* Dictionaries

A dictionary consists of a set of user-defined codes and their descriptions that are used to validate entry of drill hole data into *LogCheck*. This chapter describes three ways to create a dictionary, the data format used in a dictionary and the dictionary file structure. Editing a dictionary is briefly described here and in more detail in Chapter 7.

A dictionary is required for each hole data type that contains coded data, that is all data types except Activities, Geologists, Rehab and UCS which do not have any coded fields.

CoalLog versions of *LogCheck* already have the standard CoalLog dictionaries embedded in the program. Other versions will require the user to create or obtain dictionaries before they can enter data into *LogCheck*.

However, whether using a CoalLog version or not, it is necessary to set up a Seams Dictionary with codes for local Horizons, Seams, Stratigraphic markers and Plies before these can be entered into Geology data. Instructions for setting this up can be found in Chapter 2 in the section 2.8.2 Setting up a local Seams Dictionary.

3.6 Dictionary Structure

Each dictionary consists of two files with names of the form:

- *Data Type* Dictionary.dbf
- *Data Type* Dictionary.mdx.

For example, the geology dictionary files will be called:

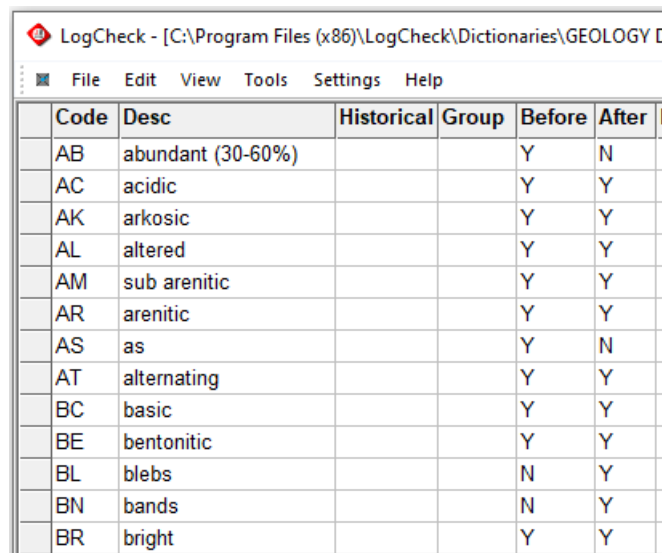
- Geology Dictionary.dbf a dictionary of the categories, their codes and descriptions;
- Geology Dictionary.mdx an index into the dictionary of code names.

The following example shows the first few lines of the LithoType category of a Geology dictionary:

Code	Desc	Historical	Group	Before	After	Pattern	Pattern2	Colour	Fill	FillColour	BgColour	Comments
AI	Acid/Felsic Intrusive					IN3		241			241	
AL	Alluvium					AL3		51			51	
AN	Andesite					VR3		140			140	
AV	Acid/Felsic Volcanic					VR2		140			140	
BC	Brown Coal								BC			
BI	Basic/Mafic Intrusive					IN5		241			241	
BO	Boulders					BO1		40			40	
BR	Breccia					BR3		40			40	
BS	Basalt					VR4		140			140	
BU	Basement Undifferentiated					BU1	MM1	6			6	
BV	Basic/Mafic Volcanic					VR4		140			140	
BW	Burnt Wood / Charcoal					FW1			COCI			
CA	Calcite					CA1		131			131	
CB	Carbonate					LS3		131			131	
CC	Calcrete					CR1	C1	131			131	
CG	Conglomerate					CGPP		40			40	
CH	Chert					CH1		32			32	
CK	Chalk					CK1		131			131	
CL	Clay					CL1		254			254	
CO	Coal		COAL						CO			
CS	Claystone					CS1		254			254	
CV	Colluvium					CV		40			40	

LogCheck dictionaries contain the following columns:

- **Code:** Used by the geologist when entering data;
- **Desc:** The full description that the code represents. This is what will appear for the code in reports, and in plots where descriptions are being displayed;
- **Historical** A flag used with CoalLog data, a Y indicates an item that may only be used in historical data not current data;
- **Group:** Is used to group certain dictionary entries. It is used in various parts of *LogCheck*, and is discussed in more detail in the following section;
- **Before:** A Y in this field indicates that when the entry appears in a full English description a comma should be included before the word. For example, as shown in the Lithological Adjectives dictionary on the next page, there is an N instead of a Y in the Before column of entries for blebs and bands as, in general, the words blebs and bands will probably be proceeded by another adjective such as sandy;



Code	Desc	Historical	Group	Before	After
AB	abundant (30-60%)			Y	N
AC	acidic			Y	Y
AK	arkosic			Y	Y
AL	altered			Y	Y
AM	sub arenitic			Y	Y
AR	arenitic			Y	Y
AS	as			Y	N
AT	alternating			Y	Y
BC	basic			Y	Y
BE	bentonitic			Y	Y
BL	blebs			N	Y
BN	bands			N	Y
BR	bright			Y	Y

- After:** A Y in this field indicates that when the entry appears in a full English description a comma should be included after the word. For example, in the Lithological Adjectives dictionary above there is an N instead of a Y in the After column of *abundant* and *as*, because generally the words *abundant* and *as* will probably be followed by other qualifiers such as fractures.

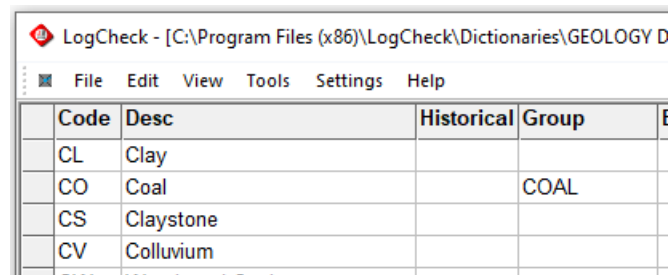
 When there are two qualifiers together, if the value for After for the first is different to the Before value of the second, then the N takes precedence.
- Pattern:** The primary pattern that will be used for plotting (see Appendix B for a full list of standard patterns).
- Pattern2:** The secondary pattern for plotting – if specified, it is combined with the primary pattern (see Appendix B for a full list);
- Colour:** This can contain a number between 1 and 255 which represents an AutoCAD colour number (see Appendix A for a full list of AutoCAD colours). For example, in the LithoType dictionary shown on the previous page Acid/Felsic Intrusive has its Colour set to 241 (dull purple) and can be plotted in this colour when it appears in a *LogCheck* downhole plot;
- Fill:** The type of fill that will be used for plotting (see Appendix C for a full list of standard fills);
- FillColour:** An AutoCAD colour number for colouring the fill (see Appendix A);
- BgColour:** An AutoCAD colour number for colouring the background (see Appendix A);
- Comments:** This is not used by *LogCheck*. It is provided so that the user can enter reminder notes that they may need when doing dictionary housekeeping.

3.7 The Dictionary Group Column

The Group column is used by *LogCheck*'s audits, summaries and statistical tools. For most dictionary categories it is not required, however it is required in the following circumstances:

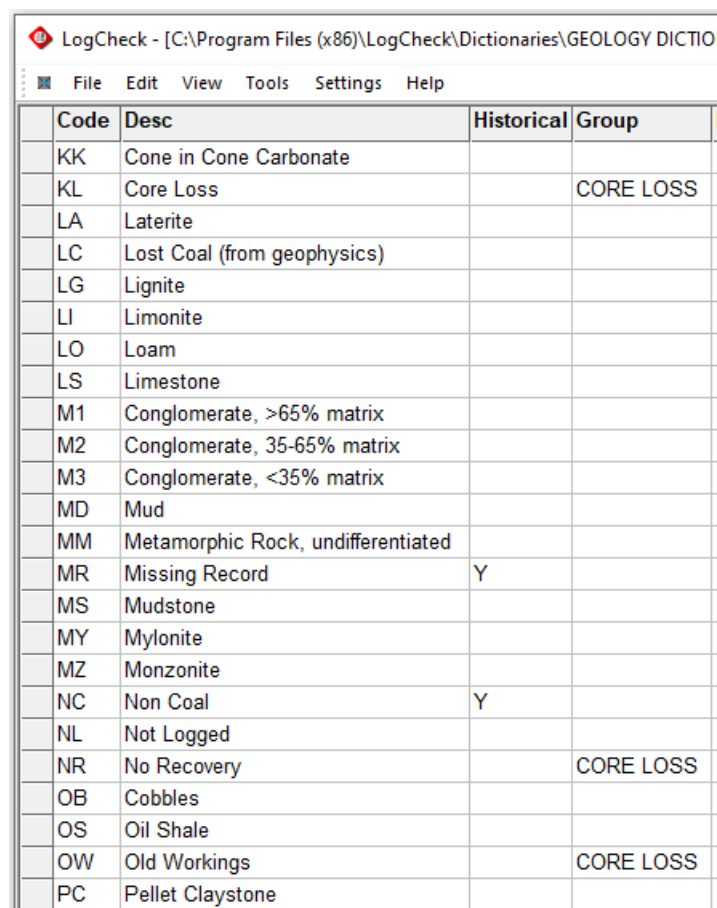
3.7.1 Geology Dictionary - LithoType Category Groups

The Group column of the LithoType dictionary category in the Geology dictionary needs COAL against any LithoTypes that are to be considered as coal in summaries:



Code	Desc	Historical	Group
CL	Clay		
CO	Coal		COAL
CS	Claystone		
CV	Colluvium		

and CORE LOSS against any core losses:

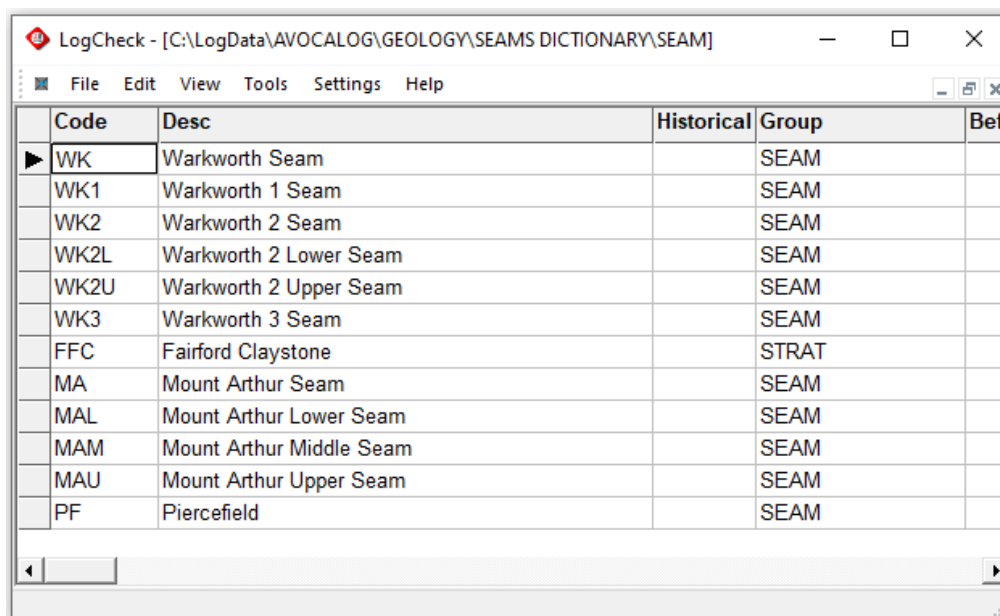


Code	Desc	Historical	Group
KK	Cone in Cone Carbonate		
KL	Core Loss		CORE LOSS
LA	Laterite		
LC	Lost Coal (from geophysics)		
LG	Lignite		
LI	Limonite		
LO	Loam		
LS	Limestone		
M1	Conglomerate, >65% matrix		
M2	Conglomerate, 35-65% matrix		
M3	Conglomerate, <35% matrix		
MD	Mud		
MM	Metamorphic Rock, undifferentiated		
MR	Missing Record	Y	
MS	Mudstone		
MY	Mylonite		
MZ	Monzonite		
NC	Non Coal	Y	
NL	Not Logged		
NR	No Recovery		CORE LOSS
OB	Cobbles		
OS	Oil Shale		
OW	Old Workings		CORE LOSS
PC	Pellet Claystone		

These groupings enable *LogCheck* to calculate in its summaries amount of coal in a sample or seam and the percentage recovery within a sample or seam.

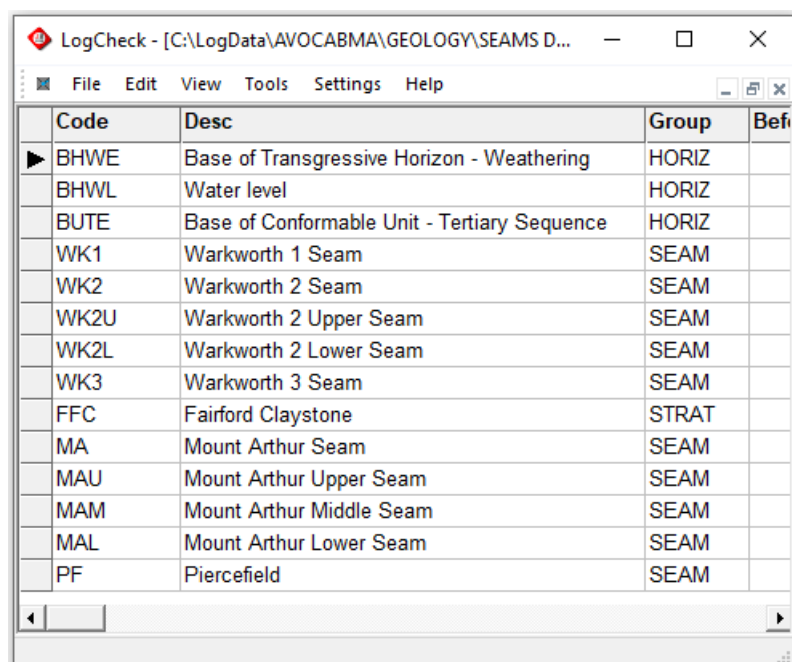
3.7.2 Seams Dictionary - Seam Category Groups

Group is required for all items in the Seam Category of the Seams Dictionary so that seam summaries and audits can distinguish Seams from Stratigraphic markers. The Group column must have a value of SEAM or STRAT.



Code	Desc	Historical	Group	Befa
Wk	Warkworth Seam		SEAM	
WK1	Warkworth 1 Seam		SEAM	
WK2	Warkworth 2 Seam		SEAM	
WK2L	Warkworth 2 Lower Seam		SEAM	
WK2U	Warkworth 2 Upper Seam		SEAM	
WK3	Warkworth 3 Seam		SEAM	
FFC	Fairford Claystone		STRAT	
MA	Mount Arthur Seam		SEAM	
MAL	Mount Arthur Lower Seam		SEAM	
MAM	Mount Arthur Middle Seam		SEAM	
MAU	Mount Arthur Upper Seam		SEAM	
PF	Piercefield		SEAM	

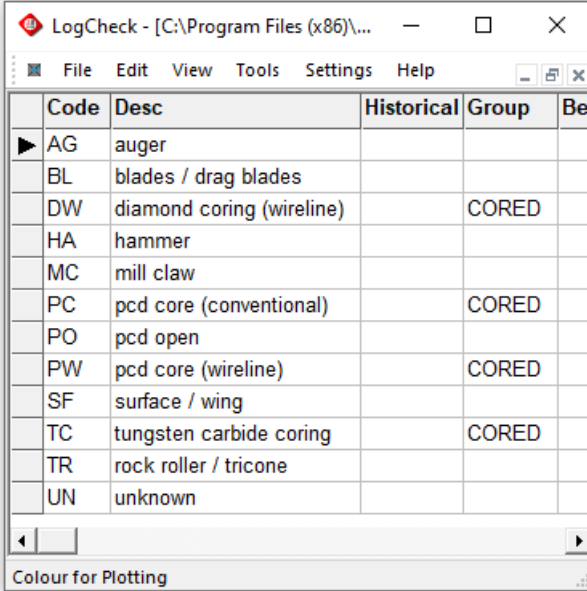
In *LogCheck* versions other than the CoalLog and Anglo Coal versions, horizons are also stored in the Seam column and these need to have their Group set to **HORIZ**:



Code	Desc	Group	Befa
BHWE	Base of Transgressive Horizon - Weathering	HORIZ	
BHWL	Water level	HORIZ	
BUTE	Base of Conformable Unit - Tertiary Sequence	HORIZ	
WK1	Warkworth 1 Seam	SEAM	
WK2	Warkworth 2 Seam	SEAM	
WK2U	Warkworth 2 Upper Seam	SEAM	
WK2L	Warkworth 2 Lower Seam	SEAM	
WK3	Warkworth 3 Seam	SEAM	
FFC	Fairford Claystone	STRAT	
MA	Mount Arthur Seam	SEAM	
MAU	Mount Arthur Upper Seam	SEAM	
MAM	Mount Arthur Middle Seam	SEAM	
MAL	Mount Arthur Lower Seam	SEAM	
PF	Piercefield	SEAM	

3.7.3 Drilling Dictionary – Bit Type Category Groups

The Bit Type category of the Drilling Dictionary needs CORED against any Bit Types that produce core rather than chips. This enables *LogCheck* to know which parts of a hole have been cored and which have not for calculating Percentage Recovery for seam and sample summaries. An example of Groups in the Bit Type Category:



The screenshot shows the LogCheck application window with a menu bar (File, Edit, View, Tools, Settings, Help) and a table of Bit Type Category Groups. The table has five columns: Code, Desc, Historical, Group, and Be. The rows list various drilling bit types, with some marked as 'CORED' in the Group column. A 'Colour for Plotting' bar is visible at the bottom of the window.

Code	Desc	Historical	Group	Be
AG	auger			
BL	blades / drag blades			
DW	diamond coring (wireline)		CORED	
HA	hammer			
MC	mill claw			
PC	pcd core (conventional)		CORED	
PO	pcd open			
PW	pcd core (wireline)		CORED	
SF	surface / wing			
TC	tungsten carbide coring		CORED	
TR	rock roller / tricone			
UN	unknown			

3.8 Creating a Dictionary

In *LogCheck*, a dictionary is a list of codes and their descriptions. The location of dictionaries is described in Chapter 11.

A dictionary can be generated in three ways:

- Creating from scratch
- Copying dictionary files from another project
- Importing a dictionary from a CSV file

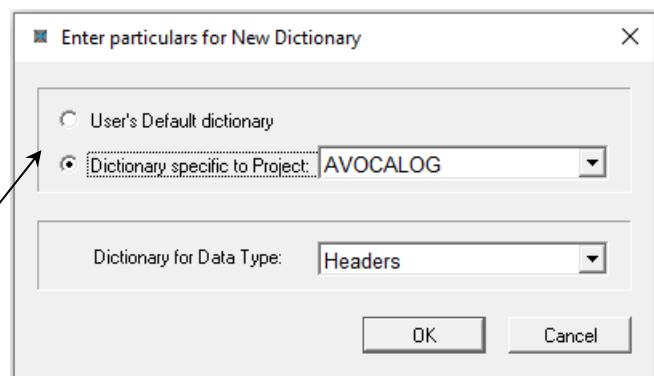
You need to be in Manager mode to create or edit dictionaries – see Section 3.2.1 of this chapter for how to set to Manager mode.

LogCheck also automatically creates a dictionary for LAS files in the folder *LasWork*. This dictionary contains a list of all the variable names and units used in the project's LAS files. This dictionary can be viewed but not modified.

3.8.1 Creating a Dictionary from Scratch

Dictionaries are rarely created from scratch but to create one from scratch select File > New > Dictionary from the *LogCheck* menu. The prompt to the right will then appear. Note that the Dictionary menu item only appears on the File > New menu if the user is in Manager mode.

Choose between a default dictionary, or one specific to a project



In this window, you choose between a User Default dictionary, or one that is specific to a project. User Default dictionaries are available for many projects whereas dictionary specific to project should be used for codes that will only be used in one project, for example a Seam Dictionary.

On selecting the Project and Data Type, and then clicking OK, the new current data set in *LogCheck* will be the entire dictionary for the selected data type, that is all categories. However, being a new dictionary, there will be nothing in any of the categories. To enter dictionary data, open each category in turn by selecting File > Open > Dictionary... from the *LogCheck* menu.

Be aware, it has been known for users to have a default dictionary and then to accidentally create a new project dictionary with nothing in it. They are then mystified as to why their dictionary, that is the default dictionary, has “disappeared”.

3.8.2 Copying Dictionary Files

A dictionary file can be created by copying the dictionary files *Data Type Dictionary.dbf* and *Data Type Dictionary.mdx* from another computer or project. Copying dictionaries is the most common way to obtain dictionaries.

Project-specific dictionary files must be copied to their corresponding data folder for the project. For example, a Geology dictionary must be copied to the Geology folder. The file locations for

dictionaries are described in detail in Chapter 11. An example Geology dictionary specific to the AVOCALOG project would consist of the following two files:

C:\LogData\AVOCALOG\Geology\Geology Dictionary.dbf

C:\LogData\AVOCALOG\Geology\Geology Dictionary.mdx

Default dictionaries should be copied to the Dictionaries folder in the *LogCheck* data folder, usually C:\LogData\Dictionaries.

3.8.3 Importing a Dictionary from a text File

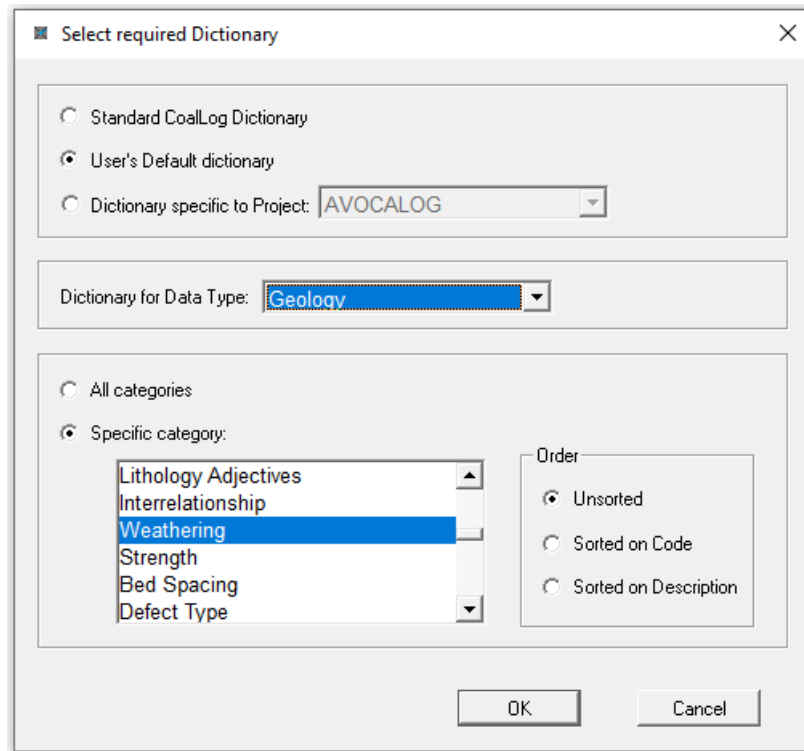
The most common way of creating dictionaries is from CSV files. There are a number of other text formats than can be used to create dictionaries, such as from a TXT file or a Minescape/GDB dictionary. For further information regarding using these other text formats contact the *LogCheck* distributors.

A dictionary in CSV format that is to be imported must contain the columns Category, Code and Description. The category column contains a set six-character name for each category in the dictionary. A list of these category names for each data type for each data format can be obtained from the *LogCheck* distributors.

The Seams Dictionary is the most common dictionary that users need to import. The steps for importing a Seams Dictionary CSV file can be found in Section 2.8.3: Setting up a local Seams Dictionary in Chapter 2 of this manual. The steps for importing dictionaries for other data types are similar.

3.9 Viewing or Modifying a Dictionary

To open a dictionary to view or modify, select File > Open > Dictionary from the *LogCheck* menu. The following window will then be displayed:



To edit rather than just view the dictionary, you need to be in Manager mode, see Section 3.2.1 Setting to Manager Mode. If in General User mode the dictionary is displayed in ReadOnly mode which is indicated by all the entries being shown in grey rather than black.

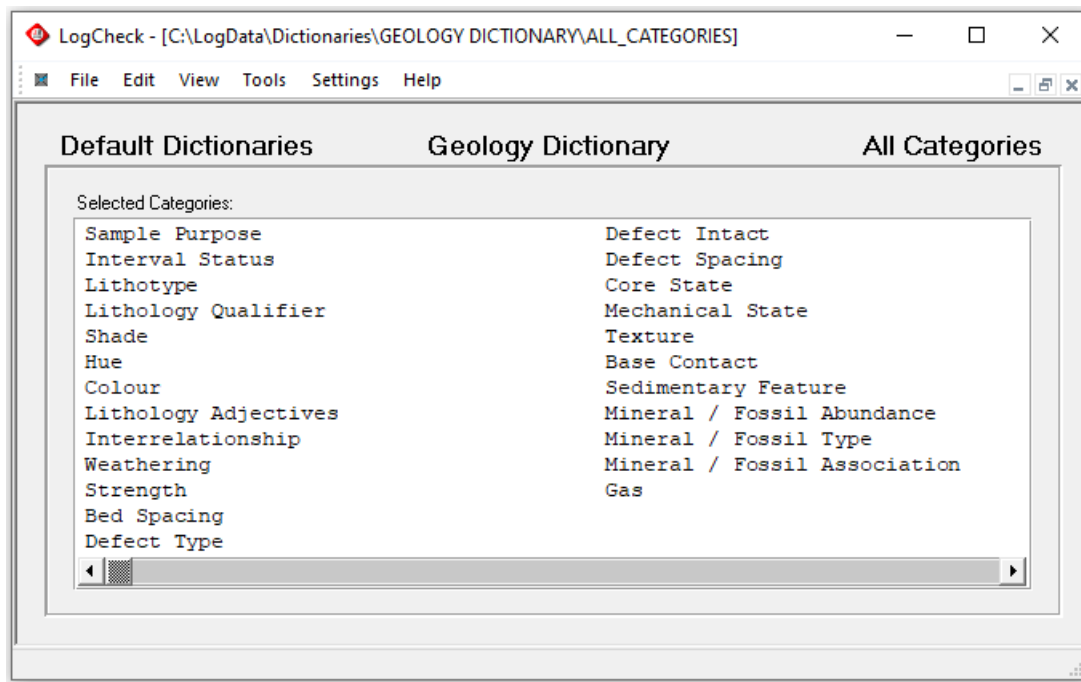
The first panel in the above window offers the following options:

- **Standard CoalLog Dictionary:** the standard dictionary that comes with *LogCheck*. Once open this dictionary can be modified but cannot be saved back over the Standard Dictionary, instead use Save As to save it as a User's Default Dictionary or a Dictionary specific to a Project.
- **User's Default Dictionary:** the default dictionary to be used by any of a User's projects that do not have a Dictionary specific to Project for the selected Data Type.
- **Dictionary specific to Project:** dictionary for use just by a specific project.

The Data Type whose dictionary is required is selected from the Data Type drop-down box. This box will only contain Data Types for dictionaries that currently exist on the user's computer at the level selected in the previous panel. For example, if User's Default Dictionary has been selected and no Geology Dictionary exists amongst the User's Default Dictionaries then Geology will not appear as an option even though there is a Geology dictionary amongst the Standard CoalLog Dictionaries and also in some projects.

In the final panel, usually *Specific category* will be chosen. However, *All categories* should be selected when one wants to export or print a copy of the entire dictionary.

After selecting All Categories, then names of all the categories in the dictionary will be displayed on the screen:



If Specific Category is selected then one must then select the category and the order to display the dictionary entries. There are three choices for order:

- 1) Unsorted: the items will be displayed in the order that they were entered into the dictionary. For some categories this may well just be a random order but for the Seams category in the Seams Dictionary it will be stratigraphic order and for the Weathering category in the Geology Dictionary it is in the order of decreasing weathering.
- 2) Sorted on Code: the items will be displayed in alphabetic order of their codes.
- 3) Sorted on Description: the items will be displayed in alphabetic order of the descriptions.

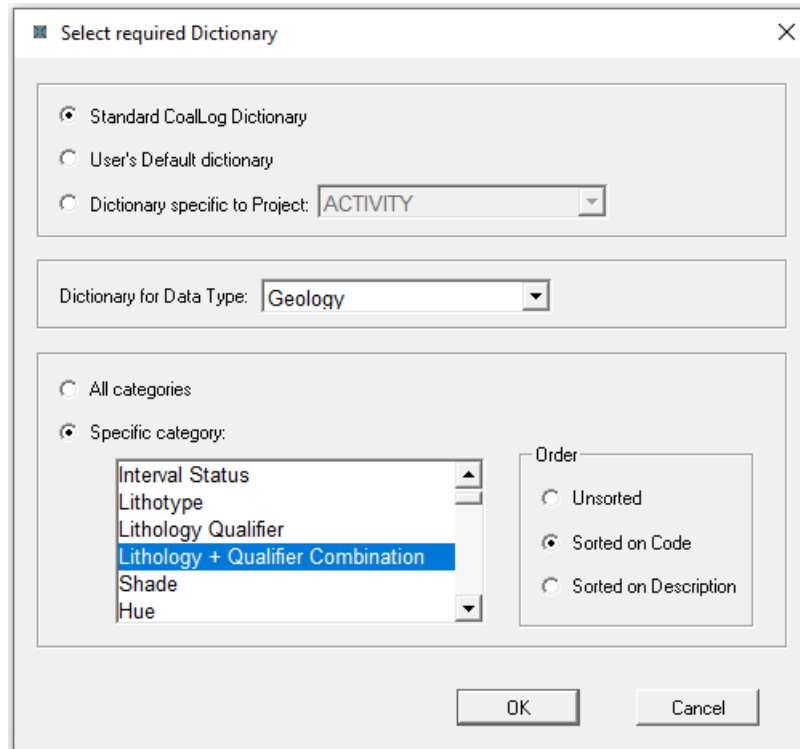
The following example shows the Weathering Category in the Geology Dictionary:

Unsorted			Sorted on Code		
	Code	Desc		Code	Desc
►	R	residual soil	►	D	distinctly weathered
	E	extremely weathered		E	extremely weathered
	H	highly weathered		F	fresh
	D	distinctly weathered		H	highly weathered
	M	moderately weathered		M	moderately weathered
	S	slightly weathered		R	residual soil
	W	weathered		S	slightly weathered
	F	fresh		W	weathered

If the category is opened in sorted mode then one can enter additional entries at the bottom of the list and then when one moves to the next row they will be moved to their correct position in the list.

3.10 CoalLog Geology Dictionary – Lithological Qualifiers

In the CoalLog version of *LogCheck*, there are Lithotype and Lithology Qualifier categories. Lithotype is a broader term, for example, coal. Its detailed characteristics are specified by Lithology Qualifier codes. According to CoalLog, each Lithology Qualifiers can only be used for particular Lithotypes, for example, brightnesses can only be used for coals and clast sizes to conglomerates and alluvium. To cater for this, the Geology Dictionary for the CoalLog version of *LogCheck* has an additional category called Lithotype + Qualifier Combination which specifies all the valid combinations:



The patterns and fills for the combinations are also defined in this dictionary category:

Code	Desc	Historical	Group	Before	After	Pattern	Pattern2	Colour	Fill	FillColour	BgColour
CGPO	Conglomerate, pebbly to cobbly					CGPU		40			40
CGPP	Conglomerate, pebbly					CGPP		40			40
CGPU	Conglomerate, pebbly to bouldery					CGPU		40			40
CGUU	Conglomerate, bouldery					CGUU		40			40
CLGV	Clay, gravelly					CL1	GV2	254			254
CLSA	Clay, sandy					CL1	SA2	254			254
CLSI	Clay, silty					CL1	SI2	254			254
COAN	Coal, anthracite								COAN		
COBB	Coal, bright with dull bands (60-90%)								C2		
COBD	Coal, Interbanded dull and bright (40-60%)								C3		
COBR	Coal, bright (>90% bright coal)								CO		
COCI	Coal, cindered								COCI		
COCT	Coal, cannel (torbanite, bog)								COSP		
COCU	Coal, undifferentiated								CU		
CODB	Coal, dull with frequent bright bands (10-40%)								C4		

Chapter 4

Project Details

By the end of this chapter you will be able to:

- Enter the project details data.
- Specify the LAS file directory for a project.
- Specify the datum and format of survey coordinates for a project.
- Specify the project limits.
- Specify the depth units for a project.
- Specify the UCS calculation parameters for a project.

4.1 Introduction

Once a project is created the Project Details for the project becomes the current data set. The project data consists of the following entities:

- Project Title
- Optional LAS (geophysical logs) File Directory
- Optional Company Logo
- Current Geodetic Datum
- Survey Coordinates Format
- Depth Units for editing Data
- Project Limits
- UCS (Uniaxial Compressive Strength) formula for the project.

An example of the Project Details for an example project named Avoca:

The screenshot shows the LogCheck application window with the title bar 'LogCheck - [C:\LogData\AVOCA\PROJECT]'. The menu bar includes File, Edit, View, Tools, Settings, and Help. The main content area is titled 'Project: AVOCA' and contains the following fields and options:

- Project Title for printing on Reports, Plots etc.:** A text box containing 'Avoca CoaLog'.
- LAS File Directory:** A text box containing 'C:\Las Files' with a 'Browse' button.
- Project Company Logo { *.bmp, *.ico, *.gif, *.jpg, *.jpeg, *.png, *.tif, *.tiff, *.wmf}:** A text box containing 'C:\Logos\Avoca Mining Logo.jpg' with a 'Browse' button.
- Geodetic Datum:** A group box with four radio buttons:
 - ☒ AGD84 as used for AMG84 coordinates
 - ☐ GDA94 as used for MGA94 coordinates
 - ☐ GDA2020 as used for MGA2020 coordinates
 - ☐ WGS84 as used in Indonesia
- Format for Survey Coordinates:** A group box with three radio buttons:
 - ☒ Grid
 - ☐ Longitude/Latitude (decimal degrees)
 - ☐ Longitude/Latitude (deg/min/sec)
- Depth Units for editing Hole Data:** A group box with three radio buttons:
 - ☒ Metres
 - ☐ Decimal Feet
 - ☐ Feet and Inches
- Project Limits:** A table with columns for Zone, Easting (AMG84), Northing (AMG84), and Elevation.

	Zone	Easting (AMG84)	Northing (AMG84)	Elevation
Minimum	55	640000.00	7340000.00	175.00
Maximum	55	646000.00	7346000.00	225.00
- UCS from Sonic Transit Time Relationship:** A section containing the formula:

$$UCS = 1352.0000 \times e^{-0.01250 \times t}$$

where UCS = Uniaxial Compressive Strength in MPa
t = sonic transit time in μ s/m

4.2 Project Title

The title for printing on reports, plots etc. The Project Title can contain blanks and can be of any length. The Project Title is provided because the Project Name as used by LogCheck can only be a

maximum of eight characters and cannot contain any blanks. This field enables the user to provide a more meaningful title than that provided by the Project Name.

4.3 LAS File Directory

LogCheck requires all downhole geophysical logs to be in LAS V1.2 or LAS V2.0 format. The LAS format was developed by the Canadian Well Logging Society. More information regarding the LAS format can be found on its website at <https://www.cwls.org/products/#products-las>.

LogCheck enforces a strict discipline on the location and naming of all its data files except LAS files which may reside anywhere on the user's computer or network. As LAS data tends to occupy large amounts of disk space and may be accessed by a number of applications, the user is able to specify a separate location for it so as to reduce the need for multiple copies of the data, copying the data and/or holding it permanently on their hard drive.

When *LogCheck* is looking for LAS data it searches the directory specified in the Project Details and all lower directories off this directory. This field can be left blank, in which case *LogCheck* will search the LAS directory under the project folder and again all lower directories off this directory. The only restriction is that the chain of lower directories and the filename must not contain more than 100 characters. Be aware though, that the directories should not contain more than one set of readings for any particular geophysical variable at a particular reading interval, over the same depth interval for each hole.

4.4 Project Company Logo

LogCheck includes a company logo in the top left-hand corner of all printed reports including those printed to a PDF file generator. The logo used is whatever image file is specified in this field. Specified image files can be a BMP, ICO, GIF, JPG, PNG, TIF or WMF file. If no image file is specified then the GeoCheck logo will appear in top left-hand corner of all printed reports.

4.5 Geodetic Datum

All coordinates are stored in *LogCheck* both in their original geodetic datum along with the name of that datum plus in the current geodetic datum as set in the Geodetic Datum panel of the Project Details. Whenever, the current geodetic datum is changed, *LogCheck* recalculates the current coordinates for the current geodetic datum from the original coordinates for all the holes in the project.

Whenever importing coordinates into *LogCheck* their geodetic must be included. The coordinates, though, are displayed, edited and reported in whatever geodetic datum is the current one for the project. When coordinates are actually keyed into *LogCheck* rather than imported, their values are saved as both the coordinates for the original geodetic datum and the coordinates for the current geodetic datum, and the current geodetic datum is stored as the name of the original geodetic datum.

The currently available Geodetic Datums in *LogCheck* are:

- Australian Geodetic Datum (AGD84) as used for Australian Mapping Grid (AMG84) coordinates

- Geocentric Datum of Australia (GDA94) as used for Mapping Grid of Australia (MGA94) coordinates
- Geocentric Datum of Australia 2020 (GDA2020) as used for Mapping Grid of Australia 2020 (MGA202) coordinates
- World Geodetic System (WGS84) as used in Indonesia

LogCheck uses the GCalc software from the Queensland Department of Natural Resources and Mines, to convert between datums.

4.6 Format for Survey Coordinates

The format for the display of survey coordinates in *LogCheck* is specified with one of the following options:

- Grid, such as MGA,
- Longitude/Latitude as decimal degrees,
- Longitude/Latitude as degrees/minutes/seconds.

Historically, most coal exploration data in Australia has been recorded in AMG's and most petroleum exploration data in Longitude/Latitude with decimal degrees.

The Survey Coordinates Format option sets what system is used when the coordinates are entered, displayed, printed and exported. For example, often in coal bed methane work some of the historical data will come from coal exploration and some from petroleum exploration. When entering old petroleum data in Longitude/Latitude with decimal degrees change the option to Longitude/Latitude (decimal degrees). All the current data in the system for the project will then be displayed in Longitude/Latitude though it will still be stored in grid.

The latitude and longitude of a survey point will change depending on which geodetic datum was used for calculating it. Therefore, when entering latitudes and longitudes, it is essential to determine which geodetic datum was used and that the appropriate one has been selected in the Project Details.

4.7 Depth Units

Depth Units specifies the unit of measurement that is used for editing hole data. Often historical data will be in feet and inches or decimal feet. By selecting the appropriate Depth Units option the format used for entering and viewing the data can be modified. Upon entering, the data is stored in metres and all reporting, plotting and exporting of the data is in metres. This option can be changed at any time so that the Hole Data stored on the machine can be edited/displayed in the required format.

4.8 Project Limits

Project Limits are a rectangular set of coordinate limits, and a minimum and maximum elevation for all hole collars. The horizontal limits are set by specifying a minimum and maximum Easting/Northing coordinate pair. Survey coordinates are validated against the project limits whenever they entered at the keyboard or imported from file. The coordinates limits are displayed in the Project Details in whatever is the current geodetic datum.

Where the user's Header format does not contain a field for recording the Zone then the maximum Zone is automatically set to the same as the minimum zone. This zone will be applied to all coordinates when transforming the coordinates to Longitude/Latitude.

4.9 UCS Calculation Parameters

UCS (Uniaxial Compressive Strength) can be estimated from Sonic Transit Time or Velocity data. It is common practice within the Australian coal industry to determine a relationship between the UCS and sonic data for each project based on lab results of UCS and Sonic values for a number of samples from preliminary holes. Once a relationship has been established it can be used to generate UCS values for hole intervals where no laboratory UCS tests have been performed but downhole sonic values have been recorded. More information about this procedure can be found in "Geotechnical applications and interpretations of downhole geophysical logs" by G.H. McNally published by Australian Coal Industry Research Laboratories, Sydney.

When opening LAS files containing sonic data, *LogCheck* will optionally calculate the UCS from a selected sonic transit time using the formula parameters set in the Project Details. The calculated UCS is then displayed as an additional variable within the LAS data.

Chapter 5

Data Formats

By the end of this chapter you will be able to understand:

- The types of *LogCheck* data formats.
- The format of drill hole site planning data.
- The format of drill hole header data.
- The format of geologists who logged each drill hole data.
- The format of drilling data.
- The format of casing and cementing data.
- The format of geology data.
- The format of water flow data.
- The format of LAS data.
- The format of sample dispatch and coal quality data.
- The format of daily activities data.
- The format of rehabilitation data.

5.1 Introduction

This chapter describes the data format for each of the data types that are available in the standard version of *LogCheck*.

- Drill Hole Site Planning
- Headers
- Geologists
- Drilling
- Casing
- Cementing
- Geology
- Water Flows
- Downhole Geophysics (LAS)
- Sample Dispatch
- Basic Coal Quality
- Daily Activities
- Rehabilitation

Further data types are available in the *LogCheck* Geotechnical and Coal Quality extensions (see Chapters 11 and 12)

The *LogCheck* data types generally follow the Australian CoalLog standard. More information about this standard can be found at:

<https://www.ausimm.com/insights-and-resources/resources/codes-and-standards/coallog/>

The exceptions to this are:

- Drill hole site planning, rehabilitation and daily activities as these are not covered by CoalLog and so *LogCheck* uses its own standard formats for these;
- Downhole geophysics which uses the Canadian Well Logging Society Log ASCII (LAS) standard, further information regarding this standard can be found at:
<https://www.cwls.org/products/#products-las>
- Basic Coal Quality as the CoalLog standard includes the entire suite of possible Coal Quality sample preparations and tests whereas the *LogCheck* Basic Coal Quality only includes raw samples and those tests generally performed during exploration programs;
- Headers, Geology, Drilling and/or Water Flow data has user specific formats for some users.

5.2 Drill Hole Site Planning Data

Drill hole site planning data enables the storage, editing and display of the information compiled for each drillhole site when planning a drilling program. Generally, drill hole site names will be different to that of the final name of the drill hole or drill holes that are drilled on the site.

The Drill Hole Site Planning Data variables are:

- **SiteId** Site Identification code
- **Lease** The mining or exploration lease number on which the site is located
- **HT** Hole type – fully cored (FC), open (OC), etc.
- **HP1 - HP4** Hole purposes
- **GDatum** Geodetic Datum
- **UTMZone** Map zone
- **Easting** Intended Easting coordinate of the hole collar
- **Northing** Intended Northing coordinate of the hole collar
- **HDatum** Height datum - Australian Height Datum (AHD), Local Datum (LOD), etc.
- **Elevation** Intended Elevation of the hole collar

- **Ic** Intended Inclination of the hole at its collar. Negative indicates down and positive up
- **Azi** Intended Azimuth of the hole at its collar
- **Property** Name of property on which site is located
- **Landholder** Name of landholder of property on which site is located
- **EA** Environmental Authority for site – Buffer (BUFF), Endangered Regional Ecosystem (ERE), etc.
- **CCA_Date** Conduct & Compensation Agreement Date
- **CH_Date** Cultural Heritage Date
- **Access** Flag indicating that site is currently accessible
- **Prep_Date** Date preparation for drilling was completed for the site
- **Rehab_Date** Date rehabilitation of site was completed

The hole coordinates and elevation are integers as planned coordinates as this is the limit of precision for planned coordinates.

The *LogCheck* system includes a Sites Dictionary which includes the CoalLog dictionary entries for:

- Hole Type
- Hole Purposes
- Geodetic Datum
- Height Datum
- Location Accuracy

However, before entering Site data the system Sites Dictionary needs to be edited to create appropriate entries for the following categories. After editing any *LogCheck* system dictionary, it needs to be saved either as a User Default Dictionary or a project specific Dictionary, using Save As rather than Save, as system dictionaries cannot be overwritten.

- Lease Number
- Property Name
- Landholder's Name
- Environmental Authority

An example of drill hole site planning data:

The screenshot shows the LogCheck software window with the following data entered:

Field	Value
Site Id	31
Lease Number	
Geodetic Datum	GDA94
Inclination	-90
Property	LC
Environmental Authority	NONE
Hole Type	OC
UTM Zone	55
Azimuth	
Landholder	BMA
Conduct Compensation Agreement Date	/ /
Hole Purposes	ST
Easting	621091
Cultural Heritage Date	/ /
Northing	7535301
Height Datum	APX
Site Accessible	<input type="checkbox"/>
Elevation	271
Site Preparation Date	11/08/2018
Location Acc.	G
Site Rehabilitation Completion Date	/ /
Site Photographed	<input type="checkbox"/>
Comments	

5.3 Header Data

Header data consists of data for which there is only a single value for the entire hole.

The Header Data variables in the standard version of *LogCheck* are:

- **Basin** Sedimentary basin for the project
- **Lease** The mining or exploration lease number on which the hole is located
- **SiteId** The site identification code
- **HT** Hole type – fully cored (FC), open (OC), etc.
- **DS** Data Status – raw (R), final (F), etc.
- **HP1 - HP4** Hole purposes
- **Redrill** Name of previous drill hole of which this hole is a redrill
- **Acc** Survey accuracy – GPS (G), surveyed (S), etc.
- **UTMZone** Map zone
- **Easting** Easting coordinate of the hole collar
- **Northing** Northing coordinate of the hole collar
- **HDatum** Height datum - Australian Height Datum (AHD), Local Datum (LOC), etc.
- **Elevation** Elevation of the hole collar
- **Ic** Inclination of the hole at its collar. Negative indicates down and positive up
- **Azi** Azimuth of the hole at its collar
- **SurvCo** Survey company
- **SurvDate** Survey date
- **Start** Date drilling was started
- **Complete** Date drilling was completed
- **TotDep** Total depth of the hole
- **GeoOrg** Geological logging organisation
- **GT** Flag indicating if the hole has a geotechnical log
- **Ph** Flag indicating if core photos have been taken for the hole
- **GphCo** Geophysical logging company
- **L1 – L12** Codes indicating which geophysical logs were recorded on the hole
- **GphLog** Geophysical logger's name
- **SWL** Standing water level
- **SWLDate** Standing water level measurement date
- **RehabDate** Date hole rehabilitated
- **HS1 – HS2** Current status of the hole – completed (C), backfilled (B), plugged (G), etc.

LogCheck includes a Headers Dictionary which includes the CoalLog dictionary entries for:

- Sedimentary Basin
- Hole Type
- Data Status
- Hole Purposes
- Geodetic Datum
- Height Datum
- Location Accuracy
- Survey Accuracy
- Survey Organization
- Geological Logging Organization
- Geophysical Logging Organization
- Geophysical Variables
- Hole Status

This dictionary contains hundreds of entries for Sedimentary Basin, Geological Logging Organization and Geophysical Logging Organization that are probably not required and so before entering Header data, it is probably prudent to edit it to remove the unnecessary entries. Also, before any Lease numbers can be entered into *LogCheck*, appropriate entries need to be added to the dictionary. After editing any *LogCheck* system dictionary, it needs to be saved either as a User Default Dictionary or a project specific Dictionary, using Save As rather than Save, as system dictionaries cannot be overwritten.

An example of hole header data:

LogCheck - [C:\LogData\AVOCA\HEADERS\AVC030C]

File Edit View Tools Settings Help

Hole Name: AVC030C

Basin: NSH Location Acc.: S UTM Zone: 55 Date Started: 20/02/2004 Geological Organiz.: RES Standing Water Level: .

Lease Number: Geodetic Datum: AGD84 Easting: 640368.36 Date Completed: 24/02/2004 ☐ Geotech. Log ☐ Core Photos SWL Date: / /

Site Id: 1000 Northing: 7341537.89 Total Depth: 303.800 Geophysical Co.: WEA Date Rehabilitated: / /

Hole Type: PC Data Status: F Height Datum: AHD Elevation: 212.42 Geophysical Logs: C | D | G | S | V | | | | | |

Hole Purposes: Inclination: -90 Azimuth: 0 Geophysical Logger's Name:

Redrill of Hole No.: Survey Co.: Survey Date: / /

Comments: Requires cementing.

First Previous Next Last

The First, Previous, Next and Last buttons are disabled, because only one hole was selected.

When opening header data, if more than one hole is selected, the data is displayed in Grid layout as shown below:

LogCheck - [C:\LogData\AVOCA\HEADERS\ALL_HOLES]

File Edit View Tools Settings Help

Hole	Basin	Lease	SiteId	HT	DS	HP1	HP2	HP3	HP4	Redrill	Acc	UTMZone	GDatum	Easting	Northing	HDatum	Elevation	Ic	Azi	Su
▶ AVC030C	NSH		1000	PC	F						S	55	AGD84	640368.36	7341537.89	AHD	212.42	-90	0	
AVC031C			AVC031C	PC	F	TG					S	55	AGD84	641696.78	7340981.21		203.58	-90	0	
AVC032			AVC032	OC	F						S	55	AGD84	642402.09	7340309.34		204.77	-90	0	
AVC033			AVC033	OC	F						S	55	AGD84	643651.90	7340584.83		206.51	-90	0	
AVC034			AVC034	OC	F						S	55	AGD84	644628.29	7340588.33		201.19	-90	0	
AVC035			AVC035-SITE12345		F						S	55	AGD84	645654.95	7340571.53		205.10	-90	0	
AVC036C			AVC036C	PC	F						S	55	AGD84	642528.45	7345512.24		191.92	-90	0	
AVC037R			AVC037R	OC	F						A	55	AGD84	643415.52	7345342.82		194.00	-90	0	
AVC038			AVC038	OC	F						S	55	AGD84	644443.39	7345338.84		196.52	-90	0	
AVC039			AVC039	OC	F						S	55	AGD84	640805.20	7345540.11		191.53	-90	0	

You can switch to Form layout from the View menu. With more than one hole selected, the First, Previous, Next and Last buttons are available to navigate between the holes.

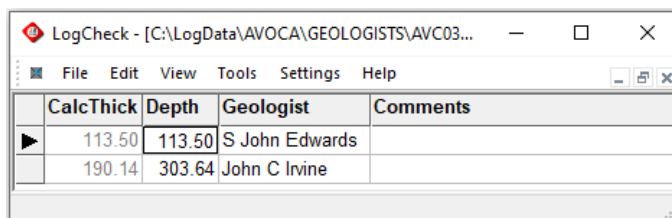
When editing the Header data for a new hole and its **SiteId** is entered, *LogCheck* automatically updates the values for:

- Lease
- Hole Type
- Hole Purposes
- UTM Zone & Coordinates
- Height Datum
- Collar Elevation
- Hole Inclination at Collar
- Hole Azimuth at Collar

where they are currently blank, with the corresponding values saved in the Site data for the **SiteId**.

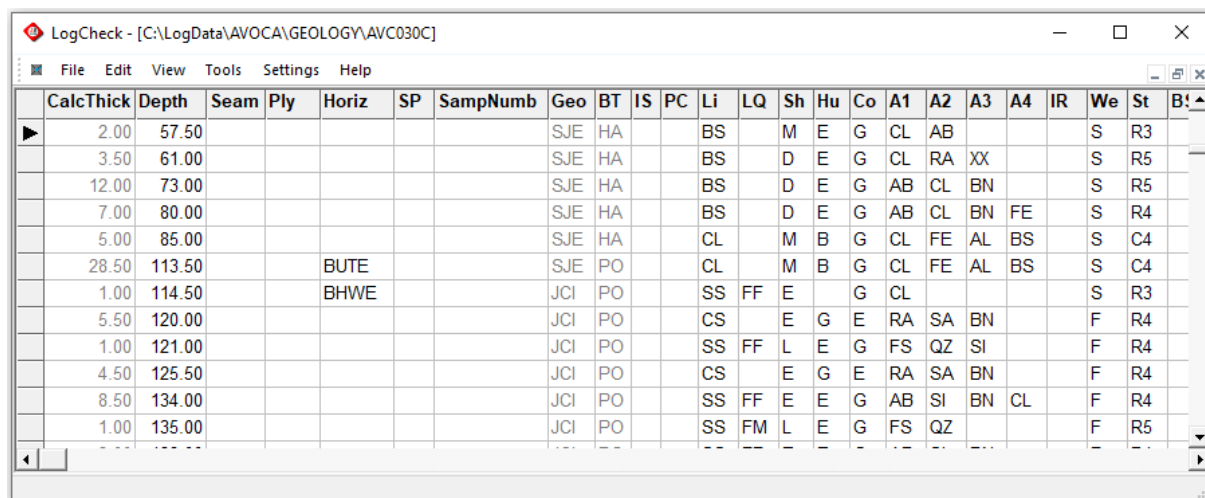
5.4 Geologists Data

The Geologist data records the names of the geologist(s) who logged the hole, and what depth ranges they logged. The fields are Base Depth and Logging Geologist. An example of the Geologist data for a hole in grid format is shown at right:



CalcThick	Depth	Geologist	Comments
113.50	113.50	S John Edwards	
190.14	303.64	John C Irvine	

Whenever Geology data is opened in the editor, then *LogCheck* adds, as a read-only field, the geologist's initials derived from the Geologist's data against each interval that they logged:



CalcThick	Depth	Seam	Ply	Horiz	SP	SampNumb	Geo	BT	IS	PC	Li	LQ	Sh	Hu	Co	A1	A2	A3	A4	IR	We	St	B
2.00	57.50						SJE	HA			BS		M	E	G	CL	AB				S	R3	
3.50	61.00						SJE	HA			BS		D	E	G	CL	RA	XX			S	R5	
12.00	73.00						SJE	HA			BS		D	E	G	AB	CL	BN			S	R5	
7.00	80.00						SJE	HA			BS		D	E	G	AB	CL	BN	FE		S	R4	
5.00	85.00						SJE	HA			CL		M	B	G	CL	FE	AL	BS		S	C4	
28.50	113.50			BUTE			SJE	PO			CL		M	B	G	CL	FE	AL	BS		S	C4	
1.00	114.50			BHWE			JCI	PO			SS	FF	E		G	CL					S	R3	
5.50	120.00						JCI	PO			CS		E	G	E	RA	SA	BN			F	R4	
1.00	121.00						JCI	PO			SS	FF	L	E	G	FS	QZ	SI			F	R4	
4.50	125.50						JCI	PO			CS		E	G	E	RA	SA	BN			F	R4	
8.50	134.00						JCI	PO			SS	FF	E	E	G	AB	SI	BN	CL		F	R4	
1.00	135.00						JCI	PO			SS	FM	L	E	G	FS	QZ				F	R5	

5.5 Drilling Data

The Drilling Data variables are:

- **CalcThick** Thickness of the interval, that is the difference as calculated by *LogCheck*, between the base depths of this interval and the previous one (read-only)
- **Depth** Driller's depth to the base of the interval. The top of an interval is assumed to be the base depth of the previous interval.
- **CalcDepth** Base depth as calculated by *LogCheck* using the formula:

$$\text{CalcDepth} = \text{KellyLen} + \text{RodsLen} + \text{BarLen} + \text{BtSubLen} + \text{OthLen} - \text{TblHgt} - \text{StUpLen}$$
(read-only)
- **KellyLen** Kelly Length
- **RodsLen** Total Length of rods
- **BarLen** Barrel Length
- **BtSubLen** Length of Bits and Subs
- **OthLen** Other Lengths
- **TblHgt** Table Height
- **StUpLen** Stickup Length
- **DrC** Drilling Contractor
- **RigNo** Rig Number
- **RT** Rig Type
- **Driller** Name of the driller
- **Date** Date the interval was drilled
- **TStrt** Time when interval was started in hhmm format, for example 1:15pm would be 1315
- **TComp** Time when interval was completed in hhmm format, for example 4:45pm would be 1645
- **BT** Bit type – hammer (HA), diamond core (DW), etc.
- **DF** Drilling fluid – bentonitic mud (M), water (W), etc
- **DrSz** Drill size name - HQ, NQ, etc
- **CoSz** Core size in mm's
- **HSz** Hole size in mm's
- **Reamed** Flag indicating if interval has been reamed
- **RunNo** Run number. A row should be entered into the data for each individual core run in the hole
- **RecThk** Recovered thickness. The overall length of the material recovered in the core run
- **GeoDepth** Base depth of interval as determined by the geologist
- **Ph** Flag indicating if core run has been photographed
- **RecPerc** Percentage recovery of core run as calculated by *LogCheck* (read-only)
- **ThkDiff** Difference between the recovered thickness and the true thickness of the interval as calculated in **CalcThick** (read-only)
- **CumThkDiff** Cumulative thickness difference over a sequence of consecutive core runs as calculated by *LogCheck*. The core loss in one run may be made up by stick-up from the next run. For example, in the drilling data shown below, core run 1 had a loss of 0.27 m but core run 2 had a gain of 0.05 m due to stick-up from the previous run, thus generating a cumulative thickness difference of 0.22 m by the end of run 2. (read-only)

The only mandatory fields in Drilling Data are Base Depth, Bit Type and for cored intervals, the Core Size.

LogCheck includes a Drilling Dictionary which includes the CoalLog dictionary entries for:

- Drilling Contractor
- Drilling Rig Type
- Bit Type
- Drilling Fluid
- Drilling Bit Size

This dictionary contains hundreds of entries for Drilling Company and Rig Type that are probably not required and so before entering Drilling data, it is probably prudent to edit the system Drilling Dictionary to remove the unnecessary entries. After editing any *LogCheck* system dictionary, it needs to be saved either as a User Default Dictionary or a project specific Dictionary, using Save As rather than Save, as system dictionaries cannot be overwritten.

For cored intervals, additional validations can be set by the database manager to check that:

- **CalcThick** is less than a specified maximum core run length
- Core recovery is not greater than 100% plus a specified additional amount for stick-up

For information on setting these validations, see Section 3.4.3 Drilling Tab in Chapter 3.

An example of drilling data:

CalcThick	Depth	DrC	RigNo	RT	Driller	Date	BT	DF	DrSz	CoSz	HSz	RunNo	RecThick	RecPerc	ThkDiff	CumThkDiff	Comments
1.00	1.00	JDD	6	B12	M.BESGROVE	01/03/2003	BL	A			266		-		-	-	
5.00	6.00	JDD	6	B12	M.BESGROVE	01/03/2003	HA	A			215		-		-	-	
109.34	115.34	JDD	6	B12	M.BESGROVE	02/03/2003	HA	I			165		-		-	-	
48.00	163.34	JDD	6	B12	M.BESGROVE	03/03/2003	HA	I			165		-		-	-	
59.44	222.78	JDD	6	B12	M.BESGROVE	04/03/2003	PO	I			120		-		-	-	
7.41	230.19	JDD	6	B12	M.BESGROVE	05/03/2003	PO	I			120		-		-	-	
4.50	234.69	JDD	6	B12	M.BESGROVE	05/03/2003	TC	I	HMLC	64	102	1	4.23	94	-0.27	-0.27	
4.50	239.19	JDD	6	B12	M.BESGROVE	05/03/2003	TC	I	HMLC	64	102	2	4.55	101	0.05	-0.22	
4.50	243.69	JDD	6	B12	M.BESGROVE	05/03/2003	TC	I	HMLC	64	102	3	4.17	93	-0.33	-0.55	
9.31	253.00	JDD	6	B12	M.BESGROVE	05/03/2003	PO	I			120		-		-	-	

The fields shown in grey above are read-only fields whose values are calculated by *LogCheck*.

Whenever Geology data is opened in the editor, then *LogCheck* adds, as a read-only field, the bit type (**BT**) codes from the Drilling data against each interval:

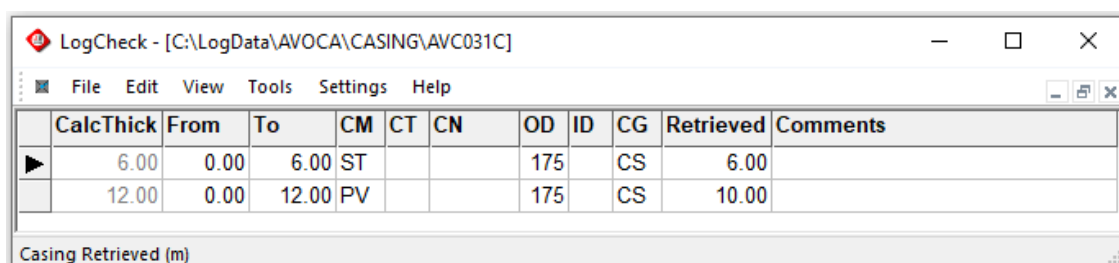
CalcThick	Depth	Seam	Ply	Horiz	SP	SampNum	Geo	BT	IS	PC	Li	LQ	Sh	Hu	Co	A1	A2	A3	A4	IR	We	St	E
1.00	157.00						GJB	HA			SS	FF	E	E	G	RA	SI	TO			F	R4	
4.00	161.00						GJB	HA			ST		E	E	G	RA	SA	TO			F	R4	
1.00	162.00						GJB	HA			SS	FM	E	E	G	RA	FF	SA			F	R4	
32.00	194.00						GJB	PO			ST		E	E	G	AB	FF	SA			F	R3	
6.00	200.00						GJB	PO			SS	FF	E	E	G	AB	SI	BN			F	R4	
10.00	210.00						GJB	PO			SS	FF	E	E	G	AB	SI	TO			F	R3	
16.00	226.00						GJB	PO			ST		E	E	G	AB	SA	BN			F	R4	
2.00	228.00						GJB	PO			SS	FF	E	E	G	AB	SI	BN			F	R4	
2.19	230.19						GJB	PO			SS	FM	E		G	RA	SI	TO			F	R4	
0.08	230.27						GJB	TC			ST		D		G						F	R4	
0.18	230.45						GJB	TC			ST		D		G	RA	SA	BN			F	R4	

5.6 Casing Data

Casing data can be recorded for each hole. The Casing data variables are:

- **CalcThick** Thickness of the interval, that is the difference as calculated by *LogCheck*, between the base depths of this interval and the previous one (read-only)
- **Depth** Depth of end of particular casing
- **CM** Casing Material – pvc (PV), steel (ST), etc
- **CT** Casing Type – perforated (P), slotted (S), etc
- **CN** Casing Name - HWT thread (HWT), Ozcon (OZCO), etc
- **OD** Outside Diameter in millimetres
- **ID** Inside Diameter in millimetres
- **CG** Casing Grout – bentonite (BE), gypsum (GY), etc
- **Retrieved** Casing Retrieved in metres

An example of casing data:



	CalcThick	From	To	CM	CT	CN	OD	ID	CG	Retrieved	Comments
▶	6.00	0.00	6.00	ST			175		CS	6.00	
	12.00	0.00	12.00	PV			175		CS	10.00	

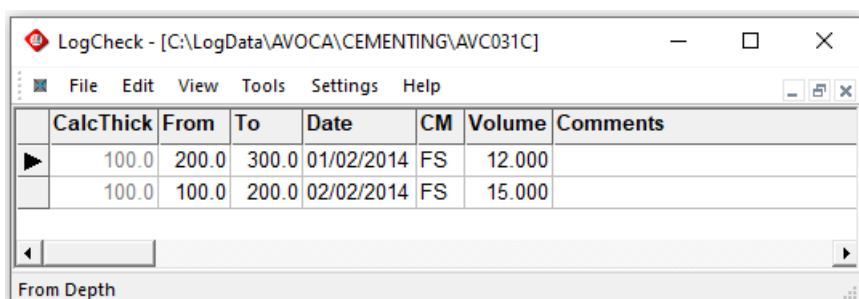
Casing Retrieved (m)

5.7 Cementing Data

Cementing data can be recorded for each hole. The Casing data variables are:

- **CalcThick** Thickness of the interval, that is the difference as calculated by *LogCheck* between the From and To depths (read-only)
- **From** Depth at top of cementing
- **To** Depth at bottom of cementing
- **Date** Date interval cemented
- **Volume** Volume of Cement in cubic metres

An example of cementing data:



	CalcThick	From	To	Date	CM	Volume	Comments
▶	100.0	200.0	300.0	01/02/2014	FS	12.000	
	100.0	100.0	200.0	02/02/2014	FS	15.000	

From Depth

Unlike all other data types, Cementing starts at the bottom of the hole and so unlike all other data types, the From and To Depths descend going down the table.

5.8 Geology Data

The Geology data variables in the CoalLog version of *LogCheck* are:

- **CalcThick** Thickness of the interval, that is the difference as calculated by *LogCheck*, between the base depths of this interval and the previous one (read-only)
- **Depth** Base depth of each lithological unit. The interval top is assumed to be the base depth of the previous unit. Interval base depth must be greater than the base depth of the previous unit. Blank Depth values are used in *LogCheck* to indicate that the row in the table is a continuation of the data for the lithological unit on the previous row.
- **Seam** Seam name. Despite its name, this field can contain both Seam names and the names of Stratigraphic Markers such as Yarrabee Tuff. This should appear on at least the first record of every lithological unit which is to be included in a Seam or Stratigraphic Marker unit.
- **Ply** Ply name
- **Horiz** Horizon name – Base of Weathering (BHWE), Base of Tertiary (BHTE), etc.
- **SP** Sample purpose – coal quality (QP), geotechnical (GT), water quality (WT), etc.
- **FieldNumb** Sample Number as allocated originally in the field. The first time that a Sample Number is allocated in the **SampNumb** field for a row, *LogCheck* automatically copies the new **SampNumb** to this field as a permanent record of the original sample number. This is useful where the Samples are later combined before sending to the laboratory, (read-only)
- **SampNumb** Sample Number. This should appear on at least the first row of every lithological unit that is part of a sample. Despite its name it can contain both numbers and letters.
- **Geo** Geologists' Initials automatically derived from the Geologists data each time the Geology data is opened (read-only)
- **BT** Bit Type obtained from the Drilling data each time the Geology data is opened (read-only)
- **IS** Interval Status – raw (R), adjusted to geophysics (A), etc.
- **PC** Percent Lithotype. Where a lithological unit consists of more than one lithotype the user must specify what percentage of the lithological unit consists of this lithotype.
- **Li** Lithotype – coal (CO), sandstone (SS), etc.
- **LQ** Lithology Qualifier – silty (SI), fine grained (FF), bright (BR), stony (SY), etc. Note that according to CoalLog, each Qualifier in the dictionary can only be used for particular LithoTypes, for example fine grained can only be used for sandstones, sands and gravels.
- **Sh** Shade – light (L), dark (D), etc.
- **Hu** Hue – brownish (B), reddish (R), etc.
- **Co** Colour – brown (B), green (E), etc.
- **A1 - A4** Adjectives – siliceous (SC), oxidised (OX), bands (BN), etc.
- **IR** Lithotype interrelationship between Lithotypes for lithological units containing more than one Lithotype – interbedded with (IB), with clasts of (CT), etc.
- **We** Weathering – extremely weathered (E), slightly weathered (S), etc.
- **St** Estimated Strength – firm (C3), high strength rock (R5), etc.
- **BS** Bed Spacing – thinly bedded (TB), thickly bedded (CB), etc.
- **DT** Defect Type – fault (FT), vein (VN), etc.
- **DI** Defect Intact Flag – intact or not
- **DS** Defect Spacing – wide (WI), narrow (NA), etc.
- **DD** Defect Dip Angle
- **CS** Core State – broken (B), solid (S), etc.
- **MS** Mechanical State – fissile (FS), powdery (PO), etc.
- **Tx** Texture – soapy (SO), crystalline (XL), etc.

- **BC** Basal Contact – gradational (G), sharp and planar (P), etc.
- **S1 & S2** Sedimentary Features – cross bedded (XB), flaser bedding (FL), etc.
- **BD** Bedding Dip Angle
- **Ab** Mineral or Fossil Abundance – common (C), minor (M), etc.
- **MF** Mineral or Fossil Type – chalcopryite (CC), rootlets (RO), etc.
- **As** Mineral or Fossil Association – clasts (CT), in veins (VN), etc.
- **Ga** Gas – low (L), high (H), etc.

Non-CoalLog versions of *LogCheck* have most of these fields but they may have slightly different names.

An example of Geology data in *LogCheck*:

CalcThick	Depth	Seam	Ply	Horiz	SP	SampNumb	Geo	BT	IS	PC	Li	LQ	Sh	Hu	Co	A1	A2	A3	A4	IR	We	St
3.00	126.00						GRS	HA			BS		D	K	G	MN	AL	LY			S	R5
10.00	136.00						GRS	HA			BS		D	K	G	XC	BU	FF	GN		F	R6
																TO						
3.00	139.00			BUTE			GRS	HA			BS		E	K	G	XC	BU	CL	ND		S	R5
3.00	142.00			BHWE			GRS	HA			SS	FF	L		G	CL	MX	IA	XC		S	R2
3.00	145.00						GRS	HA			60	ST			G	RA	SI	WP		IB	F	R4
											40	SS	FF	E		G					F	R4
1.00	146.00						GRS	PO			SS	FF	E		G	MN	SI	LM			F	R4
5.00	151.00						GRS	PO			SS	FF	E	E	G	MN	SI	LM			F	R4
3.00	154.00						GRS	PO			ST		L	E	G	CL	LM	TO	MX		F	R4
3.00	157.00						GRS	PO			SS	FF	L	E	G	AB	SI	LM			F	R4
4.00	161.00						GRS	PO			ST		E	G	E	CL	MX	TO			F	R3
5.00	166.00						GRS	PO			SS	FF	E	B	G	MN	SI	LM	FE		F	R4

A lithological single unit may consist of multiple rows, for example, where all the description does not fit onto a single row, as with the basalt unit between 126 and 136 metres above or lithological units consists of multiple lithologies, for example the sandstone and siltstone between 142 and 145 metres above which consists of 60% siltstone and 40% sandstone.

For lithological units consisting of multiple lithotypes, an interval base depth must be entered on the first row of the unit and then subsequent rows must have their base depth blank. Each new lithology within the unit is included by a code in the Lithotype column and a percentage in the % Lithotype column. The percentages for all lithotypes in a lithological unit must add up to 100%. The user can extend the description of each lithotype over a number of lines but must leave the lithotype blank on these subsequent lines.

Before any Seams, Stratigraphic Markers or Plies can be entered for Geology Data, a Seams Dictionary needs to be created for project. For more information on creating this dictionary see Section 2.8.1 Setting up a local Seams Dictionary in Chapter 2.

Items with just a depth and no thickness are referred to as horizons, for example, base of weathering, water level, top of formation. Depending on the user's data format, there are two different ways to enter horizon codes:

- For data formats with a **Horiz** column, such as CoalLog, the horizon is entered in the **Horiz** column of the unit whose base depth is at the horizon depth, for example, at the base depths of 139 and 142 metres in the example on the previous page. If the horizon occurs mid-way along a unit, the unit has to be split into two at the horizon depth.

- For data formats without a **Horiz** column, a zero-thickness unit must be entered at the horizon depth and the horizon code entered in the Seam column. A zero-thickness unit is one with the same base depth as the previous unit. Such units must have a horizon entered. If using Vulcan, it must have lithology entered, usually NL for not logged. For all other systems, the lithotype must be left blank.

The geotechnical variables Defect Type, Defect Intact, Defect Spacing and Defect Dip Angle describe overall defects in a unit. They cannot be used to record the detailed information that is required by Geotechnical Engineers to calculate numerical values such as Rock Quality Designator (RQD), Fracture Frequency, Defect Spacing and Unit Rating. To calculate these items, it is necessary to undertake a detailed Defect log as described in the Chapter xx, Geotechnical Extension. If a detailed log it is merely superfluous to record anything in the geotechnical variables of the Geology data.

LogCheck only checks that:

- depths increase down the hole,
- lithotype percentages add up to 100% and
- that zero thickness units only contain horizons and no other data

when the user attempts to save their data as these restrictions may temporarily not be satisfied while the user is editing their data.

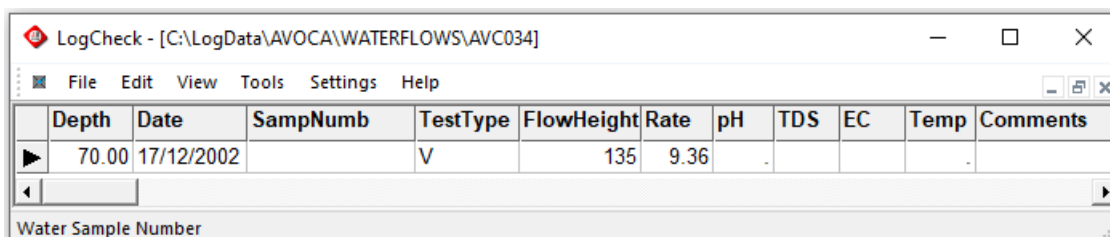
5.9 Water Flow Data

The Water Flow data variables in *LogCheck* are:

- Depth** Depth at which the water flow test was taken. Note that this is one of the few instances in *LogCheck* where the Depth refers to a single depth rather than the base depth of an interval
- Date** Date the test was performed
- SampNumb** Unique identifier for the sample
- TestType** Test Type – V-notch, 305mm board (3), estimate (E), etc
- FlowHeight** Flow Height across weir in mm's; when entered, *LogCheck* automatically calculates the flow rate
- Rate** Rate of Flow in litres/second
- pH** pH of the sample
- TDS** Total Dissolved Solids for the sample
- EC** Electrical Conductivity for the sample in $\mu\text{S}/\text{cm}$
- Temp** Water Temperature in Celsius

The only mandatory field is **Depth**.

An example of Water Flow data:



Depth	Date	SampNumb	TestType	FlowHeight	Rate	pH	TDS	EC	Temp	Comments
70.00	17/12/2002		V	135	9.36	-			-	

Water Sample Number

5.10 LAS Data

LAS files record downhole geophysical data, such as natural gamma, density, caliper and sonic. LAS stands for Log ASCII standard and the layout was developed by the Canadian Well Logging Society and can be found on its website at:

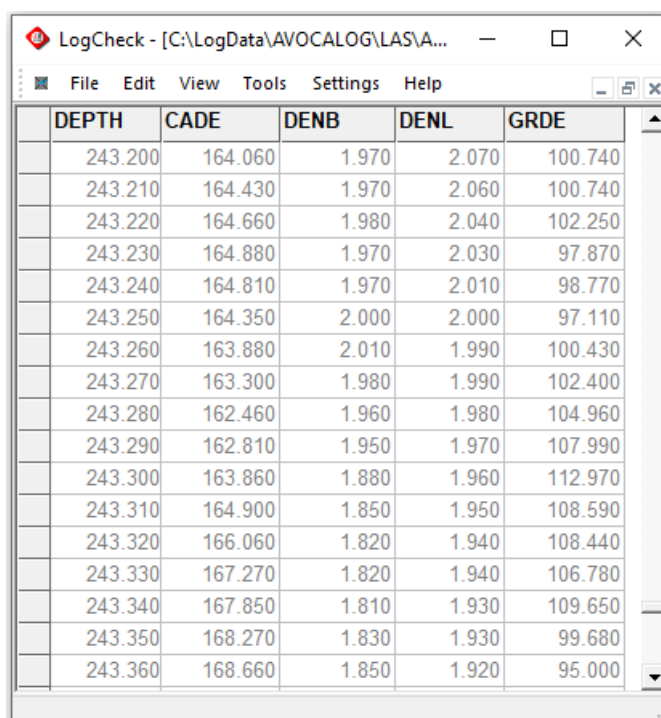
www.cwls.org/las_info.php

LAS data being an ASCII file, can be opened in a text editor such as NotePad.

When a LAS file is first opened in *LogCheck*, its data is read into a dBase file which is stored in a folder called LasWork in the user's project folder. Unless the LAS file is modified, subsequent times that it is opened are far quicker than the first time as the data has already been converted into a dBase file. The LAS data as displayed in *LogCheck* is read-only. To modify the LAS data,

When opened in *LogCheck*, LAS data is read-only. To modify the data, the original LAS file must be edited in a text editor.

An example of LAS data in *LogCheck*:



	DEPTH	CADE	DENB	DENL	GRDE
	243.200	164.060	1.970	2.070	100.740
	243.210	164.430	1.970	2.060	100.740
	243.220	164.660	1.980	2.040	102.250
	243.230	164.880	1.970	2.030	97.870
	243.240	164.810	1.970	2.010	98.770
	243.250	164.350	2.000	2.000	97.110
	243.260	163.880	2.010	1.990	100.430
	243.270	163.300	1.980	1.990	102.400
	243.280	162.460	1.960	1.980	104.960
	243.290	162.810	1.950	1.970	107.990
	243.300	163.860	1.880	1.960	112.970
	243.310	164.900	1.850	1.950	108.590
	243.320	166.060	1.820	1.940	108.440
	243.330	167.270	1.820	1.940	106.780
	243.340	167.850	1.810	1.930	109.650
	243.350	168.270	1.830	1.930	99.680
	243.360	168.660	1.850	1.920	95.000

5.11 Sample Dispatch Data

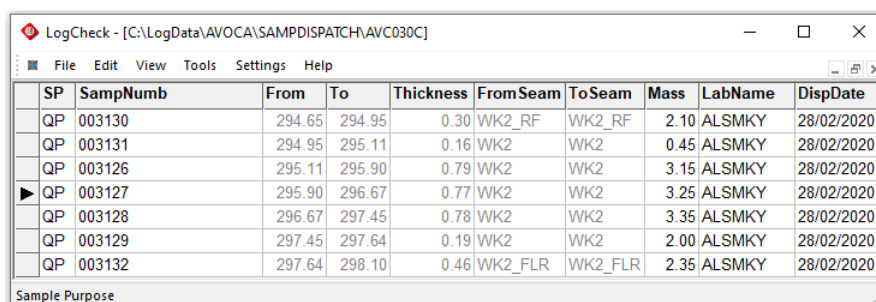
LogCheck defines a sample throughout its system by the sample's hole name and sample number rather than just its sample number. It does not use a sample's **From** and **To** depths to define the sample but instead every time data is opened for a sample, its **From** and **To** depths are updated from their current values in the Geology data.

The variables in Sample Dispatch data are:

- **SP** Sample Purpose
- **SampNumb** Sample Number, despite its name this can include alphabetic and other non-numeric characters as well as numbers. Before a Sample Number can be entered into the Coal Quality data it must have been entered into the Geology data for the hole.
- **From** From Depth of the sample as determined from the drillhole's Geology data. (read-only)
- **To** To Depth of the sample as determined from the drillhole's Geology data. (read-only)
- **Thickness** Sample thickness as automatically calculated from the difference between its From and To depths. (read-only)
- **FromSeam** Seam at the start of the sample as determined from the drillhole's Geology data. If the start of the sample sits in a seam's roof then **FromSeam** will display the seam name followed by the suffix "_RF". (read-only)
- **ToSeam** Seam at the end of the sample as determined from the drillhole's Geology data. If the end of the sample sits in a seam's floor then **ToSeam** will display the seam name followed by the suffix "_FLR". (read-only)
- **Mass** Sample Mass (kg)
- **LabName** Laboratory Name
- **DispDate** Dispatch Date
- **DispNumb** Dispatch Number

The only mandatory field is **SampNumb**.

An example of Sample Dispatch data:



SP	SampNumb	From	To	Thickness	FromSeam	ToSeam	Mass	LabName	DispDate
QP	003130	294.65	294.95	0.30	WK2_RF	WK2_RF	2.10	ALSMKY	28/02/2020
QP	003131	294.95	295.11	0.16	WK2	WK2	0.45	ALSMKY	28/02/2020
QP	003126	295.11	295.90	0.79	WK2	WK2	3.15	ALSMKY	28/02/2020
QP	003127	295.90	296.67	0.77	WK2	WK2	3.25	ALSMKY	28/02/2020
QP	003128	296.67	297.45	0.78	WK2	WK2	3.35	ALSMKY	28/02/2020
QP	003129	297.45	297.64	0.19	WK2	WK2	2.00	ALSMKY	28/02/2020
QP	003132	297.64	298.10	0.46	WK2_FLR	WK2_FLR	2.35	ALSMKY	28/02/2020

Sample Purpose

5.12 Basic Coal Quality Data

LogCheck has an optional Coal Quality extension, see Chapter 11 – Coal Quality Extension which is a full Coal Quality database including various sample preparations, composite samples, reporting and exporting data on various bases and provision for the results of over 200 different tests. However, the standard version of *LogCheck* includes a basic coal quality system that handles the results for 15 different tests for raw individual ply samples.

LogCheck defines a sample by its hole name and sample number rather than just its sample number. Therefore, there is no need to include the hole name in the sample number. It does not use a sample's **From** and **To** depths to define the sample but instead every time data is opened for a sample, its **From** and **To** depths are updated from their current values in the Geology data.

Coal Quality data opens in read-only mode unless the user is in Manager mode (Settings > Manager) though it can be imported from CSV files in user mode.

The variable in Coal Quality data in the standard version of *LogCheck* are:

- **SampType** Sample Type, automatically set to PLY in the standard version of *LogCheck*.
(read-only)
- **SampNumb** Sample Number, despite its name this can include alphabetic and other non-numeric characters as well as numbers. Before a Sample Number can be entered into the Coal Quality data it must have been entered into the Geology data for the hole.
- **From** From Depth of the sample as determined from the drillhole's Geology data.
(read-only)
- **To** To Depth of the sample as determined from the drillhole's Geology data.
(read-only)
- **Thickness** Sample thickness as automatically calculated from the difference between its From and To depths.
(read-only)
- **FromSeam** Seam at the start of the sample as determined from the drillhole's Geology data. If the start of the sample sits in a seam's roof then **FromSeam** will display the seam name followed by the suffix "_RF".
(read-only)
- **ToSeam** Seam at the end of the sample as determined from the drillhole's Geology data. If the end of the sample sits in a seam's floor then **ToSeam** will display the seam name followed by the suffix "_FLR".
(read-only)
- **FromPly** Ply at the start of the sample as determined from the drillhole's Geology data.
(read-only)
- **ToPly** Ply at the end of the sample as determined from the drillhole's Geology data.
(read-only)
- **LR** Linear Recovery as automatically determined by *LogCheck* from the drillhole's Geology data based on the amount of Core Loss recorded for the sample interval.
(read-only)
- **VR** Volume Recovery
- **LabName** Laboratory Name
- **ReportNo** Laboratory Report Number
- **Basis** Basis for samples, automatically set to ARP for As Reported in the standard version of *LogCheck*. As Reported is means the results are to the standard basis for the variable as specified in the CoalLog standard. For all variables in the Basic Coal Quality system this is Air Dried except for Total Moisture which is As Received.
(read-only)
- **MassAD** Sample Mass (kg)
- **RD** Relative Density
- **TM** Total Moisture (%)
- **MIAS** Moisture in Analysis Sample (%), historically often called Inherent Moisture.

- **Ash** Ash (%)
- **VM** Volatile Matter (%)
- **FC** Fixed Carbon (%)
- **SE** Specific Energy (MJ/kg)
- **CV** Gross Calorific Value (kCal/kg)
- **TS** Total Sulphur (%)
- **Cl** Chlorine (%)
- **P** Phosphorus (%)
- **F** Fluorine (ppm)
- **CSN** Crucible Swell Number
- **GiesMF** Gieseler Maximum Fluidity (dd/min)

The mandatory fields are **SampNumb**, **LabName** and **ReportNo**.

For test results, as well as be able to enter numeric values, the following values can also be entered:

- a numeric value preceded with a < to indicate that it is below the lower detection limit that follows the < sign
- a numeric value preceded with a > to indicate that it is above the upper detection limit that follows the > sign
- **IS** for insufficient sample
- **NS** for not sampled
- **NR** for not reported
- **TBA** for to be advised
- **NF** for no fluidity (only used for Gieseler measurements)

If only one of specific energy or calorific values is supplied, *LogCheck* automatically calculates the other from the supplied value.

An example of Basic Coal Quality data:

LogCheck - [C:\LogData\DEMOCQ\COALQUALITY\DEMO002 (ReadOnly)]

FileEditViewToolsSettingsHelp

	SampType	SampNumb	From	To	Thickness	FromSeam	ToSeam	LR	VR	DrillDate	LabName	ReportNo	Basis	RD	MIAS	Ash	VM	FC	SE	CV	TS	CSN	
▶	PLY	G1974/979	32.990	33.190	0.200	SU	SU	100.0	96.0	01/01/2001	ALSMKY	GS1976_252	ARP	1.34	4.1	8.0							3.5
	PLY	G1974/980	33.190	34.130	0.940	SU	SU	38.3	74.0	01/01/2001	ALSMKY	GS1976_252	ARP	1.31	4.2	6.0							3.0
	PLY	G1974/981	34.490	34.540	0.050	SL	SL	100.0		01/01/2001	ALSMKY	GS1976_252	ARP	1.53	3.6	31.8							1.0
	PLY	G1974/982	34.540	35.780	1.240	SL	SL	18.5		01/01/2001	ALSMKY	GS1976_252	ARP	1.27	5.3	2.5							4.0
	PLY	G1974/1092	63.050	63.710	0.660	R	R	65.2		01/01/2001	ALSMKY	GS1976_252	ARP	1.33	4.2	9.2	39.4	47.2		IS	IS	0.25	2.5
	PLY	G1974/1091	63.710	64.770	1.060	R	R	62.3		01/01/2001	ALSMKY	GS1976_252	ARP	1.28	4.7	4.3	41.4	49.6	31.55	7534	0.29	3.0	
	PLY	G1974/1093	75.680	76.720	1.040	UN1	UN1	100.0		01/01/2001	ALSMKY	GS1976_252	ARP	1.36	5.0	10.9	35.8	48.3	28.90	6901	0.54	2.0	
	PLY	G1974/1265	116.380	116.620	0.240	UN3	UN3	100.0	94.0	01/01/2001	ALSMKY	GS1976_252	ARP	1.38	6.3	16.4							2.0
	PLY	G1974/1266	116.620	117.270	0.650	UN3	UN3	100.0	37.0	01/01/2001	ALSMKY	GS1976_252	ARP	1.37	6.8	12.1							1.0
	PLY	G1974/1267	117.270	117.860	0.590	UN3	UN3	100.0	151.0	01/01/2001	ALSMKY	GS1976_252	ARP	1.30	5.3	5.5							3.5
	PLY	G1974/1268	151.390	152.270	0.880	P	P	47.7	84.0	01/01/2001	ALSMKY	GS1976_252	ARP	1.32	4.0	5.7							1.0
	PLY	G1974/1269	152.270	152.860	0.590	P	P	100.0	85.0	01/01/2001	ALSMKY	GS1976_252	ARP	1.28	3.9	3.3							3.5
	PLY	G1974/1270	152.860	152.930	0.070	P	P	100.0	109.0	01/01/2001	ALSMKY	GS1976_252	ARP	2.17	4.2	75.2							0.0
	PLY	G1974/1271	152.930	153.930	1.000	P	P	100.0	98.0	01/01/2001	ALSMKY	GS1976_252	ARP	1.30	4.1	4.7							3.5
	PLY	G1974/1272	153.930	154.830	0.900	P	P	100.0	85.0	01/01/2001	ALSMKY	GS1976_252	ARP	1.32	4.3	4.7							1.5
	PLY	G1974/1273	154.830	155.540	0.710	P	P	100.0	86.0	01/01/2001	ALSMKY	GS1976_252	ARP	1.32	5.1	2.3							1.0
	PLY	G1974/1274	155.540	156.390	0.850	P	P	100.0	80.0	01/01/2001	ALSMKY	GS1976_252	ARP	1.50	4.2	26.4							2.5
	PLY	G1974/1275	156.390	157.360	0.970	P	P	100.0	79.0	01/01/2001	ALSMKY	GS1976_252	ARP	1.35	4.1	10.8							4.5
	PLY	G1974/1276	157.360	158.110	0.750	P	P	100.0	105.0	01/01/2001	ALSMKY	GS1976_252	ARP	1.32	4.0	7.1							3.5
	PLY	G1974/1277	158.110	158.400	0.290	P	P	100.0	104.0	01/01/2001	ALSMKY	GS1976_252	ARP	1.51	4.4	29.4							1.0
	PLY	G1974/1404	201.000	201.760	0.760	HCU	HCU	100.0	97.0	01/01/2001	ALSMKY	GS1976_252	ARP	1.31	3.5	6.4							4.0
	PLY	G1974/1405	201.940	203.220	1.280	HCL	HCL	100.0	86.0	01/01/2001	ALSMKY	GS1976_252	ARP	1.33	4.9	2.5							1.0
	PLY	G1974/1406	203.220	204.470	1.250	HCL	HCL	100.0	89.0	01/01/2001	ALSMKY	GS1976_252	ARP	1.30	4.1	1.4							3.5
	PLY	G1974/1407	225.420	226.700	1.280	UN4	UN4	100.0		01/01/2001	ALSMKY	GS1976_252	ARP	1.39	3.4	12.1							
	PLY	G1974/1408	226.700	227.480	0.780	UN4	UN4	100.0		01/01/2001	ALSMKY	GS1976_252	ARP	1.28	3.1	2.3							
	PLY	G1974/1552	281.940	282.620	0.680	DU	DU	100.0		01/01/2001	ALSMKY	GS1976_252	ARP	1.31	6.7	3.6	33.1	56.6	31.05	7415	0.25	1.5	
	PLY	G1974/1553	285.000	285.900	0.900	DL	DL	100.0		01/01/2001	ALSMKY	GS1976_252	ARP	1.29	5.1	3.9	36.5	54.5	30.65	7319	0.35	4.0	
	PLY	G1974/1628	311.530	312.670	1.140	LRN	LRN	80.7		01/01/2001	ALSMKY	GS1976_252	ARP	1.32	5.7	6.0	33.0	55.3	31.50	7522	0.31	1.5	

Sample Type (PLY/Comp)

5.13 Daily Activity Data

Unlike nearly all other *LogCheck* data where a data table refers to an individual hole, daily activity data refers to a particular date. Daily activity data are all full verbal descriptions.

The variables in Daily Activity data are:

- **Safety** Safety procedures executed on the day
- **General** General description of the activities of the day
- **Planned** Planned activities for the following day

An example of Daily Activity data:

<p>Safety Comments</p> <p>All safe and really well</p> <p>Safety theme "Pos Coms"</p>
<p>General Comments</p> <p>Really good day all round on the north, both Wizard rigs topped 200m. Rig 2 completed AVC082_O (190479) to 158.5m and drilled AVC085_O (190508) to 92.4m. Rig 7 completed AVC081_O (190444) to 120m, completed AVC084_O (190452) to 132m and drilled AVC086_O (190456) to 12m. The marauders from the south arrived today and parked up near their next site 190470. Good day for earthworks as well with another 11 sites cleared. Darren will return on Wednesday to clear more.</p>
<p>Planned Operations (next 24hrs)</p> <p>ECD to commence drilling on site 190470 AVC083_O.</p> <p>Rig 2 to complete AVC085_O and move to 190413.</p> <p>Rig 7 to complete AVC086_O and move to 190467.</p>

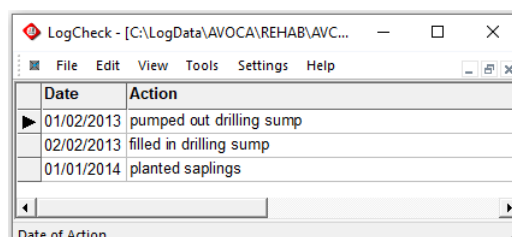
5.14 Rehabilitation Data

This enables the capturing of the rehabilitation that has been performed for a hole.

The variables in Rehabilitation data are:

- **Date** Date the action was performed
- **Action** The rehabilitation undertaken as a verbal description

An example of Rehabilitation data:



The screenshot shows the LogCheck application window with the following table of data:

Date	Action
01/02/2013	pumped out drilling sump
02/02/2013	filled in drilling sump
01/01/2014	planted saplings

Below the table is a scroll bar and a label 'Date of Action'.

Chapter 6

Creating, Importing and Opening Data

By the end of this chapter you will be able to:

- Create new data for a hole.
- Import data from a CSV file.
- Open holes for editing.
- Create and edit a group of holes known as a hole set.
- Create and edit a set of hole data intervals.

6.1 Introduction

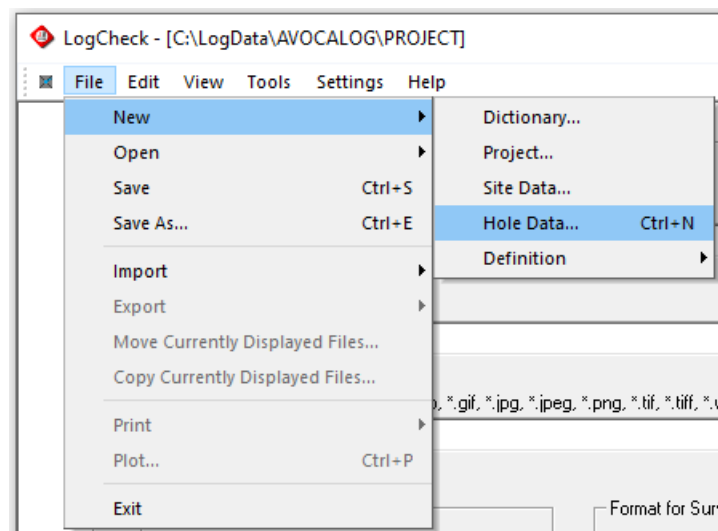
This chapter describes how to create, import or open drill holes. Once completed, the drill holes can be viewed, edited, revalidated, plotted, exported and/or reports generated.

When opening drill holes, you can select a single hole, all holes, or a group of holes, known as a hole set. Holes in a hole set can be selected from a list, by specifying a section, such as north-south or oblique section, and/or by creating a query or by importing a list from a text file.

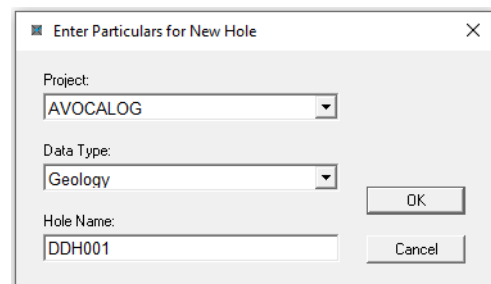
For the selected hole or holes, you can also select a predefined interval, known as an interval definition. This is usually used for plotting or reporting on just part of a drill hole, for example, from the roof of a specified seam to the floor of a specified seam.

6.2 Creating New Data for a Hole

The first step in this process is to create a new table of this data type for the hole by selecting File > New > Hole Data from the *LogCheck* menu:



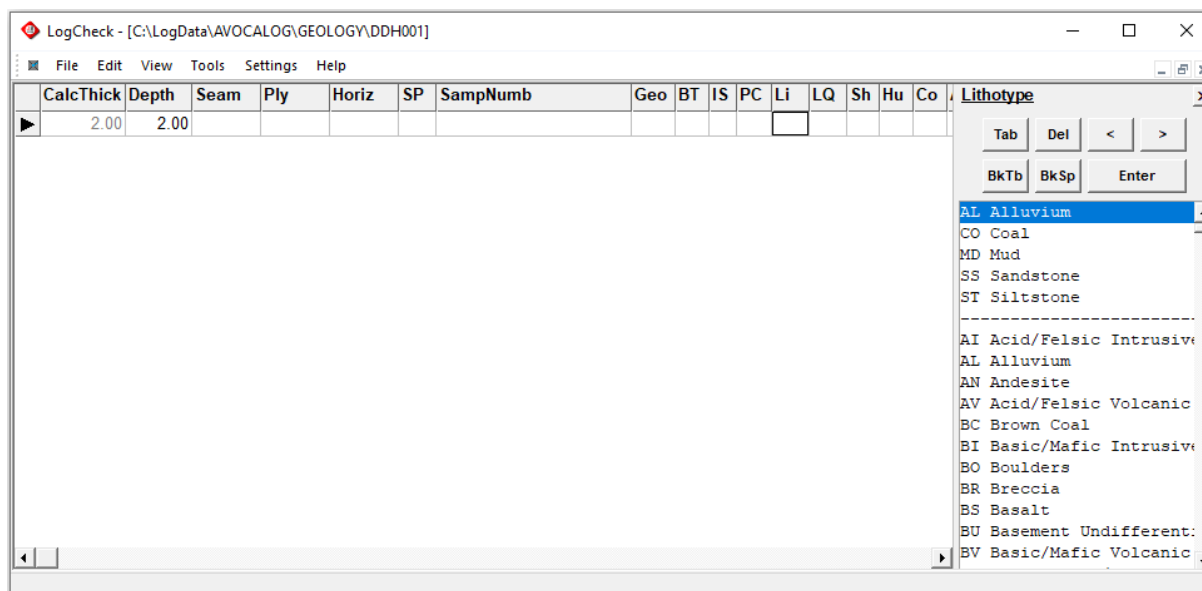
Then the window shown on the right will prompt for the Project, Data Type and the Hole Name for the new hole data.



On clicking OK, *LogCheck* will create the new table in the directory named after the data type and sitting in the project directory. It uses the hole name as its filename with a .DBF extension. Hole names in *LogCheck* are always upper case and cannot contain blanks. Hole names are generally restricted to a maximum of eight characters but can be up to sixteen characters if specifically requested.

In the above example, *LogCheck* creates two files named DDH001.dbf and DDH001.dbt in the folder Geology in the project AVOCALOG. The DBF file will contain the coded data for the hole and the DBT file the comments. If the data type directory Geology does not exist, *LogCheck* creates it.

Following creation of the table, it will then be opened in the *LogCheck* editor, as shown below:



In the above figure, the first depth of 2.00 m has been entered, and the cursor is currently in the Li (Lithotype) column. The Tab key moves the cursor to the next field, or the mouse can be used to select a column. For those data values that have an associated dictionary, the dictionary entries are displayed on the right-hand side of the editor – in this example, Lithotype entries are displayed. Pressing the down-arrow key commences a new row. The *LogCheck* editor is described in more detail in Chapter 7 of the *LogCheck* User Manual.

Hole data can be deleted, renamed or moved to another project or computer by using Windows Explorer. The filenames for a particular hole is the same for all data types, therefore care must be taken when moving files to ensure that they are placed in the correct directory for that data type in the destination project. For example, the geology data for hole DDH001 will be stored in a file named DDH001.dbf, in the Geology folder – the full path is as follows:

C:\LogData\AVOCALOG\Geology\DDH001.dbf

The header data for the same hole has the same name, DDH001.dbf and is stored in a file named DDH001.dbf, in the Headers folder – the full path is as follows:

C:\LogData\AVOCALOG\Headers\DDH001.dbf

It is essential that when deleting, renaming or moving files and whatever action that is performed on a DBF is also performed on the corresponding DBT file else the comments for the hole will be permanently lost.

6.3 Importing Data from a .CSV File

Data within .CSV being imported into *LogCheck* can be one of a number of different Data Layouts. For Geology data, the main difference between the various Data Layouts is how continuation lines for a single lithological unit are indicated.

The most common Data Layout is the *LogCheck* Data Layout. For CoalLog versions of *LogCheck*, CoalLog Data Transfer format is also widely used. There are a number of other possible Data Layouts for .CSV being imported into *LogCheck*. These include:

- MineScape / GDB
- Minex
- Vulcan
- Geobank
- Prolog
- EngLog

These Data Layouts are rarely used now. Please contact the *LogCheck* distributor for further information regarding them if your .CSV data is in one of these layouts.

The main advantage of the *LogCheck* Data Layout compared to the CoalLog Data Transfer layout is that it is more flexible but this comes at the cost of requiring more set up by the user. In particular, with *LogCheck* Data Layout, the user can have whatever column headings they wish in their data but before importing the data they must first set up a mapping between the .CSV columns and the names of the corresponding *LogCheck* variable. *LogCheck*, though does save the supplied mappings for use as the default mappings when the same type of data is next imported.

Unlike most other Data Layouts for Geology Data, the *LogCheck* Data Layout does not use a Continuation Flag column to indicate continuation lines for a single lithological unit. Instead, continuation lines are indicated by leaving the unit Base Depth blank.

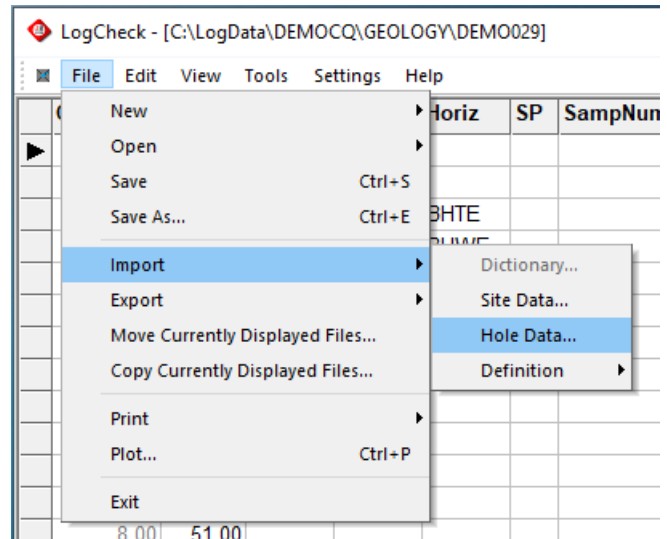
For downhole data in *LogCheck* Data Layout, the location of the interval or point being described is recorded in a number of different ways:

- For most down hole data just the Base Depth needs to be provided as the From depth is assumed to be the previous Base Depth.
- For point depth information such as Defect Mid-Point Depth is recorded in the *LogCheck* variable named Defect.
- For Point Load and Geotechnical Laboratory Tests both the Base Depth and the Sample Thickness must be provided and when the software requires a From depth it calculated this from the Base Depth and sample Thickness.
- For Coal Quality and Sample Dispatch data, no From and To Depths or Sample Thickness are required, only a Sample Number. The From and To Depths and Sample Thickness are automatically generated for the data whenever it is opened. However, all Sample Numbers used in the data must have been entered into the Geology data for the drill hole before the data can be imported.

The advantage of CoalLog Data Transfer is that no setup is required from the user before importing the data as the *LogCheck* already contains the mappings between the *LogCheck* variables and the columns in the CoalLog Data Transfer file. For more information on the layout of CoalLog Data Transfer see Chapter 7 of the CoalLog Manual available for free download from:

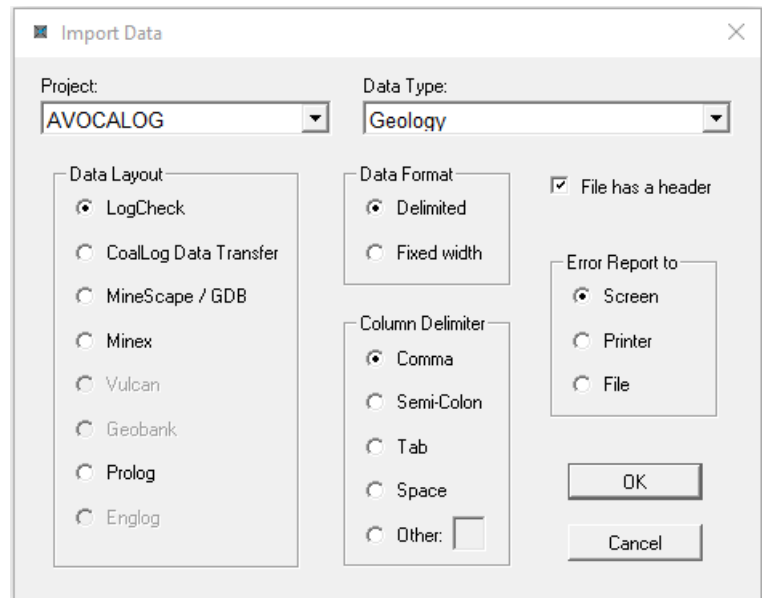
<https://www.ausimm.com/insights-and-resources/resources/codes-and-standards/coallog/>

To import Hole Data into *LogCheck*, select:

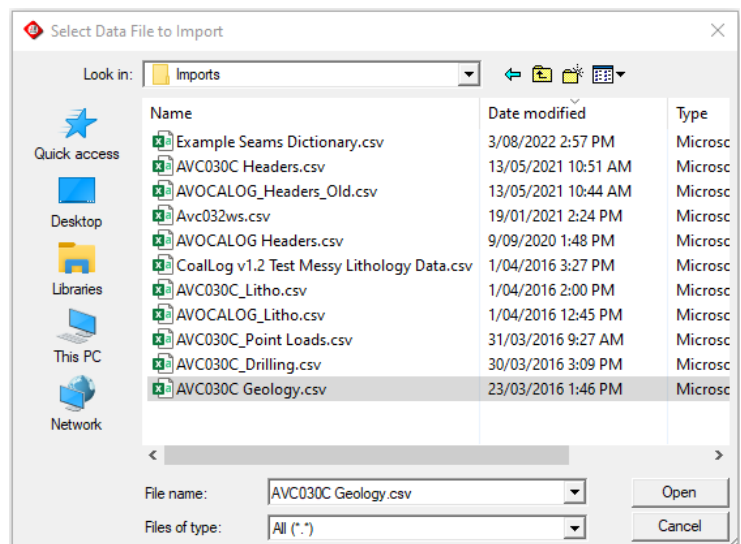


6.3.1 Importing Data in *LogCheck* Data Layout

For *LogCheck* Data Layout, select Data Layout of *LogCheck* and the Data Type of the in the .CSV file:



Then enter the location and name of the import file:



Next set the column name in the import .CSV file for each *LogCheck* variable:

The 'Select columns to import' dialog box contains the following variables and their selected column names:

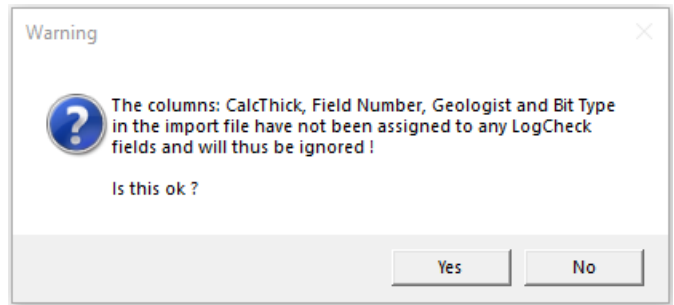
Variable	Selected Column Name
Hole Name	Hole
Interval Top Depth	From_Depth
Interval Base Depth	To_Depth
Seam Name	Seam
Ply Name	Ply
Horizon Name	Horizon
Sample Purpose	Sample Purpose
Sample Number	Sample Number
Interval Status	Interval Status
% Lithotype	Lith Percentage
Lithotype	LithoType
Lithology Qualifier	Litho Qualifier
Shade	Shade
Hue	Hue
Colour	Colour
Adjectives	Adject1
	Adject2
	Adject3
	Adject4
	Interrelationship
	Inter Relationship
Weathering	Weathering
Estimated Strength	Estimated Streng
Bedding Spacing	Bed Spacing
Defect Type	Defect Type
Defect Intact	Defect Intact
Defect Spacing	Defect Spacing
Defect Dip Angle	Defect Dip
Core State	Core State
Mechanical State	Mechanical State
Texture	Texture
Basal Contact	Basal Contact
Sedimentary Features	Sed Feature 1
	Sed Feature 2
Bedding Dip Angle	Bed Dip
Mineral/Fossil Abund.	Abundance
Mineral/Fossil Type	Mineral/Fossil
Mineral/Fossil Assoc.	Association
Gas	Gas
Comments	Comments

Pressing the drop-down arrow will display the list of column names in the import file:

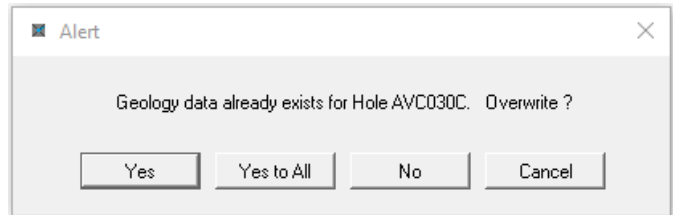
The 'Select columns to import' dialog box shows the 'Interval Base Depth' dropdown menu open, displaying the following list of column names:

- Hole
- From_Depth
- To_Depth
- CalcThick
- Seam
- Ply
- Horizon
- Sample Purpose
- Field Number
- Sample Number
- Geologist
- Bit Type
- Interval Status

LogCheck warns the user if any of the columns in the import file has not been assigned to a *LogCheck* variable:

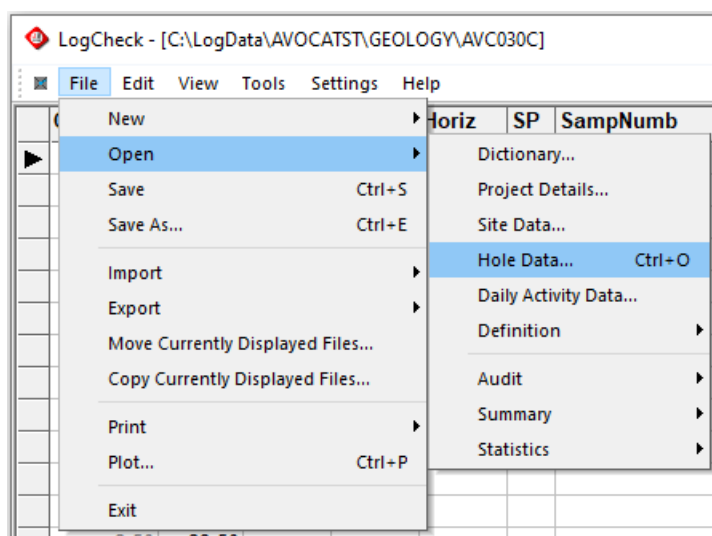


LogCheck also warns the user if any files are going to be overwritten by the imported data:

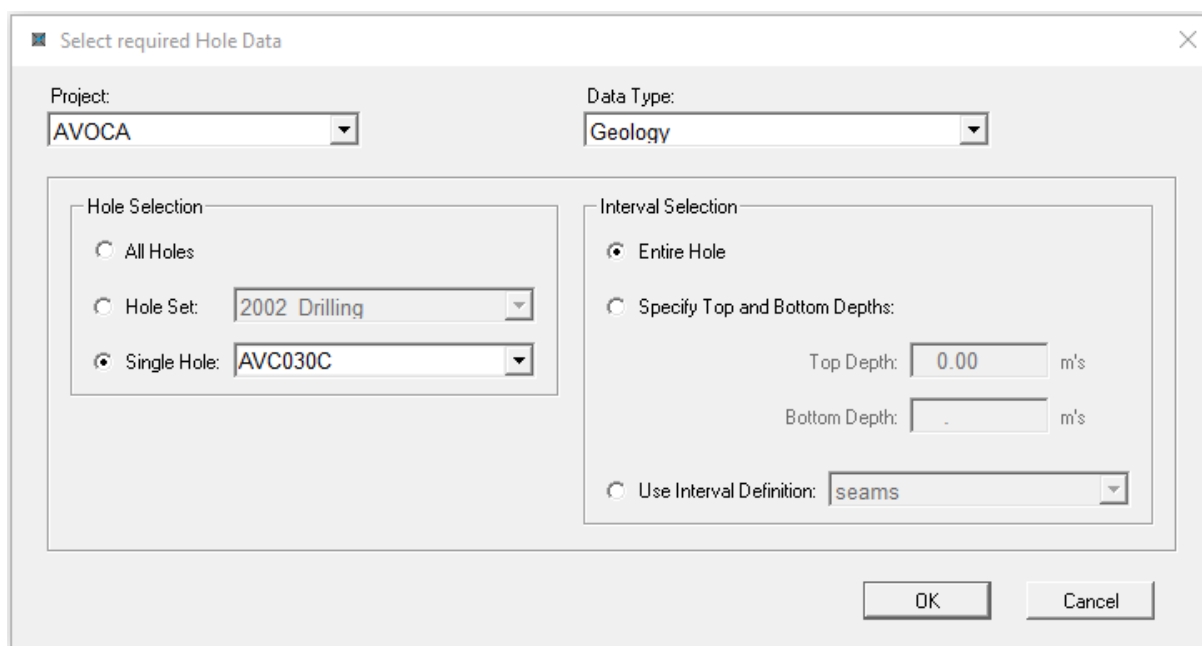


6.4 Opening Hole Data

To open already existing data the data for a drill hole, go to the File menu, select Open, then select Hole Data (or alternatively, press Ctrl+O):



Next select the required: Project, Data Type, Hole(s) and Interval to open:



6.4.1 Selecting Project

Select the Project containing the data to be opened. The drop-down list of possible projects includes all projects in the current *LogCheck* Data Directory that contain Hole Data.

6.4.2 Selecting Data Type

Select the Data Type of the data to be opened. The drop-down list contains of possible data types includes only contains the data types for which there is hole data in the currently selected project.

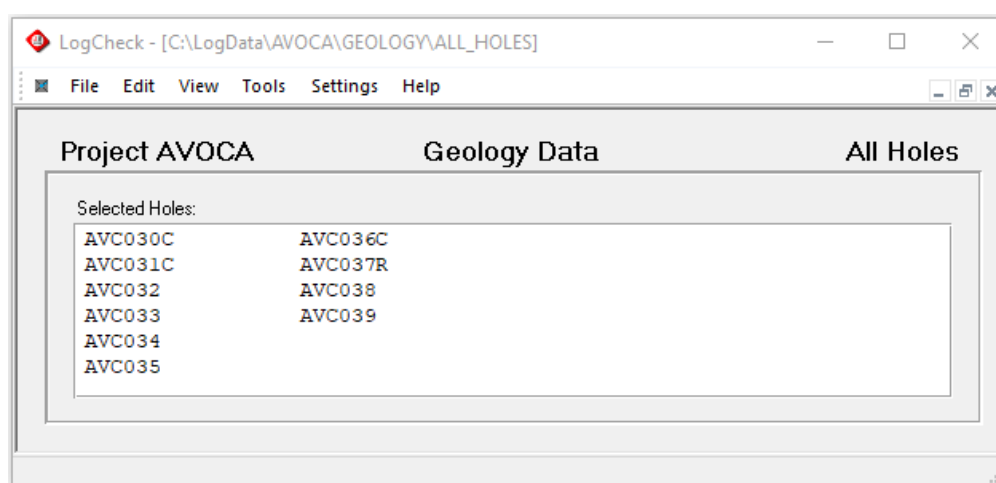
6.4.3 Selecting Holes

There are three options when selecting holes:

- All Holes All holes for the project are selected.
- Hole Set Only those holes in a specified Hole Set are available (see following section).
- Single Hole Only the hole specified is selected. Choose the required hole from the drop-down list. This list only contains the holes within the current project that have the currently selected data type.

To edit data for a hole, the Single Hole option must be selected. If multiple holes are opened, using the All Holes or Hole Set options, they can all be exported, printed and/or plotted, however, editing is limited to the Find or Find and Replace functions.

After selecting multiple holes, the screen will show the project, data type and a list of the holes that are currently open:



6.4.4 Selecting Intervals

The interval selection option allows you to specify which part(s) of the hole(s) are to be opened. The options are:

- Entire hole: Open entire.
- Specify top and bottom depths: Specify a top and bottom depth in metres.
- Use interval definition: Select an interval or intervals – see the Section below in this chapter for instructions on how to create an interval definition.

Interval selection is not available for header data as all its data applies to the entire hole.

If selecting less than the entire hole then the data opens in read-only mode. Generally, opening less than the entire hole is used for plotting or reporting.

6.4.5 Opening LAS Data

Downhole geophysical data (LAS) is opened in *LogCheck* in the same manner as other Hole Data as shown above but with the selected Data Type being LAS:

There are though a number of differences between opening LAS data and other Hole Data:

- For all other Hole Data, *LogCheck* always searches for it in that Data Type's folder in the Project's folder, whereas with LAS data, it only searches for it in a folder named LAS in the Project's folder if no other folder has been specified for the LAS File Directory in the Project Details:

Project: AVOCA

If one has been specified as shown above then *LogCheck* searches for the LAS data in this folder. If LAS data has been copied onto the user's computer but LAS is not shown as an option for Data Type, it is usually because the LAS File Directory in the Project Details is incorrect.

- For all other Hole Data, *LogCheck* only searches for the data in the Data Type's folder in the Project's folder but does not search for data in subfolders in this folder, whereas with LAS data, it not only searches the LAS data folder but also all the subfolders in the folder and all the subfolders in the subfolders etc. This thus enables the user to setup separate subfolders in the LAS data folder for each borehole and to store all the LAS files for each borehole in the subfolder named after the borehole.

- For all other Hole Data Types, *LogCheck* identifies the data's hole by the data file's file name, whereas with LAS data, *LogCheck* identifies the hole by the name specified in the WELL line in the Well Information Block of the LAS data's header:

```

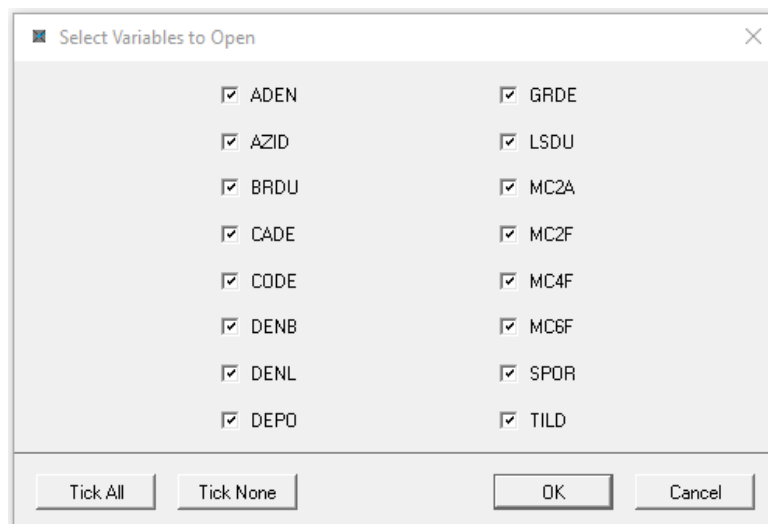
~Well Information Block
#MNM.UNIT      Data Type      Description
#-----
STRT.M         304.000        :START DEPTH
STOP.M         .010         :STOP DEPTH
STEP.M         -.010        :STEP
NULL.          -999.250      :NULL VALUE
COMP.          COALLOG       :COMPANY
WELL.          AVC030C       :WELL
FLD .          AVOCA        :FIELD

```

If when opening LAS data, the required hole does not appear in the Single Hole drop-down list even though its LAS data has been copied into the project's LAS Data Directory, it is generally because the hole name been incorrectly entered into the WELL line of its Las files.

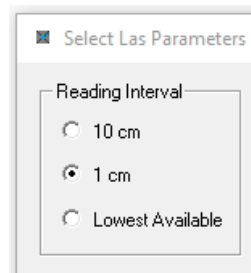
- For all other Hole Data Types, if the user opens all the data for the entire hole then they can modify the data within *LogCheck*, whereas LAS data cannot be modified in *LogCheck*. To modify LAS data the user must open the LAS file in a text editor such as NotePad.
- For all other Hole Data Types, *LogCheck* converts the data into dBASE binary files when it is originally imported or when it is entered via the keyboard, whereas with LAS data, it is only converted into dBASE binary files the first time *LogCheck* requires the particular LAS file or after the LAS file has been modified by the user. Therefore, subsequent times the LAS file is opened by *LogCheck* are considerably faster than the first time it is opened or the first time it is opened again after being modified.
- For all other Hole Data Types, all the data for the particular Data Type for each hole is stored in a single file whereas with LAS data it may be spread across a number of LAS files. These files may differ in the hole intervals that they include, the curves that they include and/or their reading intervals. Therefore, when opening LAS data *LogCheck* creates a temporary file including just the data for the required interval, required curves and the required reading interval.

As with all other Hole Data Types, the required interval is specified by the user in the Hole opening window. For LAS data, following selection of the required holes and intervals, the user is prompted for the curves that they require:



This list of possible curves includes all the curves in all the LAS files for all the holes whose LAS data is to be opened. Occasionally, the curve names displayed will look slightly different to how they are shown in the actual LAS files as the curve names used in *LogCheck* must be valid dBASE field names. Where curve names include characters that are not allowed in dBASE field names, these characters are replaced by underscore characters. For example, the curve name DEN(SS) is changed to DEN_SS.

After selecting the required curves, the user is prompted for the required reading interval:



This list of possible reading intervals includes all the reading intervals that occur in the LAS files containing the required curves for the required holes. Where the user selects *Lowest Available*, then the reading interval used for creating the temporary file for each hole is the lowest reading interval for all the LAS files for that hole containing any required curves. Where some of the required curves only have reading intervals different to that selected by the user, these curves will be resampled at the required reading interval for the temporary file.

Be warned that if there is more than one LAS file in the LAS File Directory, with different values for a required curve over the required interval at the required reading interval then *LogCheck* will merge the two sets of values with possibly unpredictable resulting values.

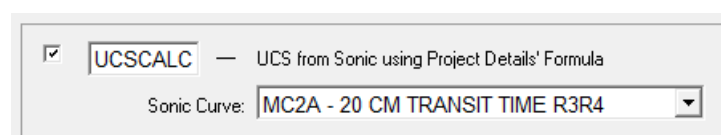
- For all other Hole Data Types, it is not possible on opening the data to adjust the data depths, whereas with LAS data, the user can specify an adjustment to all the depths in the file:



This is useful where the LAS data is to be displayed next to data collected on the hole by the geologist and the zero depth point used by the geophysical logger differed to the one used by the geologist.

- For all other Hole Data Types, no optional calculated fields are generated when opening data, whereas with LAS data, the user is provided with the option to include a number of fields that are calculated during the generation of the temporary file.

The first optional calculated field is:



Selecting this enables the user to calculate UniaxialCompressive Strength (UCS) from one of the sonic transit time curves that have been included. If no transit time curves have been selected then this option will be disabled.

The user can specify a name for the new curve and the transit time curve to use. In the above example, these are UCSCALC and MC2A respectively.

The UCS is calculated based on the parameters that the user has setup in the Project Details for the project:

UCS from Sonic Transit Time Relationship

$$\text{UCS} = 1352.0000 \times e^{-0.01250 \times t}$$

where UCS = Uniaxial Compressive Strength in MPa
t = sonic transit time in $\mu\text{s/m}$

The parameters for this relationship will vary from project to project and so must first be determined based on lab results of UCS and Sonic Transit Time values for a number of samples from preliminary holes. More information about this procedure can be found in “Geotechnical applications and interpretations of downhole geophysical logs” by G.H. McNally published by Australian Coal Industry Research Laboratories, Sydney.

The second optional calculated field is:

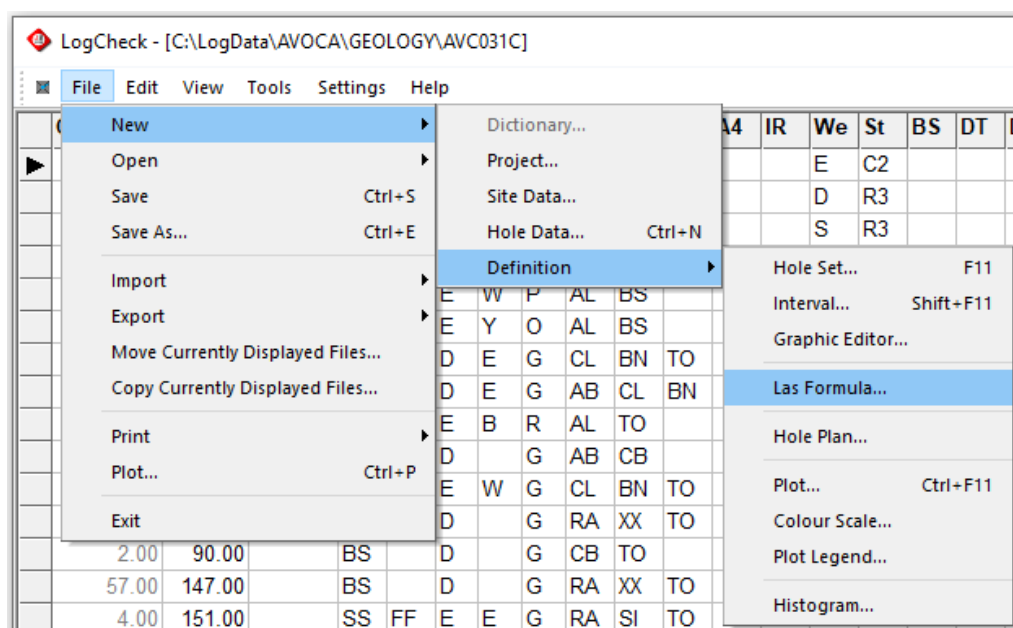
☒ UCSCALC — Calculated from a LAS Formula

LAS Formula: GeoscienceUcs

Selecting this enables the user to calculate Uniaxial Compressive Strength (UCS) from curves that have been included and a LAS Formula. The LAS Formulae are defined by a *LogCheck* definition called LAS Formula. If no LAS Formulae have been selected then this option will not be enabled.

The user can specify a name for the new curve and the LASFormula to use. In the above example, these are UCSCALC and GeoscienceUcs respectively.

To create a LAS Formula Definition, select File > New > Definitions > Las Formula:



An example of a Las Formula for calculating UCS:

Las Formula Definition: GeoscienceUcs

Las Formula

```
iif(den_ss < 1.8, 0.07 * vl2f - 148.57, 5785 * exp(-17374 / vl2f))
```

The formula is expressed in dBASE's query language (see Appendix B). In the above example, the formula essentially uses sonic velocity rather than transit time and uses a different calculation for UCS depending on whether the readings were taken in coal ($\text{den_ss} < 1.8$) or non-coal.

The third optional calculated field is:

☒ **RSI** — Roof Strength Index using:

Density Curve: **ADEN - VECTAR PROCESSED DENSITY**

UCS: **UCSCALC - UCS CALCULATED FROM MC2**

Replace missing densities with: ☒ Average rock density for hole

☐ 2.50 g/cc

Selecting this enables the user to calculate Roof Strength Indices (RSI) using a density curve and UCS curve. RSI is calculated for each reading by calculating the insitu pressure above the reading by summing the density times the reading interval of all the readings above the reading and then dividing this pressure by the readings UCS. If no density curves have been selected or if no UCS curves has been either selected or calculated then this option will be disabled.

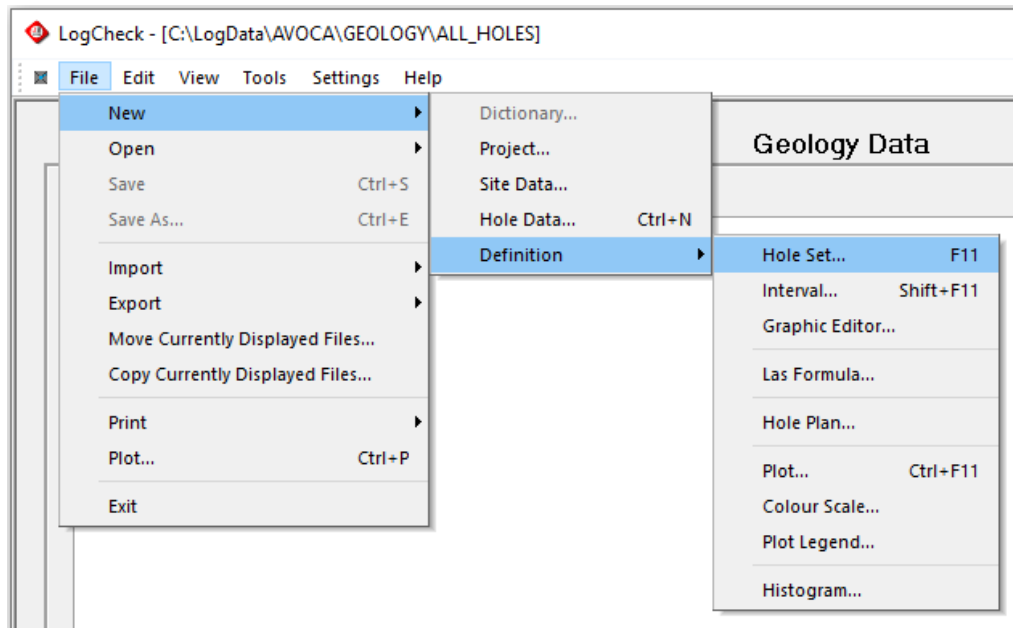
The user can specify a name for the new curve, the density and UCS curves to use. In the above example, these are RSI, ADEN and UCSCALC respectively. The user can also specify whether when calculating pressures to replace any missing densities with either the Average rock density for the hole or by a specified density value.

6.5 Creating/Editing Hole Set Definitions

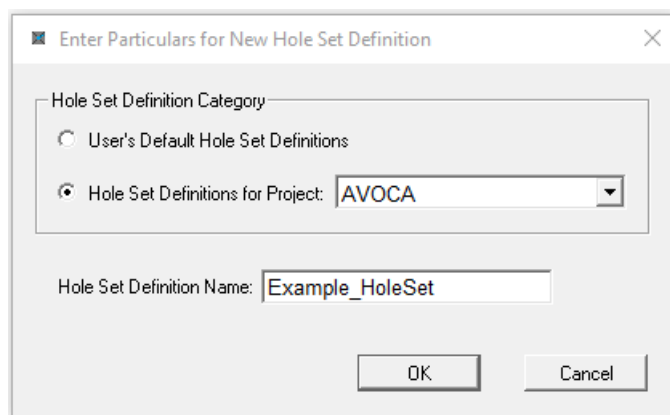
A Hole Set Definition is a group of holes that can be operated on simultaneously, for example to:

- Revalidate all the data for a group of holes,
- Plot a group of holes,
- Report on a group of holes
- Export data for a group of holes to other systems.

To create a new Hole Set Definition, go to File > New > Definition, then select Hole Set:

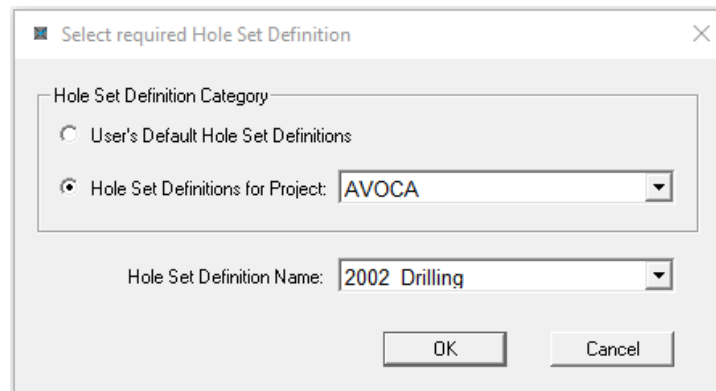


Next enter the location and name for the new Hole Set:

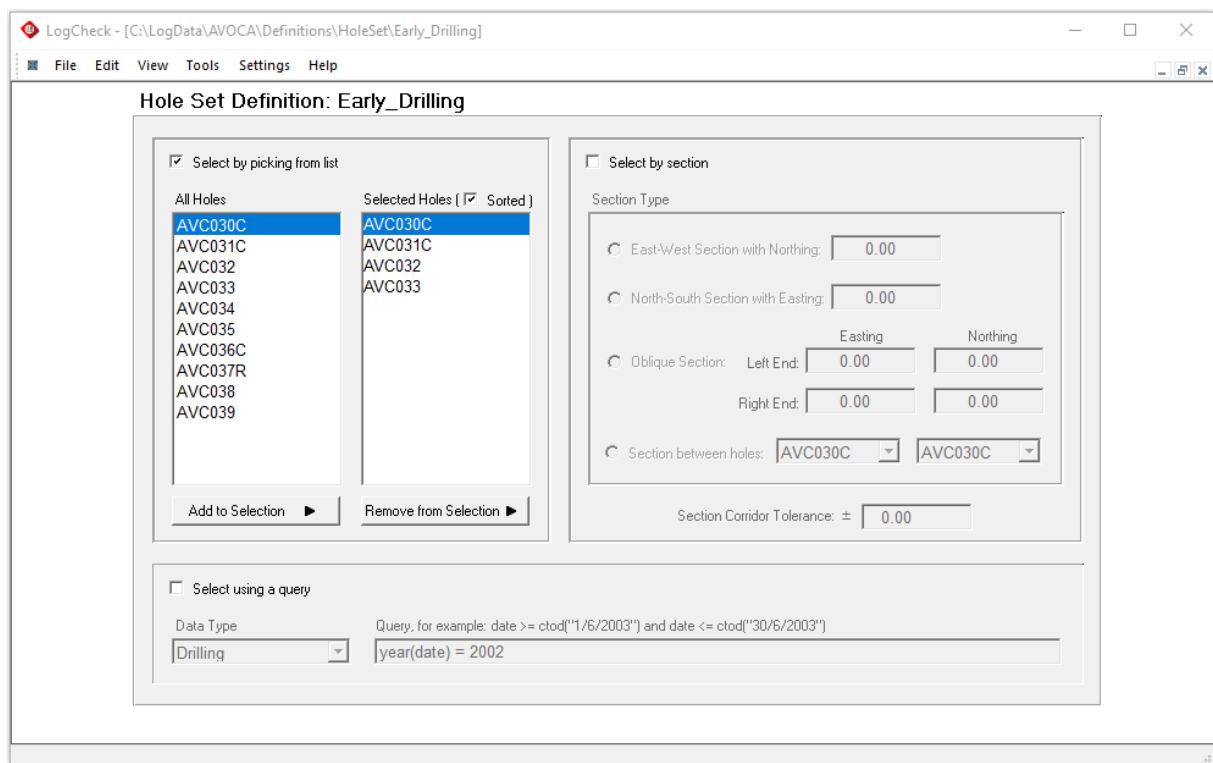


The Hole Set Definition Name that the user supplies can be of any length and contain upper and lower case characters but cannot include blanks.

To open an existing Hole Set Definition, go to File > Open > Hole Set definition, and then select the required Hole Set.



Next the Hole Set Definition form is displayed:



Holes to be included in the hole set can be chosen in three ways:

- by picking from list
- by selecting those on a section;
- using a query

6.5.1 Select by Picking from List

The figure below is the panel of the Hole Set Definition form that enables selecting drill holes by creating a list of selected holes from a list of all holes in the project for which data exists for at least one data type:

☒ Select by picking from list

All Holes	Selected Holes (<input checked="" type="checkbox"/> Sorted)
AVC030C	AVC030C
AVC031C	AVC031C
AVC032	AVC032
AVC033	AVC033
AVC034	
AVC035	
AVC036C	
AVC037R	
AVC038	
AVC039	

Add to Selection ► Remove from Selection ►

Select from the list on the left, then click the Add to Selection button. Multiple selections can be made by using the Ctrl or Shift keys with the mouse. The example above shows that holes AVC030C, AVC031C, AVC032 and AVC033 have been included in the Hole Set. To remove holes from the list, select them and then click the Remove from Selection button.

If the Sorted box after Selected Holes is not ticked then the holes are listed in the order that they were selected rather than in alphanumeric order:

☒ Select by picking from list

All Holes	Selected Holes (<input type="checkbox"/> Sorted)
AVC030C	AVC032
AVC031C	AVC031C
AVC032	AVC033
AVC033	AVC030C
AVC034	
AVC035	
AVC036C	
AVC037R	
AVC038	
AVC039	

Add to Selection ► Remove from Selection ►

This is useful, if the user wishes to plot the holes on a section but rather than doing a scaled wants to plot the holes a fixed distance apart and to define the order that they appear.

6.5.2 Select by Section

The figure below is the panel of the Hole Set Definition form that enables selecting those drill holes that are located along a section:

Select Section Type:

- East-West Section and then enter the section's Northing
- North-South Section and then enter the section's Easting
- Oblique Section and then enter the coordinates of the left and right-hand ends of the section
- Section between specified holes and then select the names of the hole that the section is between

The Section Corridor Tolerance allows you to set the width of the corridor for including holes. Clearly, Select by Section can only select holes whose coordinates have been entered in the header data.

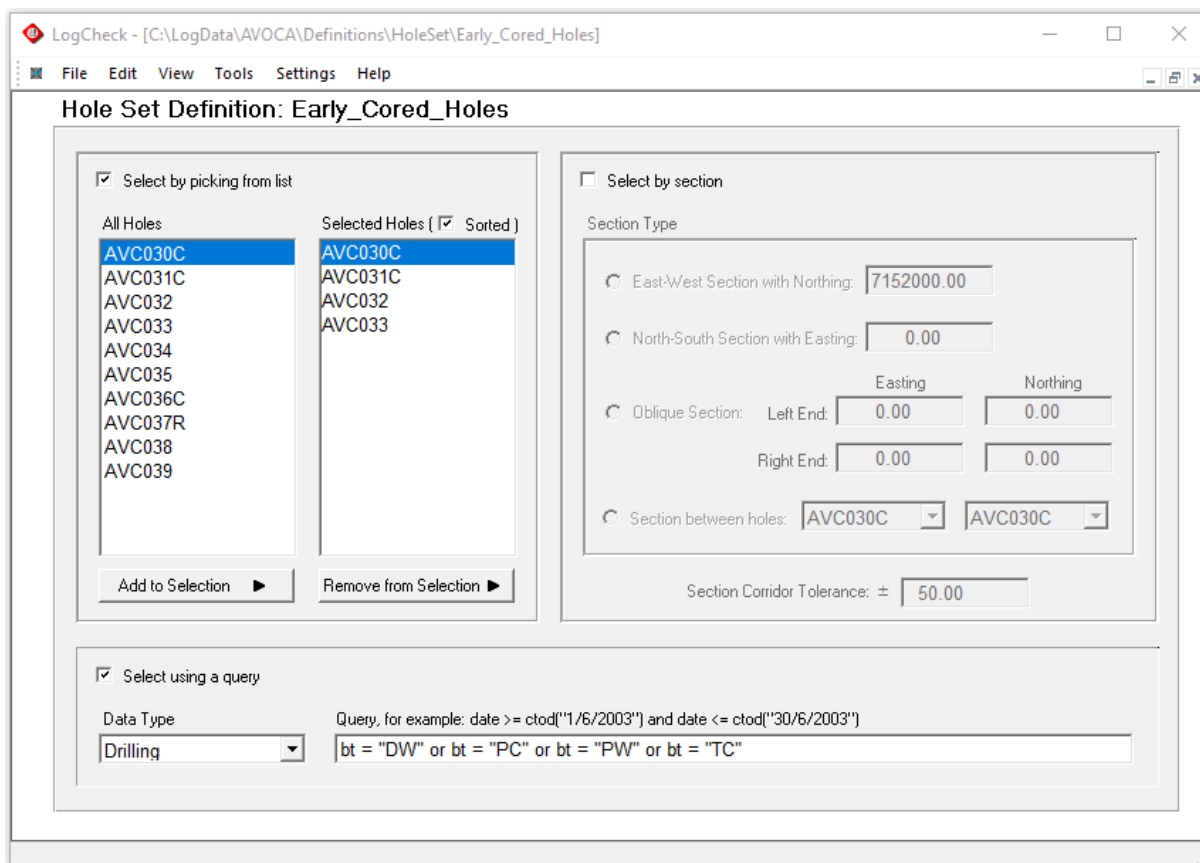
6.5.3 Select using a Query

The figure below is panel of the Hole Set Definition form that allows you to create a hole set by using a query. The query is in DBL, which is the dBase query language (see Appendix B).

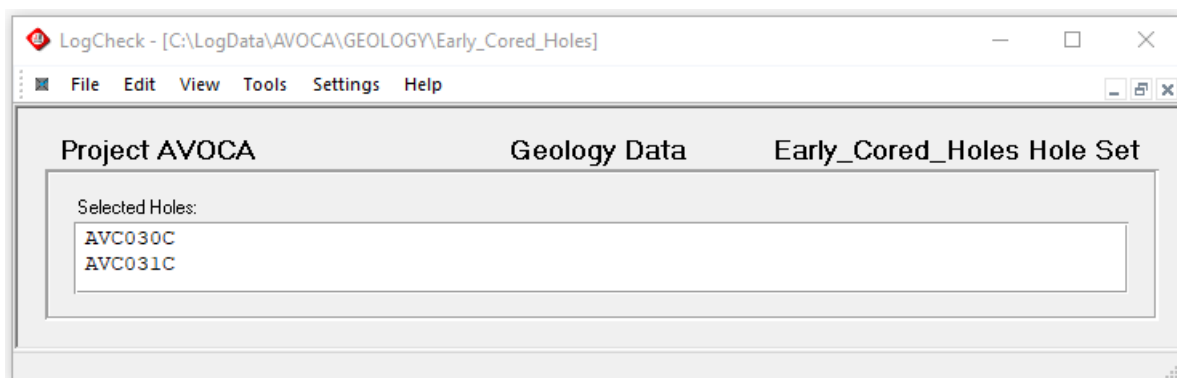
In this example, all holes containing a cored section somewhere in the hole will be selected. The Bit Type field in Drilling data is named bt and DW, PC, PW and TC are all CoalLog Bit Types that are produce core. Note that when entering a character value in the query it must be enclosed in double quotes.

6.5.4 Select using a Combination of Methods

Holes can be selected using a combination of the methods described above by ticking multiple methods. For example, to select the cored holes from a list, tick both Select by picking from list and Select using a query:

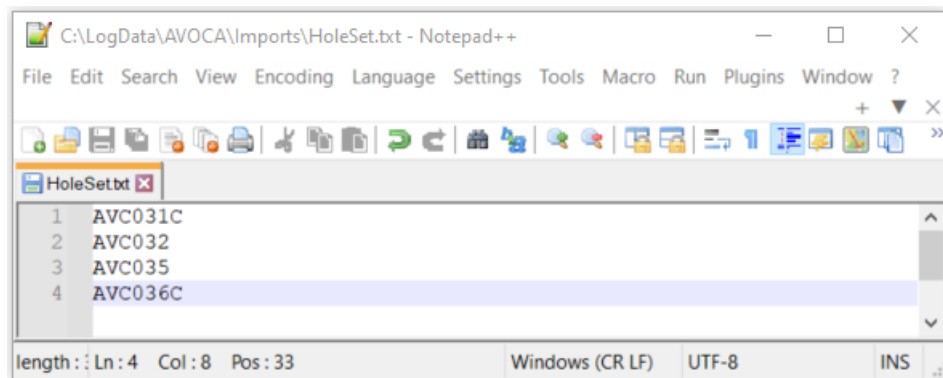


The above example, will select only the cored holes from the list AVC030C, AVC031C, AVC032 and AVC033:

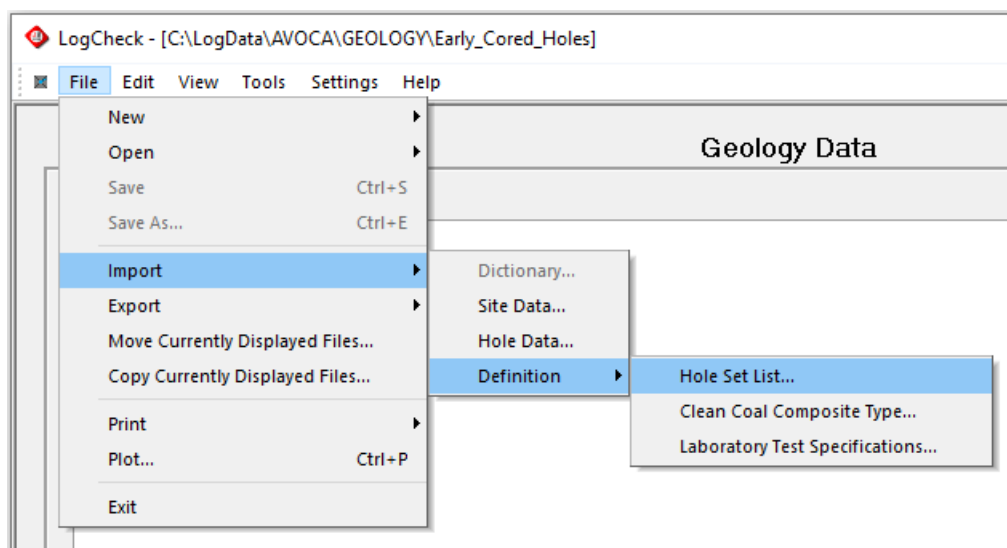


6.5.5 Importing a Hole Set

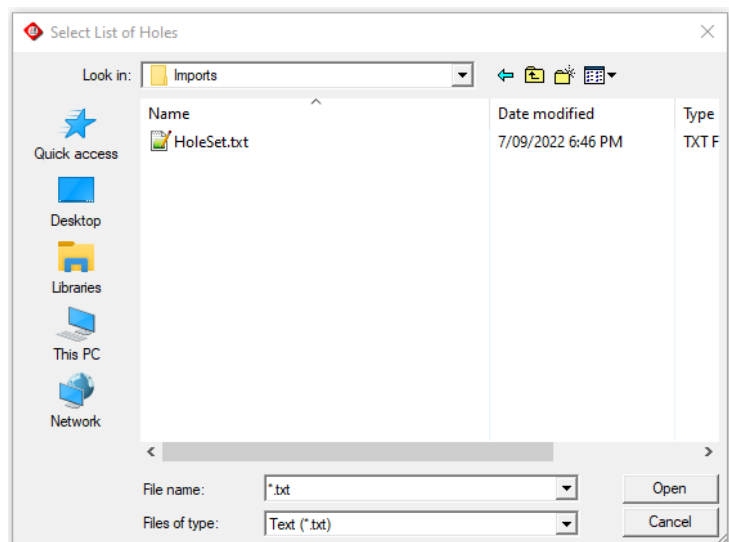
A Hole Set Definition can also be created by importing a list of holes from a text file. For example, Notepad++ can be used to create a list of hole names:



To create a Hole Set from the text file. Select File > Import > Definition > Hole Set List



Next select the file containing the list of holes:



Finally select the Project for the Hole Set and the name it is to be given:

Enter Particulars for New Hole Set Definition

Project: AVOCA

Hole Set Definition Name: My_New_HoleSet

OK Cancel

After importing the Hole Set will be displayed:

LogCheck - [C:\LogData\AVOCA\Definitions\HoleSet\My_New_HoleSet]

File Edit View Tools Settings Help

Hole Set Definition: My_New_HoleSet

☒ Select by picking from list

All Holes: AVOCA030C, AVOCA031C, AVOCA032, AVOCA033, AVOCA034, AVOCA035, AVOCA036C, AVOCA037R, AVOCA038, AVOCA039

Selected Holes (☒ Sorted): AVOCA031C, AVOCA032, AVOCA035, AVOCA036C

Add to Selection Remove from Selection

☐ Select by section

Section Type

☒ East-West Section with Northing: 0.00

☐ North-South Section with Easting: 0.00

☐ Oblique Section: Left End: Easting 0.00 Northing 0.00 Right End: Easting 0.00 Northing 0.00

☐ Section between holes: AVOCA030C AVOCA030C

Section Corridor Tolerance: ± 0.00

☐ Select using a query

Data Type: Headers

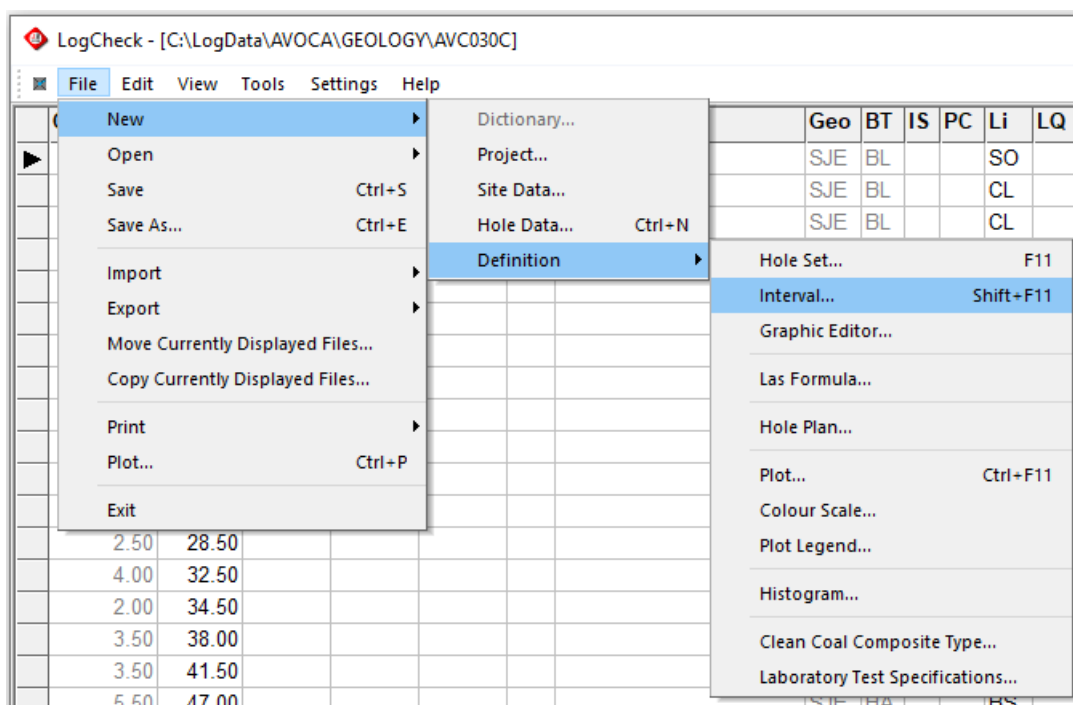
Query, for example: date >= ctod("1/6/2003") and date <= ctod("30/6/2003")

6.6 Creating/Editing Interval Definitions

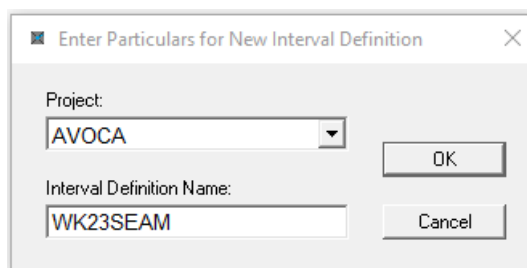
An Interval Definition enables specification of downhole intervals, based on specific criteria for the top and bottom of the interval. This can be used in the Open Hole window to specify which part of a hole or holes to open for viewing, plotting, exporting and/or reporting.

6.6.1 Creating a New Interval Definition

To create a new Interval Definition, go to File > New > Definition then select Interval.



This displays the window to enter the name for the new Interval Definition:



Enter a relevant name (in this example, WK23SEAM), then click OK.

Next, the Interval Definition window for the new interval definition is displayed:

Interval Definition: WK23SEAM

Data Type to use for Selection Criteria
 Geology

Interval Top Definition

0.00 metres ☒ above ☐ top of unit directly above selected units
☐ below ☒ top of selected units
☐ base of selected units
☐ base of unit directly below selected units

Selected units, for example, SEAM = "P" and DEPTH >= 100, (leave blank for top of hole)

Interval Bottom Definition

0.00 metres ☐ above ☐ top of unit directly above selected units
☒ below ☐ top of selected units
☒ base of selected units
☐ base of unit directly below selected units

Selected units, for example, SEAM = "P" and DEPTH >= 100, (leave blank for bottom of hole)

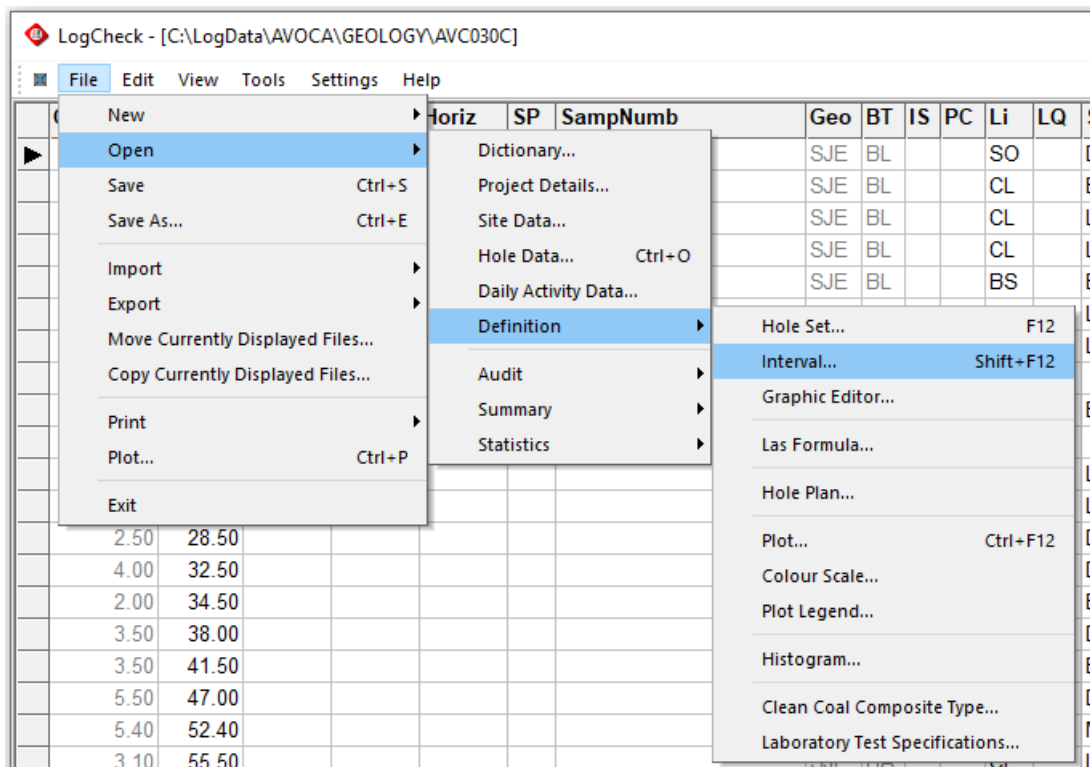
Procedure for Multiple Intervals in a Single Hole

☒ a single interval from the first top to the last bottom
☐ a single interval from the first top to the first bottom below it
☐ multiple intervals from each top to the first bottom below that top

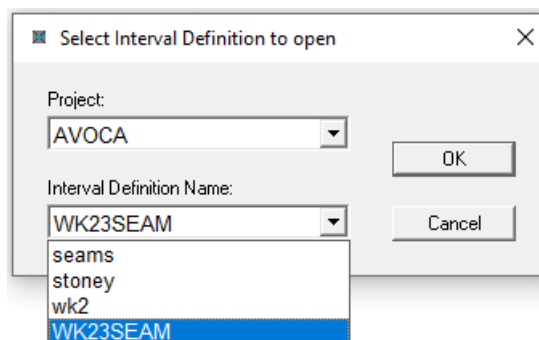
As with the Query option in the Hole Set Definition, the response to the Selected Units prompt for the interval Top and Bottom is in DBL (see Appendix B).

6.6.2 Open an Existing Interval Definition

To open an existing Interval Definition, go to File > Open > Definition, then select Interval Definition.



This then brings up the window:



Select the required Interval Definition and click the OK button to display the Interval Definition window (shown below).

Interval definitions can be specified that display as a single interval, or as multiple intervals that do not display all the intervening intervals between the units in the *LogCheck* editor. Examples of these are discussed in the following sections.

6.6.2.1 Example 1: Single Interval for One or More Units

An interval definition based on the geology data that runs from 2.0m above the top of the WK2 seam to 2.0m below the base of the WK3 seam that will display as a single interval in the *LogCheck* editor is shown below:

Interval Definition: WK23SEAM

Data Type to use for Selection Criteria
 Geology

Interval Top Definition

2.00 metres ☒ above ☐ top of unit directly above selected units
☐ below ☒ top of selected units
☐ base of selected units
☐ base of unit directly below selected units

Selected units, for example, SEAM = "P" and DEPTH >= 100, (leave blank for top of hole)
 SEAM = "WK2"

Interval Bottom Definition

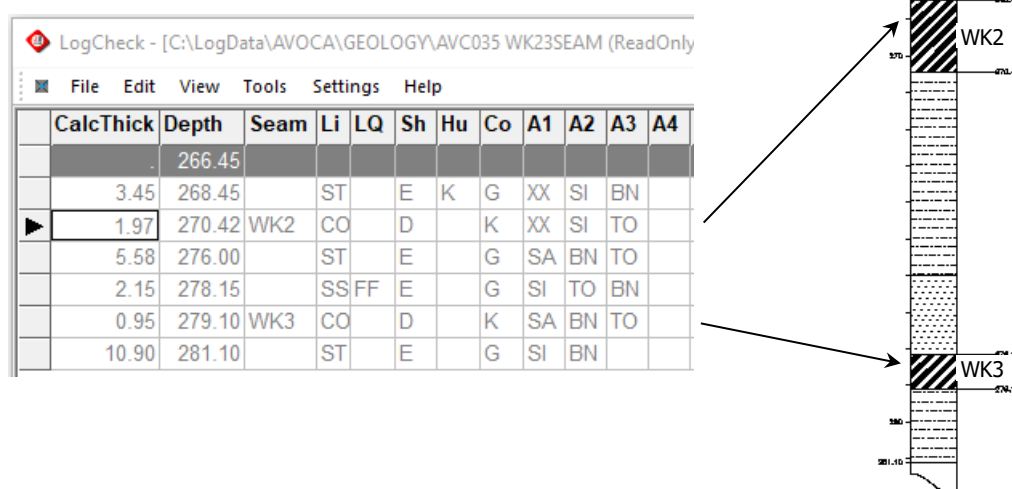
2.00 metres ☐ above ☐ top of unit directly above selected units
☒ below ☐ top of selected units
☒ base of selected units
☐ base of unit directly below selected units

Selected units, for example, SEAM = "P" and DEPTH >= 100, (leave blank for bottom of hole)
 SEAM = "WK3"

Procedure for Multiple Intervals in a Single Hole

☒ a single interval from the first top to the last bottom
☐ a single interval from the first top to the first bottom below it
☐ multiple intervals from each top to the first bottom below that top

The result of opening up hole AVC035 with the WK23SEAM interval definition in the *LogCheck* hole editor is shown below on the left. If the hole is then plotted (File > Plot), the results are shown on the right. This example illustrates the effect of selecting the “*Single interval from the first top to the last bottom*” option from the Multiple Interval choices in the interval definition.



The range selected by this interval definition is displayed as a single interval in the *LogCheck* editor even though the intervening interval between the WK2 and WK3 seams is longer than the 2.0m above the WK2 seam and below the WK3 seam.

Note that a blank row coloured dark grey is used to indicate that only part of the hole has been opened. Although the total logged depth of the hole is 314.0m, the editor only displays down to the 2.0 m below the base of the WK3 seam that was specified in the interval definition.

The data type used for the selection criteria does not have to be the same as the data type that is being opened. For example, the above interval definition could be used to open the LAS data for all depths from 2.0m above the top of the WK2 seam to 2.0m below the base of the WK3 seam. As a variation on this example, if “WK2” and “WK3” is replaced with “WK”, this would define an interval running from 2.0m above the first seam starting with “WK” to 2.0m below the last seam starting with a “WK”.

Because the selection criteria are applied with the dBASE DBL query language, specifying “WK ”, where there is a blank after the “K”, would select from 2.0m above the first seam named precisely “WK” to 2.0m below the seam named precisely “WK”. In this case, the trailing blank enforces a strict match with the characters, rather than matching any seam that started with “WK”.

6.6.2.2 Example 2: Selecting Multiple Intervals in a Single Hole

This example illustrates the effect of selecting the “*multiple intervals from each top to the first bottom below that top*” option from the Multiple Interval choices in the interval definition.

Interval Definition: Seams

Data Type to use for Selection Criteria
Geology

Interval Top Definition
1.00 metres ☒ above ☐ top of unit directly above selected units
☐ below ☒ top of selected units
☐ base of selected units
☐ base of unit directly below selected units
Selected units, for example, SEAM = "P" and DEPTH >= 100, (leave blank for top of hole)
SEAM <> " "

Interval Bottom Definition
1.00 metres ☐ above ☐ top of unit directly above selected units
☒ below ☐ top of selected units
☒ base of selected units
☐ base of unit directly below selected units
Selected units, for example, SEAM = "P" and DEPTH >= 100, (leave blank for bottom of hole)
SEAM <> " "

Procedure for Multiple Intervals in a Single Hole
☐ a single interval from the first top to the last bottom
☐ a single interval from the first top to the first bottom below it
☒ multiple intervals from each top to the first bottom below that top

The effect is to select potentially non-contiguous sequences and display them at the same time.

In this example, the Interval Top Definition is set to 1.0 m above each seam that occurs in the hole.

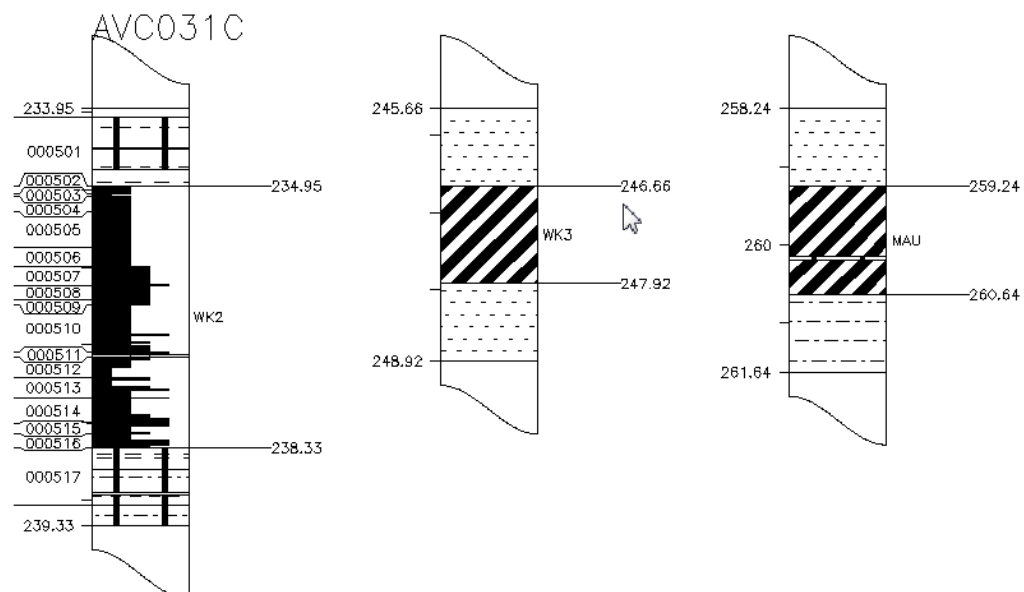
The Interval Bottom Definition is set to 1.0 m below each seam that occurs in the hole. The end result

is to select all seams that occur in the hole, but only the seam itself and 1.0 m of the roof and 1.0 m below the floor.

The result of opening up hole AVC031C with the SEAM interval definition in the *LogCheck* hole editor is shown below. Note that a blank row coloured dark grey is used to separate the selected intervals – in this case each seam and 1.0 m above it and 1.0 m below it.

LogCheck - [C:\LogData\AVOCA\GEOLOGY\AVC031C Seams (ReadOnly)]													
File	Edit	View	Tools	Settings	Help								
	CalcThick	Depth	Seam	Li	LQ	Sh	Hu	Co	A1	A2	A3	A4	II
	0.06	240.05	WK2	CO	BB	D		K					
	0.02	240.07	WK2	CO	BD	D		K					
	0.28	240.35	WK2	CO	BD								
	0.04	240.39		XM		D	K	B					
	0.05	240.44		XT		D	K	B					
	0.24	240.68		XT		D	G	B					
	0.04	240.72		SS	FF	E		G					
	0.13	240.85		XH		D	G	B	RA	SI	BN		
	0.40	241.25		XT		D	G	B	RA	SI	BN		
	0.90	241.35		XT		D	G	B	AB	XX	TO		
		245.00											
	2.00	246.00		SS	FF	E		G	RA	SI	BN		
	1.25	247.25	WK3	CO		D		K	AB	XX	SI		
	5.75	248.25		SS	FF	E		G	RA	SI	BN		
		258.25											
	6.25	259.25		SS	FF	E		G	RA	SI	BN		
	1.40	260.65	MA	CO		D		K	AB	XX	SI		
	9.01	261.65		ST		E		G	RA	SA	BN		

The results of plotting this data are shown below. Note the effect of selecting “multiple intervals” – exactly 1.0m above and below each seam, and the seam itself is selected.



6.6.2.3 Example 3: Seam Roof Plus Adjacent Bolting Horizon Definition

Where the roof of a seam is unstable, the user may need to see the unit above the immediate roof to determine if it can be used as a stratum in which bolts can be set to support the seam roof. To include this bolting horizon into the interval, select the “*top of unit directly above selected units*” option for the top interval. In this example, the Interval Top Definition is set at 0.5 m above the top of the unit that overlies the WK2 seam, and the Interval Bottom Definition is set at 0.0 m above the top of the WK2 seam – that is, the top of the WK2 seam.

Interval Definition: WK2_Roof

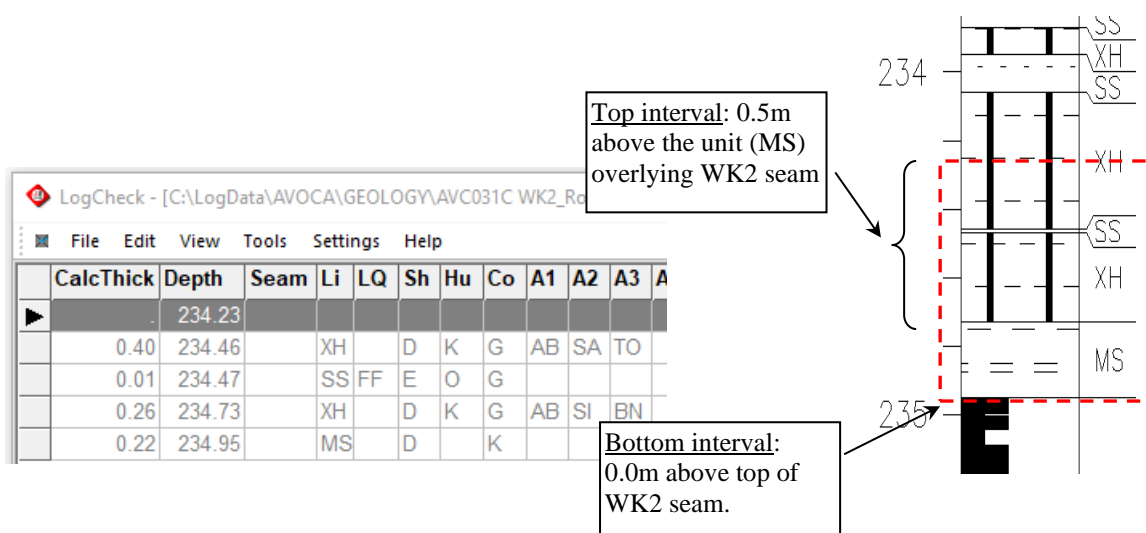
Data Type to use for Selection Criteria
 Geology

Interval Top Definition
 0.50 metres ☒ above ☒ top of unit directly above selected units
☐ below ☐ top of selected units
☐ base of selected units
☐ base of unit directly below selected units
 Selected units, for example, SEAM = "P" and DEPTH >= 100, (leave blank for top of hole)
 seam = "WK2"

Interval Bottom Definition
 0.00 metres ☒ above ☐ top of unit directly above selected units
☐ below ☒ top of selected units
☐ base of selected units
☐ base of unit directly below selected units
 Selected units, for example, SEAM = "P" and DEPTH >= 100, (leave blank for bottom of hole)
 SEAM = "WK2"

Procedure for Multiple Intervals in a Single Hole
☒ a single interval from the first top to the last bottom
☐ a single interval from the first top to the first bottom below it
☐ multiple intervals from each top to the first bottom below that top

The result of opening up hole AVC031C with the WK2ROOF interval definition in the *LogCheck* hole editor is shown below. Note that a blank row coloured dark grey is used to mark the beginning of the selected interval.



6.6.2.4 Example 4: a single interval from the first top to the first bottom below it

An example of selecting the “a single interval from the first top to the first bottom below it” option from the Multiple Interval choices in the interval definition is the following for selecting the uppermost seam in any hole:

Interval Definition: Top_Seam

Data Type to use for Selection Criteria
 Geology

Interval Top Definition

1.00 metres ☒ above ☐ top of unit directly above selected units
☐ below ☒ top of selected units
☐ base of selected units
☐ base of unit directly below selected units

Selected units, for example, SEAM = "P" and DEPTH >= 100, (leave blank for top of hole)
 SEAM <> " "

Interval Bottom Definition

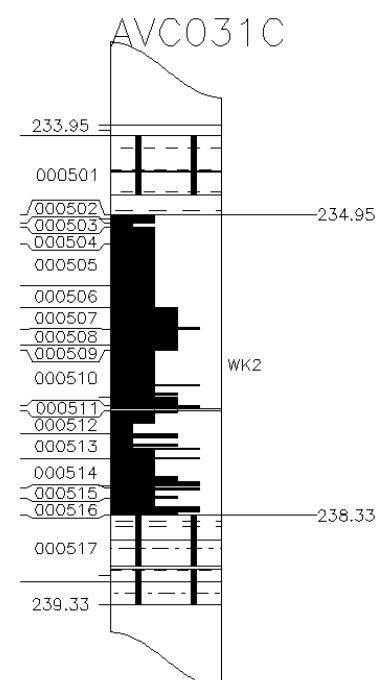
1.00 metres ☐ above ☐ top of unit directly above selected units
☒ below ☐ top of selected units
☒ base of selected units
☐ base of unit directly below selected units

Selected units, for example, SEAM = "P" and DEPTH >= 100, (leave blank for bottom of hole)
 SEAM <> " "

Procedure for Multiple Intervals in a Single Hole

☐ a single interval from the first top to the last bottom
☒ a single interval from the first top to the first bottom below it
☐ multiple intervals from each top to the first bottom below that top

As WK2 is the upper most seam in the borehole AVC031, the resulting plot generated after opening the borehole AVC031 with the above Interval Definition would be:



Chapter 7

LogCheck Editor

By the end of this chapter you will be able to:

- Navigate the *LogCheck* editor form.
- Modify hole data in the hole edit form.
- Append, copy and delete rows in the hole edit form.
- Find and replace logging data.
- Modify options in the Settings menu.
- Validate drill hole data against a dictionary.
- Compare two copies of the same hole or two copies of a dictionary.

7.1 Introduction

The *LogCheck* editor is used for viewing and modifying both dictionaries and hole data, and for viewing summaries and audits. Dictionary can only be modified if Manager status has been turned on for the current session (see Chapter 3). Hole data can generally be modified, however, if the file properties are set to read-only, or only part of a hole is opened, it can only be viewed (see following section for setting the read-only property). Summaries and audits are all read-only.

If the data being viewed is read-only, it is shown in grey rather than black. In addition, even when you can modify data, there may be calculated fields such as Calculated Thickness in most Hole Data Types, and Bit Type and Geologist's Initials in Geology data that cannot be modified. Bit Type must be modified in the hole's Drilling data and Geologist in the hole's Geologists data. These read-only fields are also shown in grey.

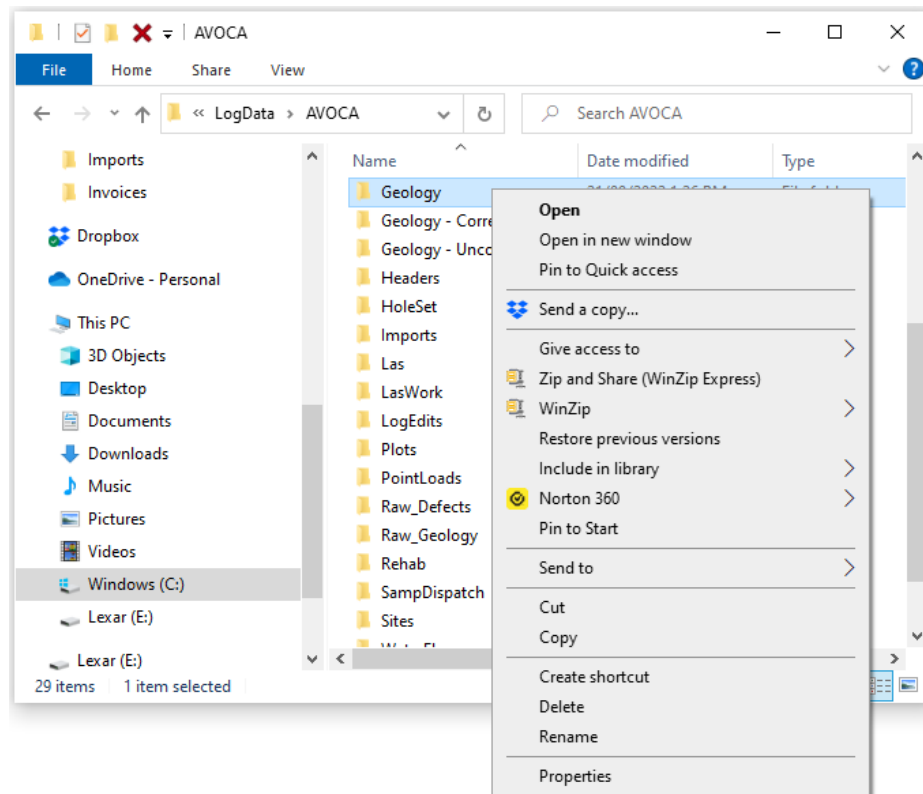
Most dictionary categories are stored in alphabetical order, however some categories, such as *weathering* and *estimated strength* in some versions may be entered in a more appropriate order such as degree of weathering or strength. For categories in alphabetical order, select Append Rows to add further items to the bottom of the list, and *LogCheck* will automatically move the entry to its appropriate place once it has been entered. For categories not in alphabetical order, select Insert Rows or Append Rows to enter new data in its appropriate place.

7.2 Setting the Read-Only Property of Data Files

The read-only property can be set for a single file, multiple files or a folder and all of its contents.

To set or unset the read-only property:

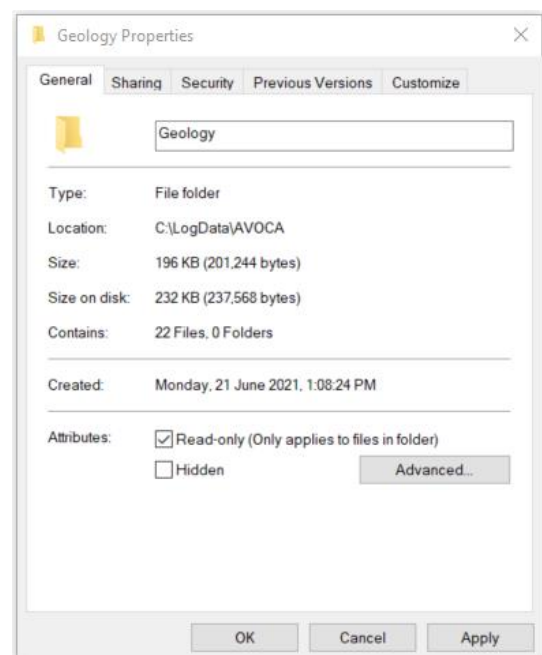
- Open up My Computer or Windows Explorer and navigate to the folder where the data to be set to read-only is stored.
- Right-click the required folder or files and select the Properties item from the menu:



- The Properties window then displays:

To set the read-only property, click the Read-only checkbox so that it is checked and click the OK button.

To unset the read-only property, clear the check from the box, and click the OK button.

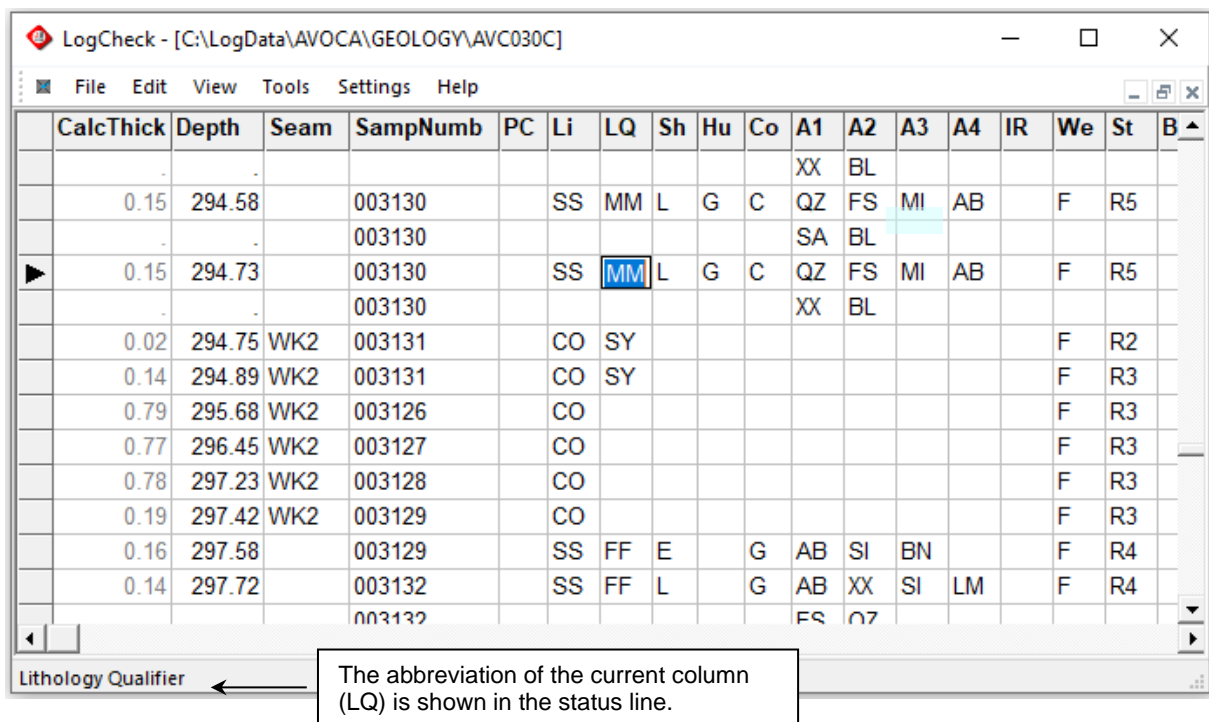


7.3 Editor Form

After opening the data, as described in Chapter 3 for dictionaries and Chapter 6 for hole data, the data is displayed in *LogCheck*'s data editor, which can display the data in either Grid Layout, or Form Layout. The respective items in the View menu allow you to switch between them, or the Shift+F8 hot key will toggle between the two views.

7.3.1 Grid Layout

In Grid Layout, each row represents a logged drill-hole entry and each column represents a variable. The menus that are available along the top of the form are: Edit, View, Tools, Settings and Help.



Note that there is no explicit “Close Hole” command – opening another hole automatically closes the previously opened hole, however, if any changes have been made to the data, the user is first asked if they want to save their changes.

7.3.1.1 Navigating Data in Grid Layout

For existing hole data you can move around the Edit Window by using the following keys:

- Tab key Moves to the next column on the current row
- Shift Tab key Moves to the previous column
- PgDn key Moves down a page at a time
- PgUp key Moves up a page at a time
- Ctrl+PgUp Moves to the top of the data
- Ctrl+PgDn Moves to the bottom of the data
- Mouse wheel Scrolls up or down the log
- Scroll bars Drag the vertical or horizontal scrollbars with the mouse
- Arrow keys The Left, Right, Up and Down arrow keys move one item in the selected direction
- F2 Enables editing of current field

- **End** Moves to the last column unless editing current field where it moves to the end of the current field
- **Home** Moves to the first column unless editing current field where it moves to the start of the current field

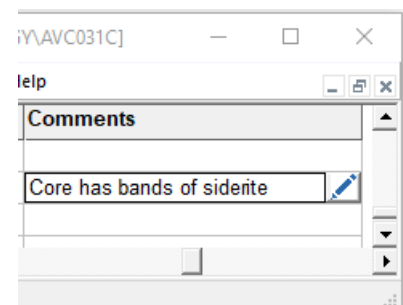
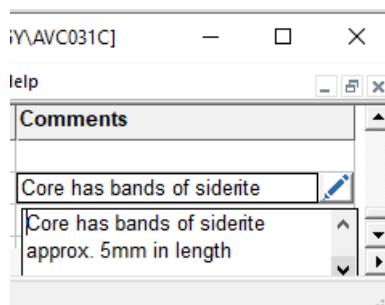
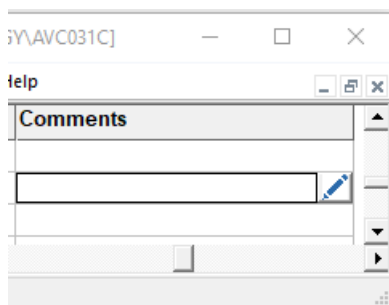
7.3.1.2 Entering Comments in Grid Layout

Most Data Types have a Comments field on the far right of the Hole Edit form enabling additional notes to be entered for a unit. There is no limit on the number of characters for comments. You can either type a single-line comment, or click the spanner icon, and a multi-line edit box appears.

When you first enter the field, it shows a spanner on the right-hand side, as shown below:

In the multi-line edit box, you can add further comments, as shown below:

To terminate the input, click the spanner again, and the first line of the comment is displayed, as shown below:



When generating an English log for the data, these comments are appended to the unit's description. To put them on a new line the entered comment should start with a blank line, however, unless there are characters on this line dBASE automatically removes the blank line and so it is necessary to type at least one space character on this blank line.

7.3.2 Form Layout

An example of Geology Data in Form Layout is shown below:

LogCheck - [C:\LogData\AVOCA\GEOLOGY\AVC031C]

File Edit View Tools Settings Help

Calculated Thickness
1.26

Interval Base Depth
247.92

Seam Name
WK3

% Lithotype
☐

Lithotype
CO

Lithology Qualifier
☐

Shade
D

Hue
☐

Colour
K

Adjectives
AB XX SI ☐

Interrelationship
☐

Weathering
F

Estimated Strength
R2

Bedding Spacing
☐

Defect Type
☐

Defect Intact
☐

Defect Spacing
☐

Defect Dip Angle
☐

Core State
☐

Mechanical State
☐

Texture
☐

Basal Contact
☐

Sedimentary Features
☐

Bedding Dip Angle
☐

Mineral/Fossil Abund.
☐

Mineral/Fossil Type
☐

Mineral/Fossil Assoc.
☐

Gas
☐

Comments
☐

Sample Number

First Previous Next Last

In Form Layout, all the data for just a single data row is shown along with a full description of each field. The advantages of this layout are that:

- You don't need to scroll across to fields on the right, as in Grid View;
- The full descriptions of fields are shown alongside the values.

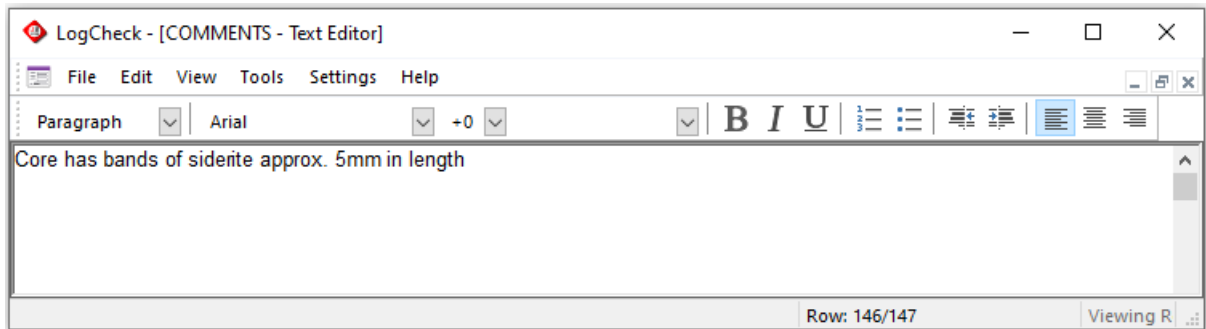
7.3.2.1 Navigating Data in Form Layout

For existing hole data you can move around the Edit Window by using the following keys:

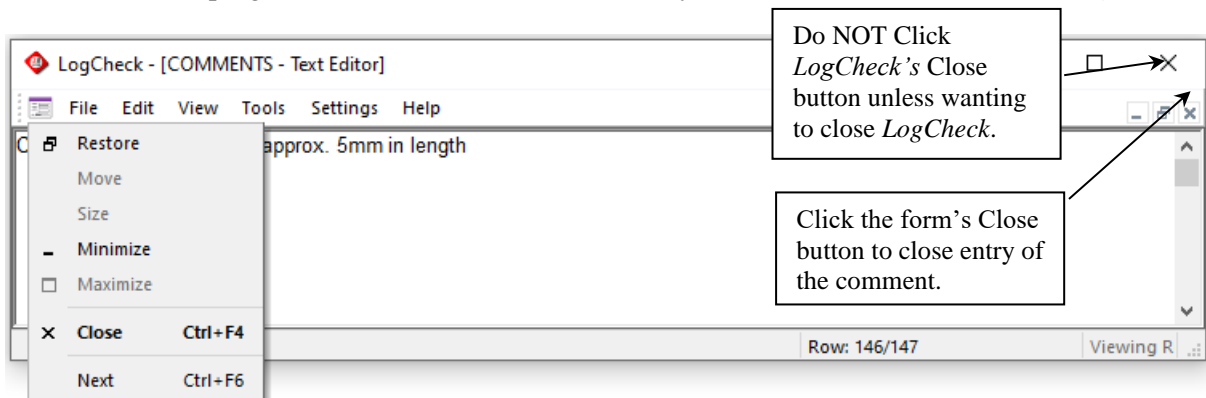
- Tab key Moves to the next column on the current row
- Shift Tab key Moves to the previous column
- First button Moves to the first row in the data
- Previous button Moves to the previous row in the data
- Next button Moves to the next row in the data
- Last button Moves to the last row in the data
- F2 Enables editing of current field;

7.3.2.2 Entering Comments in Form Layout

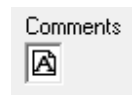
To enter Comments, double-click the Comments field to bring up a full-screen editor, as shown below.



When entry of Comments is complete, click the Close button (or Ctrl+F4) from the form's control menu, which is to the immediate left of the File menu or click the form's close button. Do not click the close button in top right corner of the form as this not only closes the form but also closes *LogCheck*:



After a comment has been entered for a data row, the comment field displays an A in the comment field on the screen:



7.3.3 LogCheck Editor Functions to minimize Keystrokes

One of the most important features of the *LogCheck* editor is that it has been designed to minimize the number of keystrokes required to enter data.

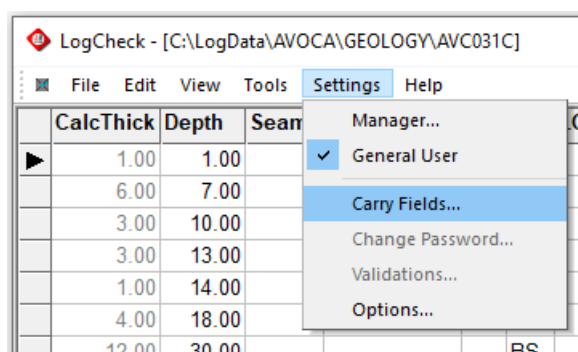
Examples of keystroke minimization employed in *LogCheck* include:

- when entering data, the user can either:
 - type the data using the keyboard.
 - use the dictionary/keypad that is displayed on the side of the screen. This is especially useful when using tablets which only have a keyboard that pops up on the screen

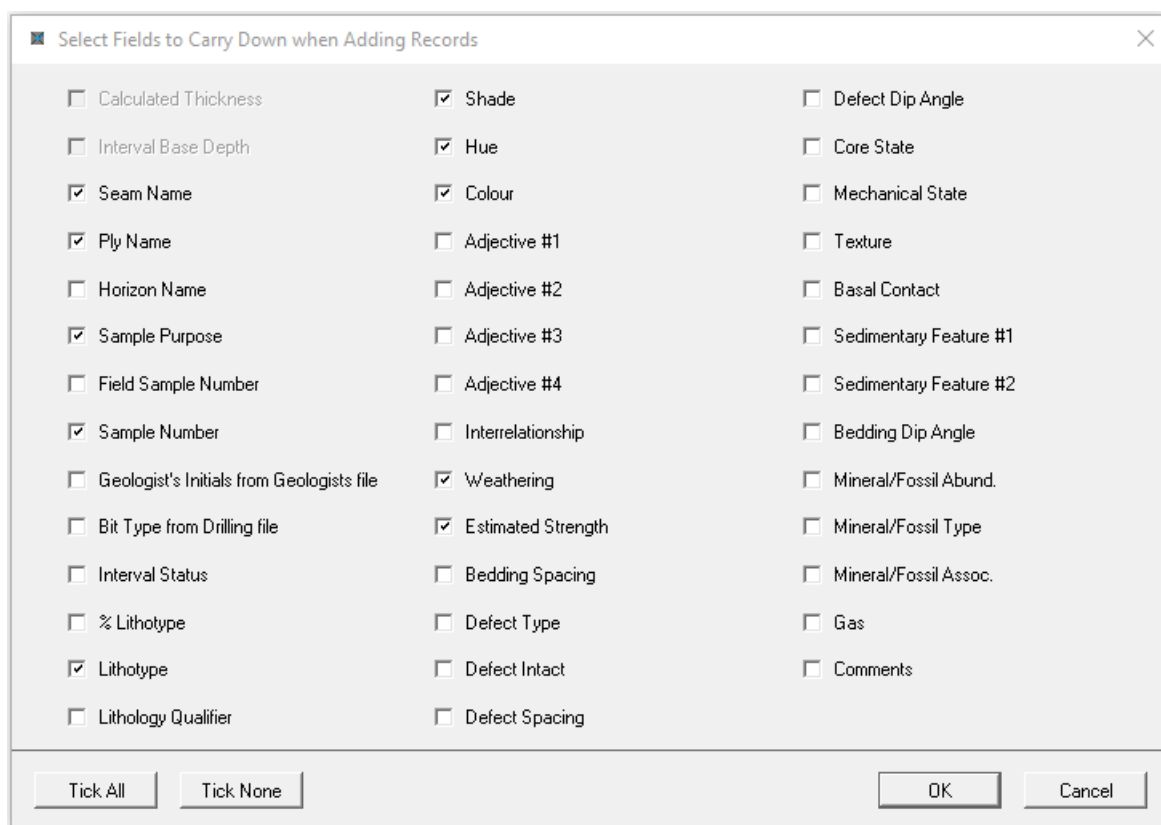
When the dictionary is displayed, it changes according to the type of data in the current cell. To display the dictionary, go to the View menu, then select Display Keypad/Dictionary.

- when entering depths, if you enter a value less than 1.0, then *LogCheck* retrieves the integer value from the previous line; making it faster to enter data for thin units by reducing the amount of typing. For example, for a depth of 170.80, if the previous depth was 170.25, then you only need type in .80 – *LogCheck* carries the 170 down from above. For numeric fields, such as depth, even though a numeric keypad may be displayed, it is often easier to use the keyboard.

- when inserting or appending rows to the data, *LogCheck* automatically copies down values from specified fields in the previous row. The user can at any time set or reset the fields they would like copied down by selecting Settings > Carry Fields from the *LogCheck* menu:



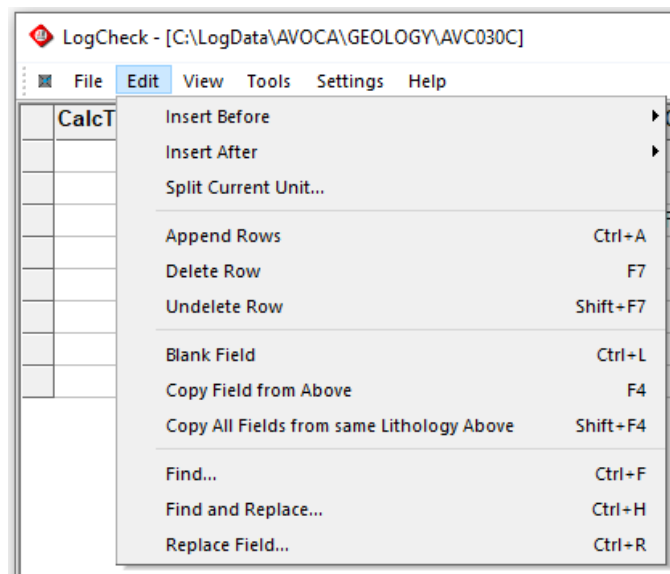
The following window will then be displayed for the user to select the fields they would like to automatically copy down:



- a lithological unit can be split into two exactly the same units by selecting Split Current Unit from the Edit Menu (see Section 10.4.3 – Split Current Unit for more information)
- where the value to be entered into a field is the same as the previous non-blank value for the field, by pressing the F4 key, the previous value is copied into the field rather than the user having to retype it. (see Section 10.4.8 - Copy Field from Above for more information)
- where the entire description of a newly entered unit is the same as the previous unit with the same LithoType as the newly entered unit, by pressing Shift-F4, the previous entire description is copied down to the newly entered unit. (see Section 10.4.9 – Copy all Fields from same Lithology Above for more information)

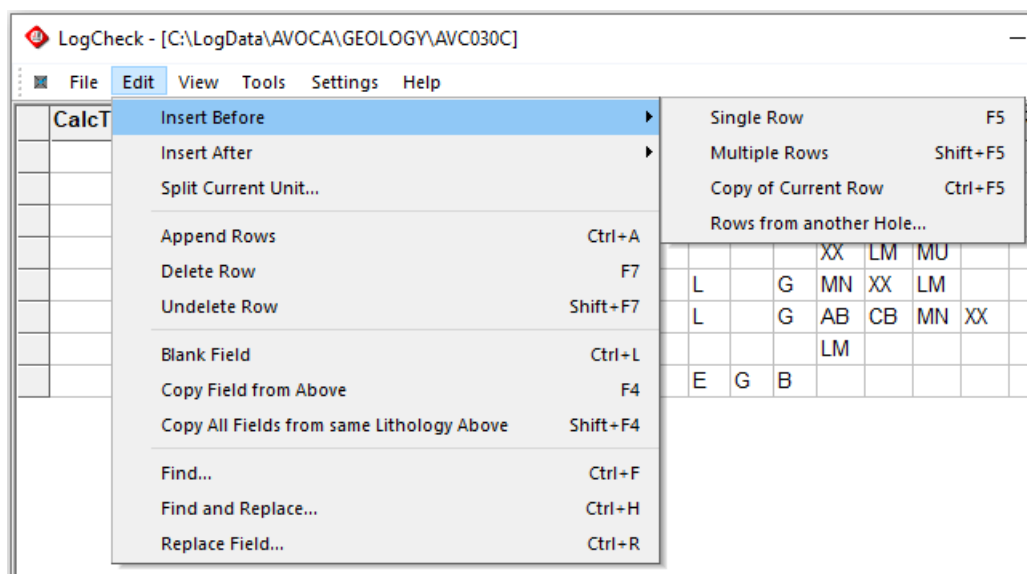
7.4 Edit Menu

The Edit menu provides function to assist in editing the data:



7.4.1 Inserting Rows Before the Current Row

To insert new row(s) before the current row in a log, select Edit > Insert Before:

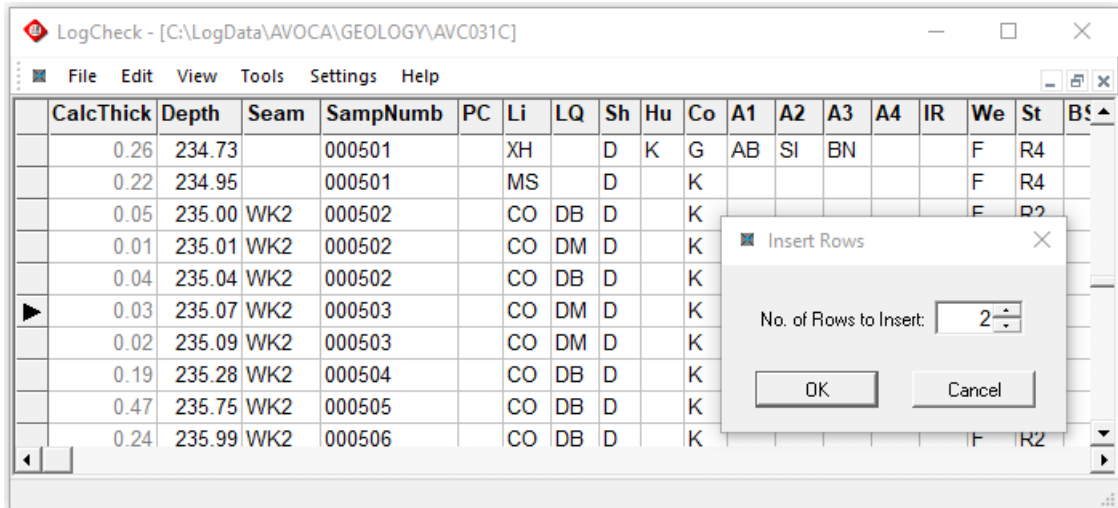


The options for Insert Before are:

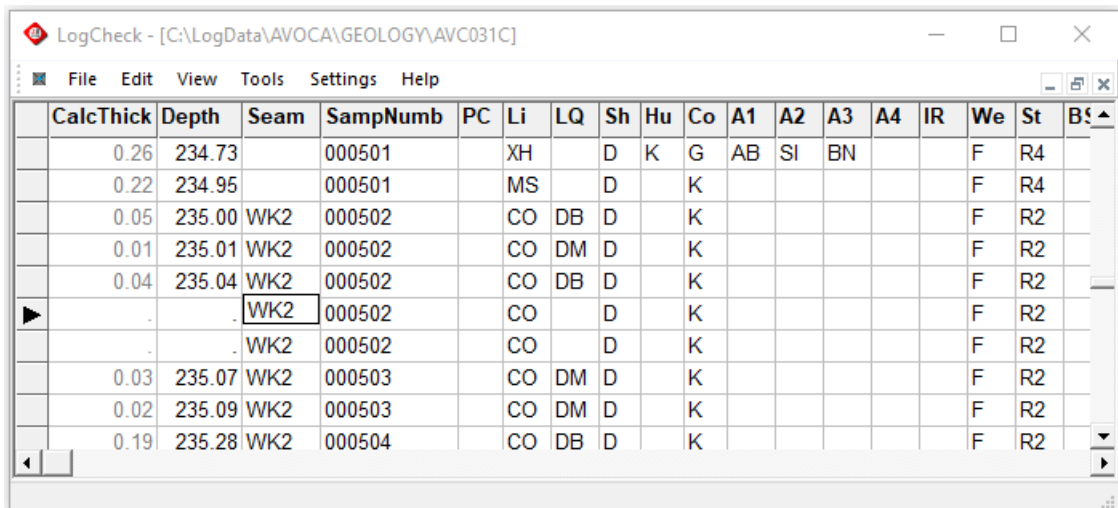
- **Single Row** Inserts a single row, with no further dialog.
- **Multiple Rows** Inserts multiple rows, after prompting the user for the number of rows to insert.
- **Copy of Current Unit** Inserts an identical copy of the current unit, including the depth.
- **Rows from another hole** Inserts specified rows from another hole

When new single or multiple rows are inserted, data from some of the columns on the row above are copied to the new rows. The user can control which columns are copied by going to the Settings menu, then selecting Carry Fields (see above, Section 10.3.3 - Entering and Modifying Data in the *LogCheck* Editor).

To insert multiple rows before the current row in a log, select Edit > Insert Before > Multiple Rows (or Shift+F5). The figure below shows the Multiple Rows dialog, which requests the number of new rows to insert:



The new rows are inserted above the current row, and the specified fields (in this case, Seam, SampNumb, Li, Sh, Hu, Co, We and St) are copied from the row above, as shown below:



Copy of Current Row (or Ctrl+F5) inserts an identical copy of the current row. An example is shown below. The first image is before the operation and the second after:

LogCheck - [C:\LogData\AVOCA\GEOLOGY\AVC032]

	CalcThick	Depth	Seam	SampNumb	PC	Li	LQ	Sh	Hu	Co	A1	A2	A3	A4	IR	We	St	B5
											TO							
	3.00	139.00				BS		E	K	G	XC	BU	CL	ND		S	R5	
	3.00	142.00				SS	FF	L		G	CL	MX	IA	XC		S	R2	
											BU							
▶	3.00	145.00			60	SS	FF	L		G	RA	SI	WP	SP		F	R4	
											XC	GN						
					40	SS	FF	E		G						F	R4	
	1.00	146.00				SS	FF	E		G	MN	SI	LM			F	R4	
	5.00	151.00				SS	FF	E	E	G	SP	SI	LM			F	R4	
	3.00	154.00				ST		L	E	G	CL	LM	TO	MX		F	R4	

Interval Base Depth

LogCheck - [C:\LogData\AVOCA\GEOLOGY\AVC032]

	CalcThick	Depth	Seam	SampNumb	PC	Li	LQ	Sh	Hu	Co	A1	A2	A3	A4	IR	We	St	B5
											TO							
	3.00	139.00				BS		E	K	G	XC	BU	CL	ND		S	R5	
	3.00	142.00				SS	FF	L		G	CL	MX	IA	XC		S	R2	
											BU							
▶	3.00	145.00			60	SS	FF	L		G	RA	SI	WP	SP		F	R4	
	0.00	145.00			60	SS	FF	L		G	RA	SI	WP	SP		F	R4	
											XC	GN						
					40	SS	FF	E		G						F	R4	
	1.00	146.00								G	MN	SI	LM			F	R4	
	5.00	151.00							E	G	SP	SI	LM			F	R4	

Interval Base Depth

Insert Copy of Current Row also adjusts the thickness of the previous current row to 0.0

As can be seen above, Insert Copy of Current Row only copies a single row not the entire lithological unit. To actually copy the entire unit use Split Current Unit as described below.

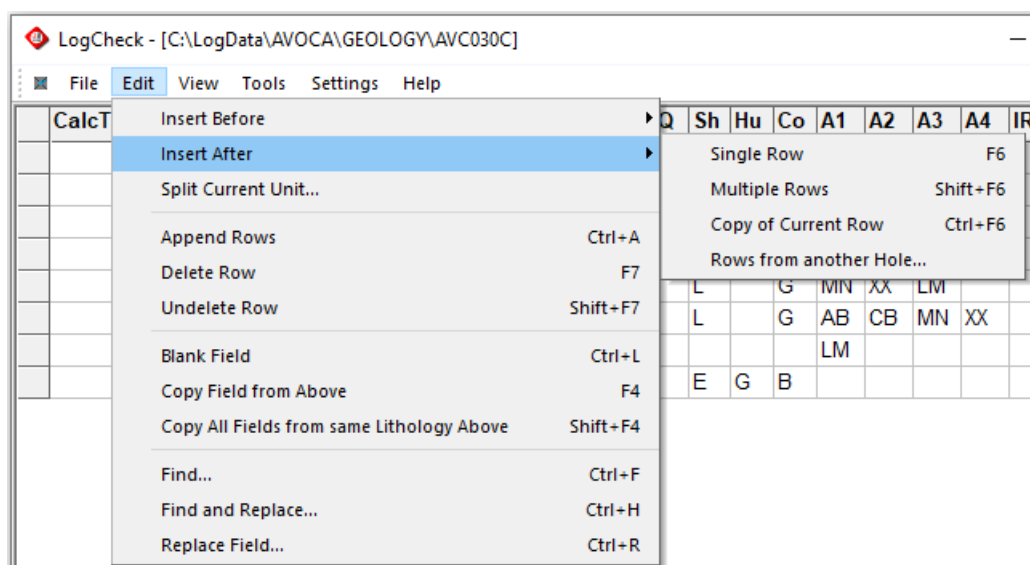
You can also insert rows from another hole (or Shift+F6). This is similar to the copy and paste options that are available in a word processor. The Insert Rows from another Hole option prompts for the name of the other hole and the interval from the other hole to be inserted:

The new rows are inserted above the current row. In the example above, intervals from 190.00 to 195.00 from hole AVC031C will be inserted in the log for hole AVC030. Inserting rows from another hole may be useful when:

- a separate pre-collar being drilled for a hole by a different rig.
- coal seam core will be tested for gas desorption and not logged at the time of drilling so that it can be sealed in a gas bomb as quickly as possible. It will usually then be logged some weeks later, after gas testing is completed. This data will often be recorded in a different file.

7.4.2 Insert Rows After

The Insert Rows After menu option provides the same options as Insert Rows Above, except that new rows are inserted after the current row.



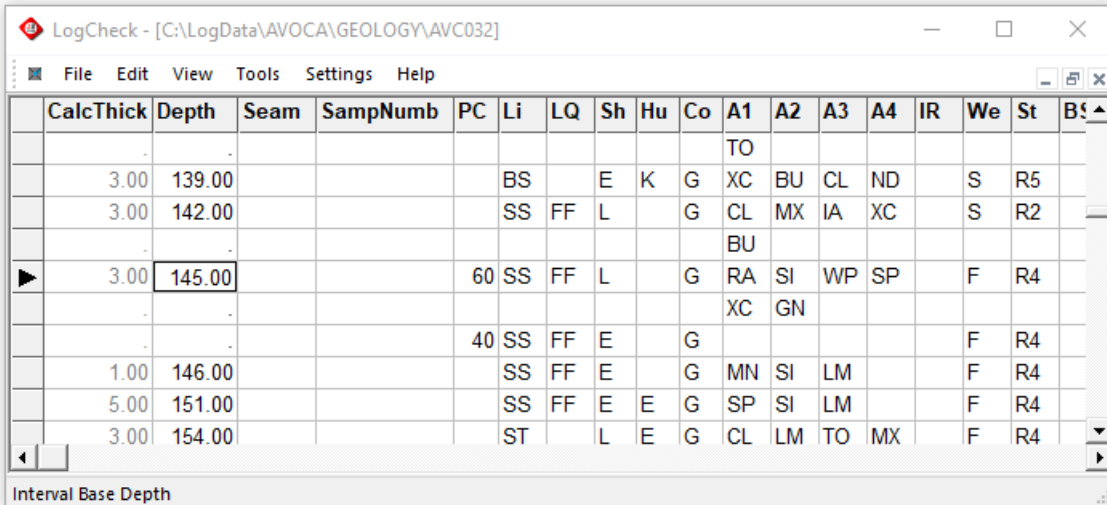
7.4.3 Split Current Unit

This is only available for Geology data. It enables the user to split a lithological unit at a specified depth. It creates a repeat of the unit immediately above the unit and gives the repeat a depth specified by the user. If the original unit consists of multiple rows then these are all included in the repeat.

Splitting the Current Unit can be useful if you want to:

- take a sample in one half, but not the other half of a unit
- split a unit into two samples if there is a change in weathering characteristics across the unit, but all other aspects are the same

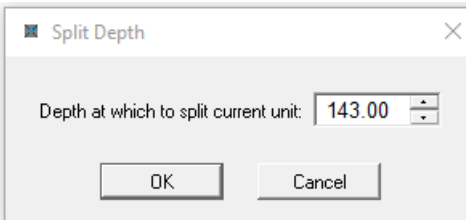
For example, to split the unit with a top depth of 142 metres and base depth of 145 metres in the following data:



	CalcThick	Depth	Seam	SampNum	PC	Li	LQ	Sh	Hu	Co	A1	A2	A3	A4	IR	We	St	B
											TO							
	3.00	139.00				BS		E	K	G	XC	BU	CL	ND		S	R5	
	3.00	142.00				SS	FF	L		G	CL	MX	IA	XC		S	R2	
											BU							
▶	3.00	145.00			60	SS	FF	L		G	RA	SI	WP	SP		F	R4	
											XC	GN						
					40	SS	FF	E		G						F	R4	
	1.00	146.00				SS	FF	E		G	MN	SI	LM			F	R4	
	5.00	151.00				SS	FF	E	E	G	SP	SI	LM			F	R4	
	3.00	154.00				ST		L	E	G	CL	LM	TO	MX		F	R4	

Interval Base Depth

- Navigate to any row in the unit
- Select Edit > Split Current Unit:
- Enter the depth at which it is to be split:



Split Depth

Depth at which to split current unit: 143.00

OK Cancel

This depth must be greater than the unit's top depth and less than the unit's base depth.

The result of the above splitting is:

	CalcThick	Depth	Seam	SampNumb	PC	Li	LQ	Sh	Hu	Co	A1	A2	A3	A4	IR	We	St	B!
											TO							
	3.00	139.00				BS		E	K	G	XC	BU	CL	ND		S	R5	
	3.00	142.00				SS	FF	L		G	CL	MX	IA	XC		S	R2	
											BU							
▶	1.00	143.00			60	SS	FF	L		G	RA	SI	WP	SP		F	R4	
											XC	GN						
					40	SS	FF	E		G						F	R4	
	2.00	145.00			60	SS	FF	L		G	RA	SI	WP	SP		F	R4	
											XC	GN						
					40	SS	FF	E		G						F	R4	

7.4.4 Append Rows

The Append Rows option of the Edit menu (or Ctrl+A) adds a new record to the end of the currently selected hole. The Append Rows option, as with the Insert Rows option, copies down fields from columns above the new row. The user can control which columns are copied by going to the Settings menu, then selecting Carry Fields (see above, Section 10.3.3 - Entering and Modifying Data in the LogCheck Editor). An alternative way to add a new record to is to page down to the last row, then press the Down Arrow key.

After appending a row, the first column of the new appended row, displays large + sign to indicate a new row is being added:

	CalcThick	Depth	Seam	SampNumb	PC	Li	LQ	Sh	Hu	Co	A1	A2	A3	A4	IR	We	St	B!
	3.00	240.00				ST		E		G	IA	SA	BN			F	R4	
	6.25	246.25				ST		E		G	CL	LM	TO			F	R3	
	1.29	247.54	MAU			CO				K						F		
	4.46	252.00				ST		E		C	SA	BN				F	R4	
	4.11	256.11				SS	FF	L		G	SP	XC	LM			F	R4	
	0.74	256.85	MAL			CO				K						F	R2	
	5.15	262.00				SS	FF	E		G						F	R3	
	2.00	264.00				CS		D		G	SI	LM	TO			F	R4	
	4.00	268.00				SS	FM	L		G						F	R5	
+						SS		L		G						F	R5	

The new will row only added be after the user adds or modifies any data to the row and then navigates to another row or to a menu item.

7.4.5 Deleting Row(s)

The Delete Row option of the Edit menu (or F7) will delete the current row in the grid. Note that confirmation of deleting is not requested. If you have accidentally deleted a number of rows, you can either choose the Undelete Rows option or if you have not completed a Save during the current session, exit *LogCheck* without saving, and re-open the hole which will restore the previous version of the data.

7.4.6 Undeleting Row(s)

The Undelete Row option of the Edit menu (or Shift+F7) will undelete a row that was previously deleted. Confirmation of undeleting is not requested. You can keep selecting Undelete Row to undelete one further deleted row back to the start of the editing session.

7.4.7 Making Fields Blank

Deleting data in a numeric field turns the number into 0.0. Blank data generally has a different meaning to a value of 0, for example in the depth field, a blank indicates line continuation. If you want to convert a numeric value, including 0.0 into a blank, highlight the field and select the Blank Field option (or Ctrl+L) from the Edit menu.

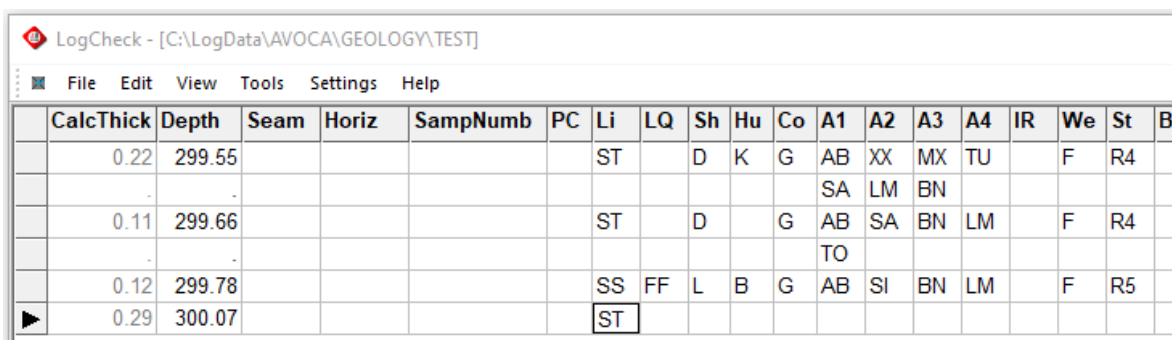
7.4.8 Copy Field from Above

Copy Field from Above (or F4) searches up the currently selected column to find the first non-blank entry, and then copies it to the current row. This option is often useful when adding seams or sample numbers into already entered data.

7.4.9 Copy All Fields from same Lithology Above

Copy All Fields from same Lithology Above (or Shift+F4) searches up from the current row for the first previous row with the same LithoType and Lithology Qualifier as the current row and then copies the entire description from this row to the current row. If the previous description for the lithology includes more than one row, it only copies the second and subsequent rows if the current row is the last row in the data.

In the following example, the last row of the data has a LithoType of siltstone (ST) and the first previous row with a LithoType of siltstone (ST) is three rows above the last row:



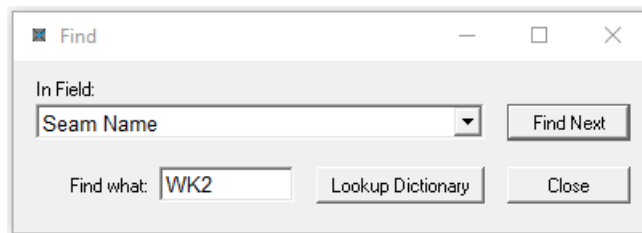
	CalcThick	Depth	Seam	Horiz	SampNumb	PC	Li	LQ	Sh	Hu	Co	A1	A2	A3	A4	IR	We	St	B
	0.22	299.55					ST		D	K	G	AB	XX	MX	TU		F	R4	
												SA	LM	BN					
	0.11	299.66					ST		D		G	AB	SA	BN	LM		F	R4	
												TO							
	0.12	299.78					SS	FF	L	B	G	AB	SI	BN	LM		F	R5	
▶	0.29	300.07					ST												

After selecting Copy All Fields from same Lithology Above the description of the siltstone three rows above is copied to the the current unit:

CalcThick	Depth	Seam	Horiz	SampNumb	PC	Li	LQ	Sh	Hu	Co	A1	A2	A3	A4	IR	We	St	B
0.22	299.55					ST		D	K	G	AB	XX	MX	TU		F	R4	
-	-										SA	LM	BN					
0.11	299.66					ST		D		G	AB	SA	BN	LM		F	R4	
-	-										TO							
0.12	299.78					SS	FF	L	B	G	AB	SI	BN	LM		F	R5	
0.29	300.07					ST		D		G	AB	SA	BN	LM		F	R4	
-	-										TO							

7.4.10 Find

The Find option of the Edit menu (or Ctrl+F) allows you to find values in a specified column. The popup Window below allows you to specify values to find and the field (column) to find it in.

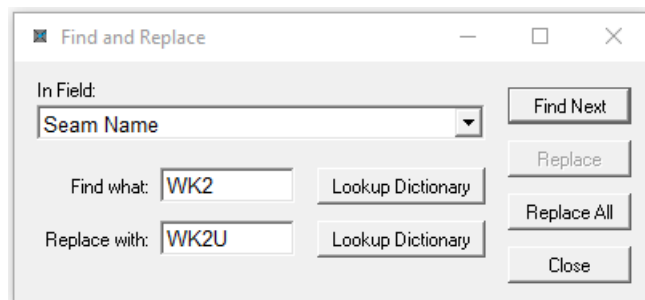


In the above example, repeatedly clicking the Find Next button will search for the next occurrence of “WK2” in the Seam column.

7.4.11 Find and Replace

The Find and Replace option of the Edit menu (or Ctrl+H) allows you to search for specific values and replace them with something different.

The popup Window requests the Field in which to search, the value to be replaced, and the value to replace it with:



Clicking the Lookup Dictionary button allows you to select a valid replacement entry from the dictionary. The Replace button is only enabled once the next target value is found and will then replace the value with the new value. The Replace All button searches for and replaces all copies of the target value. In the example shown, all occurrences of Horizon WK2 will be replaced with WK2U.

The Find, Find and Replace, and Replace options of the Edit menu are the only Edit options that operate when you have multiple holes open. This can be useful if you decide to change the seam nomenclature. For example, to change all instances of Seam WK2 to WK2U. Even with multiple holes open, all of the changes you make are made to temporary copies of the hole data. They are not made permanently until you save the data.

7.4.12 Replace Field

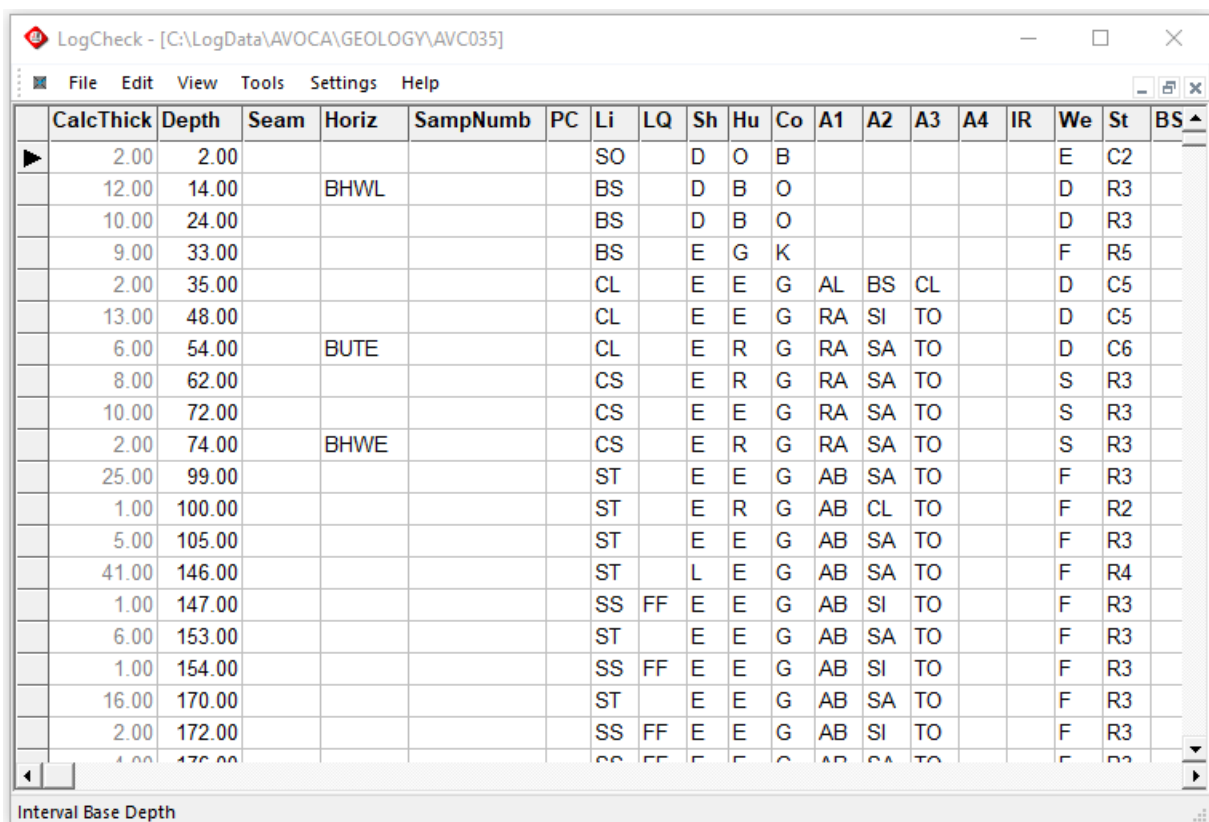
The Replace Field option of the Edit menu allows you to replace all entries for a single hole between two depths. The replacement value can be either:

- A blank;
- A value selected from the dictionary;
- Manipulated numerical values;
- Expansion/Contraction of depths.

7.4.12.1 Replacing with a Blank

As an example of replacing with a blank, consider the common case of a hole that starts out as weathered, then goes to slightly weathered, then fresh, which then repeats for the rest of the hole. This clutters the reporting – as all subsequent intervals will generally be fresh, so the solution is to replace the remainder of core logged as fresh, with a blank.

For example, in the data below:



CalcThick	Depth	Seam	Horiz	SampNumb	PC	Li	LQ	Sh	Hu	Co	A1	A2	A3	A4	IR	We	St	BS
2.00	2.00					SO		D	O	B						E	C2	
12.00	14.00		BHWL			BS		D	B	O						D	R3	
10.00	24.00					BS		D	B	O						D	R3	
9.00	33.00					BS		E	G	K						F	R5	
2.00	35.00					CL		E	E	G	AL	BS	CL			D	C5	
13.00	48.00					CL		E	E	G	RA	SI	TO			D	C5	
6.00	54.00		BUTE			CL		E	R	G	RA	SA	TO			D	C6	
8.00	62.00					CS		E	R	G	RA	SA	TO			S	R3	
10.00	72.00					CS		E	E	G	RA	SA	TO			S	R3	
2.00	74.00		BHWE			CS		E	R	G	RA	SA	TO			S	R3	
25.00	99.00					ST		E	E	G	AB	SA	TO			F	R3	
1.00	100.00					ST		E	R	G	AB	CL	TO			F	R2	
5.00	105.00					ST		E	E	G	AB	SA	TO			F	R3	
41.00	146.00					ST		L	E	G	AB	SA	TO			F	R4	
1.00	147.00					SS	FF	E	E	G	AB	SI	TO			F	R3	
6.00	153.00					ST		E	E	G	AB	SA	TO			F	R3	
1.00	154.00					SS	FF	E	E	G	AB	SI	TO			F	R3	
16.00	170.00					ST		E	E	G	AB	SA	TO			F	R3	
2.00	172.00					SS	FF	E	E	G	AB	SI	TO			F	R3	
4.00	176.00					SS	FF	E	E	G	AB	SA	TO			F	R3	

To remove the weathering values below 100 metres depth select the following in the Replace popup Window:

Replace Field

For Field:

- Adjective #1
- Adjective #2
- Adjective #3
- Adjective #4
- Interrelationship
- Weathering**
- Estimated Strength
- Bedding Spacing

From Interval Base Depth:

To Interval Base Depth:

Replace with:

☒ Blank

☐

☐ x Old Value +

☐ Expansion / Contraction

Old Value 1: New Value 1:

Old Value 2: New Value 2:

The result of replacing the F in the Weathering column with a blank from 105m:

CalcThick	Depth	Seam	Horiz	SampNum	PC	Li	LQ	Sh	Hu	Co	A1	A2	A3	A4	IR	We	St	BS
2.00	2.00					SO		D	O	B						E	C2	
12.00	14.00		BHWL			BS		D	B	O						D	R3	
10.00	24.00					BS		D	B	O						D	R3	
9.00	33.00					BS		E	G	K						F	R5	
2.00	35.00					CL		E	E	G	AL	BS	CL			D	C5	
13.00	48.00					CL		E	E	G	RA	SI	TO			D	C5	
6.00	54.00		BUTE			CL		E	R	G	RA	SA	TO			D	C6	
8.00	62.00					CS		E	R	G	RA	SA	TO			S	R3	
10.00	72.00					CS		E	E	G	RA	SA	TO			S	R3	
2.00	74.00		BHWE			CS		E	R	G	RA	SA	TO			S	R3	
25.00	99.00					ST		E	E	G	AB	SA	TO			F	R3	
1.00	100.00					ST		E	R	G	AB	CL	TO			F	R2	
5.00	105.00					ST		E	E	G	AB	SA	TO				R3	
41.00	146.00					ST		L	E	G	AB	SA	TO				R4	
1.00	147.00					SS	FF	E	E	G	AB	SI	TO				R3	
6.00	153.00					ST		E	E	G	AB	SA	TO				R3	
1.00	154.00					SS	FF	E	E	G	AB	SI	TO				R3	
16.00	170.00					ST		E	E	G	AB	SA	TO				R3	
2.00	172.00					SS	FF	E	E	G	AB	SI	TO				R3	
1.00	176.00					SS	FF	E	E	G	AB	SA	TO				R3	

7.4.12.2 Replacing with a Value from the Dictionary

This option allows all values between two specified depths to be replaced with another value from the dictionary. This can be useful for specifying the seam on all the units that it applies to.

For example, in the following data:

CalcThick	Depth	Seam	Horiz	SampNumb	PC	Li	LQ	Sh	Hu	Co	A1	A2	A3	A4	IR	We	St	B
0.15	294.58					SS	MM	L	G	C	QZ	FS	MI	AB		F	R5	
-	-										SA	BL						
0.15	294.73					SS	MM	L	G	C	QZ	FS	MI	AB		F	R5	
-	-										XX	BL						
0.02	294.75					CO	SY									F	R2	
0.14	294.89					CO	SY									F	R3	
0.79	295.68					CO										F	R3	
0.77	296.45					CO										F	R3	
0.78	297.23					CO										F	R3	
0.19	297.42					CO										F	R3	
0.16	297.58					SS	FF	E		G	AB	SI	BN			F	R4	
0.14	297.72					SS	FF	L		G	AB	XX	SI	LM		F	R4	
-	-										FS	QZ						

To set the seam for the coal (CO) with base depths from 294.75 to 297.42 to WK2, select the following in the Replace popup window:

Replace Field

For Field:

- Interval Base Depth
- Seam Name**
- Ply Name
- Horizon Name
- Sample Purpose
- Field Sample Number
- Sample Number
- Geologist's Initials from Geologists file

From Interval Base Depth: 294.75

To Interval Base Depth: 297.42

Replace with:

☐ Blank

☒ **WK2** Lookup Dictionary

☐ 1.0000 x Old Value + 0.00

☐ Expansion / Contraction

Old Value 1: 294.75 New Value 1: 294.75

Old Value 2: 297.42 New Value 2: 297.42

Replace Close

Resulting in WK2 being added as the Seam for base depths 294.75 to 297.42 metres:

CalcThick	Depth	Seam	Horiz	SampNumb	PC	Li	LQ	Sh	Hu	Co	A1	A2	A3	A4	IR	We	St	B
0.15	294.58					SS	MM	L	G	C	QZ	FS	MI	AB		F	R5	
-	-										SA	BL						
0.15	294.73					SS	MM	L	G	C	QZ	FS	MI	AB		F	R5	
-	-										XX	BL						
0.02	294.75	WK2				CO	SY									F	R2	
0.14	294.89	WK2				CO	SY									F	R3	
0.79	295.68	WK2				CO										F	R3	
0.77	296.45	WK2				CO										F	R3	
0.78	297.23	WK2				CO										F	R3	
0.19	297.42	WK2				CO										F	R3	
0.16	297.58					SS	FF	E		G	AB	SI	BN			F	R4	
0.14	297.72					SS	FF	L		G	AB	XX	SI	LM		F	R4	
-	-										FS	QZ						

7.4.12.3 Manipulating Numerical Values

The Replace Field option is useful for manipulating numerical values. Coal geologists spend a lot of time matching depths in the geology file to depths recorded in the geophysical log of the hole.

For example, in the following data:

CalcThick	Depth	Seam	Horiz	SampNumb	PC	Li	LQ	Sh	Hu	Co	A1	A2	A3	A4	IR	We	St	B
3.50	38.00					BS		D	E	G	RA	FE	BN			S	R5	
3.50	41.50					BS		E	B	G	FE	LI	CL			D	R4	
5.50	47.00					BS		D	E	G	RA	XX				F	R5	
5.40	52.40					BS		M	E	G	CL	AB				D	R3	
3.10	55.50					CL		L	E	G	CL	AL	BS			E	R2	
2.00	57.50					BS		M	E	G	CL	AB				S	R3	
3.50	61.00					BS		D	E	G	CL	RA	XX			S	R5	
12.00	73.00					BS		D	E	G	AB	CL	BN			S	R5	
7.00	80.00					BS		D	E	G	AB	CL	BN	FE		S	R4	
5.00	85.00					CL		M	B	G	CL	FE	AL	BS		S	C4	

To raise the depth of all intervals between depths 47m and 61m by 5cms, select the following in the Replace popup Window:

Replace Field

For Field:

- Interval Base Depth
- Seam Name
- Ply Name
- Horizon Name
- Sample Purpose
- Field Sample Number
- Sample Number
- Geologist's Initials from Geologists file

From Interval Base Depth: 41.50

To Interval Base Depth: 61.00

Replace with:

☐ Blank

☐ 41.50

☒ 1.0000 x Old Value + -0.05

☐ Expansion / Contraction

Old Value 1: 41.50 New Value 1: 41.50

Old Value 2: 61.00 New Value 2: 61.00

Resulting in the depths between 41.50m and 61.00m being raised by 5cms:

LogCheck - [C:\LogData\AVOCA\GEOLOGY\AVC030C]

File Edit View Tools Settings Help

	CalcThick	Depth	Seam	Horiz	SampNum	PC	Li	LQ	Sh	Hu	Co	A1	A2	A3	A4	IR	We	St	B
	3.50	38.00					BS		D	E	G	RA	FE	BN			S	R5	
▶	3.45	41.45					BS		E	B	G	FE	LI	CL			D	R4	
	5.50	46.95					BS		D	E	G	RA	XX				F	R5	
	5.40	52.35					BS		M	E	G	CL	AB				D	R3	
	3.10	55.45					CL		L	E	G	CL	AL	BS			E	R2	
	2.00	57.45					BS		M	E	G	CL	AB				S	R3	
	3.50	60.95					BS		D	E	G	CL	RA	XX			S	R5	
	12.05	73.00					BS		D	E	G	AB	CL	BN			S	R5	
	7.00	80.00					BS		D	E	G	AB	CL	BN	FE		S	R4	
	5.00	85.00					CL		M	B	G	CL	FE	AL	BS		S	C4	

A second application of this would be where dips are measured with respect to the horizontal but you have historical data where the dips have been measured with respect to the core axis (vertical). For these holes, the dips can be corrected by typing -1.00 for the \times Old Value, and using 90 for the $+$ value, as shown at right:

Replace with:

☐ Blank

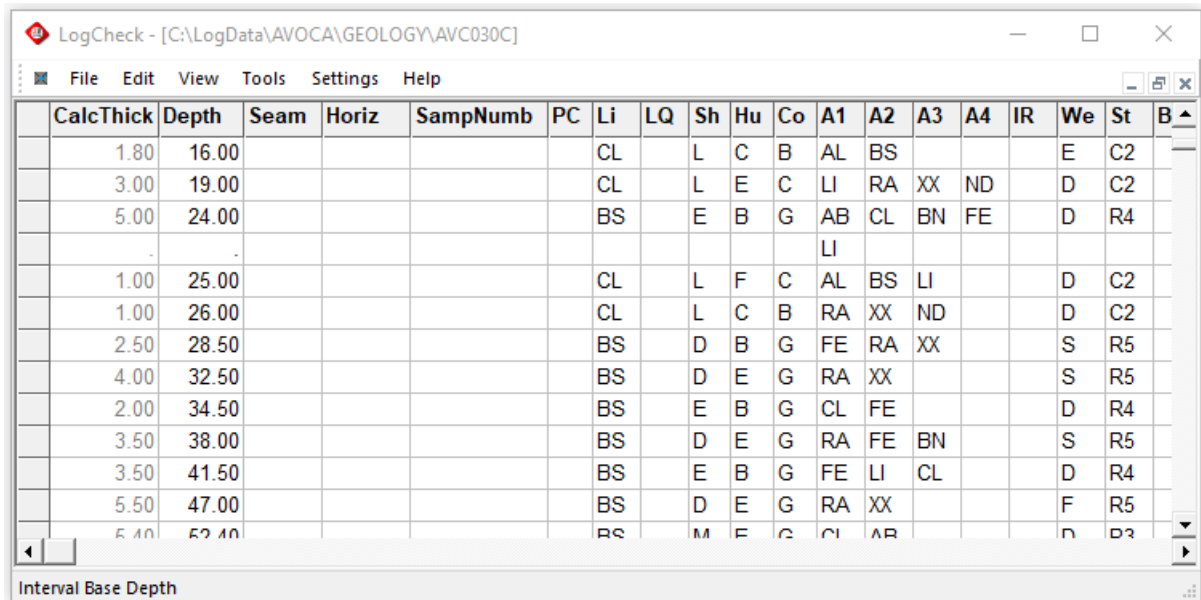
☐

☒ -1.0000 x Old Value + 90.00

7.4.12.4 Expansion/Contraction

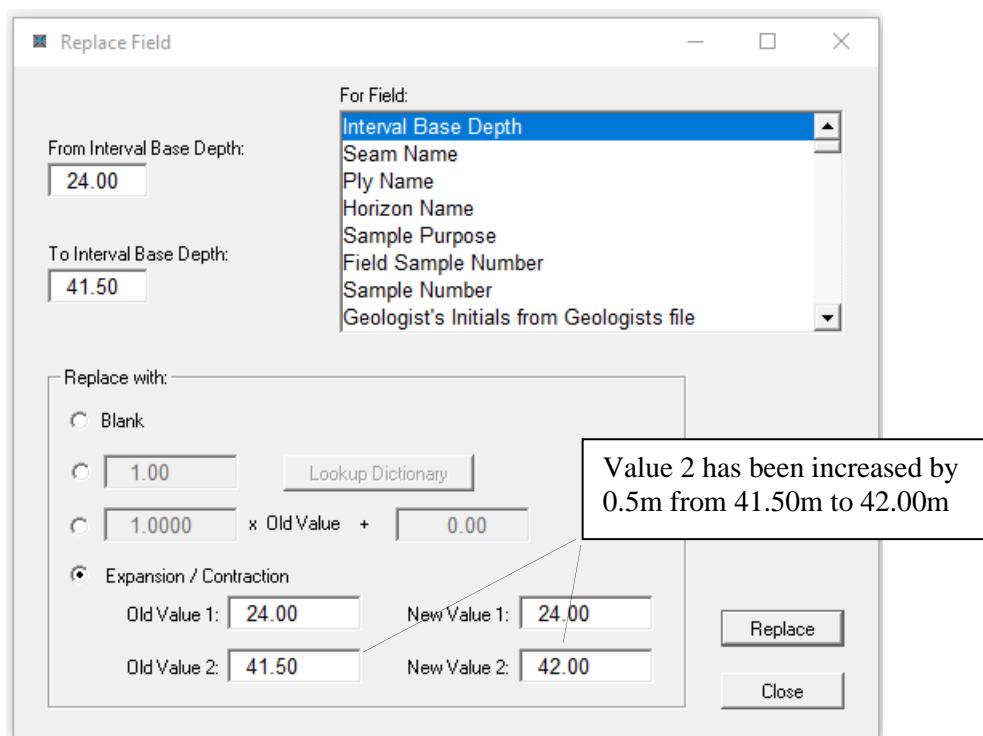
When matching the geology to the geophysics, it may be necessary to add in a core loss. You should try to identify where the core loss occurred and enter a new row indicating “core loss” (KL) in the lithology column. Where the drill core is broken up, it may be impossible to identify where the core loss occurred, so you can try to spread the loss over the interval.

For example, in the following data:



CalcThick	Depth	Seam	Horiz	SampNumb	PC	Li	LQ	Sh	Hu	Co	A1	A2	A3	A4	IR	We	St	B
1.80	16.00					CL		L	C	B	AL	BS				E	C2	
3.00	19.00					CL		L	E	C	LI	RA	XX	ND		D	C2	
5.00	24.00					BS		E	B	G	AB	CL	BN	FE		D	R4	
											LI							
1.00	25.00					CL		L	F	C	AL	BS	LI			D	C2	
1.00	26.00					CL		L	C	B	RA	XX	ND			D	C2	
2.50	28.50					BS		D	B	G	FE	RA	XX			S	R5	
4.00	32.50					BS		D	E	G	RA	XX				S	R5	
2.00	34.50					BS		E	B	G	CL	FE				D	R4	
3.50	38.00					BS		D	E	G	RA	FE	BN			S	R5	
3.50	41.50					BS		E	B	G	FE	LI	CL			D	R4	
5.50	47.00					BS		D	E	G	RA	XX				F	R5	
5.40	52.40					BS		M	E	G	CL	AB				D	R3	

To expand the interval 24.00 to 41.50m by 0.5m and spread the expansion over the entire interval, select the following in the Replace popup window:



Replace Field

For Field:

- Interval Base Depth
- Seam Name
- Ply Name
- Horizon Name
- Sample Purpose
- Field Sample Number
- Sample Number
- Geologist's Initials from Geologists file

From Interval Base Depth: 24.00

To Interval Base Depth: 41.50

Replace with:

☐ Blank

☐ 1.00

☐ 1.0000 x Old Value + 0.00

☒ Expansion / Contraction

Old Value 1: 24.00 New Value 1: 24.00

Old Value 2: 41.50 New Value 2: 42.00

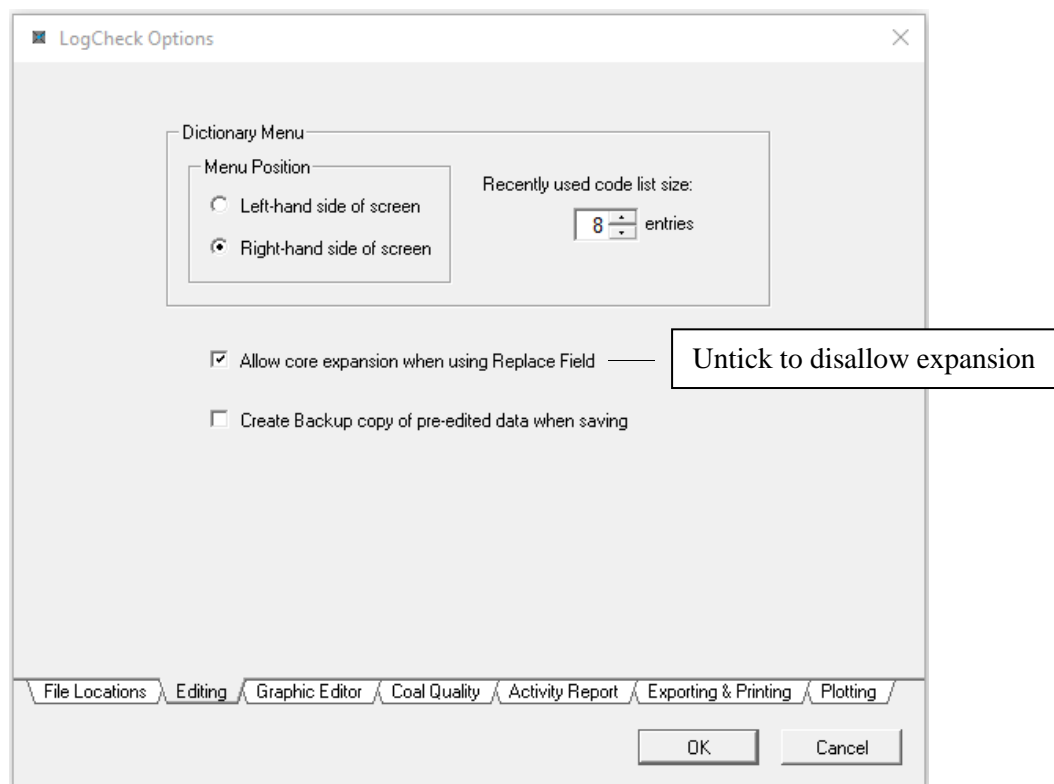
Value 2 has been increased by 0.5m from 41.50m to 42.00m

Resulting in the thicknesses of all the units between 24.00m and 41.50m being expanded to spread the core loss over all these units:

	CalcThick	Depth	Seam	Horiz	SampNumb	PC	Li	LQ	Sh	Hu	Co	A1	A2	A3	A4	IR	We	St	B
	1.80	16.00					CL		L	C	B	AL	BS				E	C2	
	3.00	19.00					CL		L	E	C	LI	RA	XX	ND		D	C2	
▶	5.00	24.00					BS		E	B	G	AB	CL	BN	FE		D	R4	
												LI							
	1.03	25.03					CL		L	F	C	AL	BS	LI			D	C2	
	1.03	26.06					CL		L	C	B	RA	XX	ND			D	C2	
	2.57	28.63					BS		D	B	G	FE	RA	XX			S	R5	
	4.11	32.74					BS		D	E	G	RA	XX				S	R5	
	2.06	34.80					BS		E	B	G	CL	FE				D	R4	
	3.60	38.40					BS		D	E	G	RA	FE	BN			S	R5	
	3.60	42.00					BS		E	B	G	FE	LI	CL			D	R4	
	5.00	47.00					BS		D	E	G	RA	XX				F	R5	
	5.40	52.40					BS		M	E	C	CL	AB				D	R3	

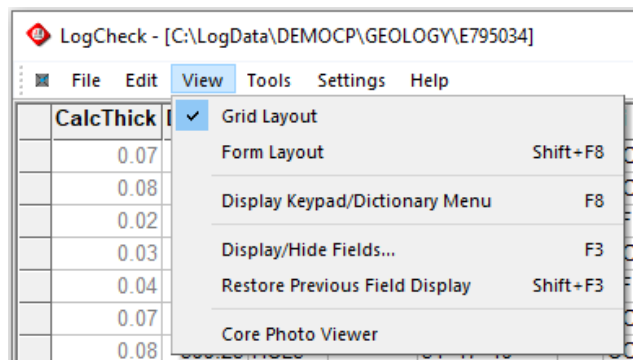
Another useful application of the Expansion/Contraction option is that after a run core has been brought to the surface it may expand and the Expansion/Contraction option can be used to readjust the thicknesses of the units such that the end depth of the core run matches the driller's end depth for the core run. In this case, make the Old and New Value 1, the depth of the start of the core run and Old Value 2 the end depth of the core run according to the geologist's measurements and New Value 2 the end depth of the core run according to the driller.

Contraction is always allowed, but as expansion should only be used where no Core Loss interval can be identified, there is an option in *LogCheck* s to disallow core expansion in the Replace Field window. This can be set by selecting Settings > Options, selecting the Editing tab:



7.5 View Menu

The View menu allows you to configure the way the *LogCheck* Editor Window is displayed.



It contains the following items:

- Grid Layout – displays the data for multiple records as a scrollable grid (see Section 7.3.1 – Grid Layout);
- Form Layout – displays the data for a single record as a form (see Section 7.3.1 – Form Layout);
- Display Keypad/Dictionary Menu – toggles menu on or off;
- Display/Hide fields – to choose which fields are to be displayed;
- Restore Previous Field Display – to restore previous display of fields;
- Core Photo Viewer – to display a separate window showing the core photo containing the currently selected unit.

7.5.1 Display Keypad/Dictionary Menu

The Keypad/Dictionary Menu changes form depending on whether the current cell is numeric, alphanumeric that does not have dictionary lookups or alphanumeric that has dictionary lookups:

The current cell is Depth which is a numeric field.

The current cell is SampNumb which is an alphanumeric field that does not have dictionary lookups.

The current cell is Seam which is an alphanumeric field that has dictionary lookups.

LogCheck - [C:\LogData\AVOCA\GEOLOGY\AVC030C]

Interval Base Depth

Tab	Del	<	>
BkTb	BkSp	Enter	
7	8	9	/
4	5	6	*
1	2	3	-
0	.	+	

Depth

Depth	Seam
294.75	W
294.89	W
295.68	W
296.45	W
297.23	W
297.42	W
297.58	
297.72	
297.88	
298.12	
298.21	
298.32	
298.44	
298.62	
299.29	
299.33	
299.55	
299.66	
299.78	
300.07	
300.19	
300.58	

LogCheck - [C:\LogData\AVOCA\GEOLOGY\AVC030C]

Sample Number

Tab	Del	<	>
BkTb	BkSp	Enter	
7	8	9	/
4	5	6	*
1	2	3	-
0	.	+	
A	B	C	D
E	F	G	H
I	J	K	L
M	N	O	P
Q	R	S	T
U	V	W	X
Y	Z	,	\
Space			

Depth

Depth	Seam	SampNumb
294.75	WK2	003130
294.89	WK2	003131
295.68	WK2	003126
296.45	WK2	003127
297.23	WK2	003128
297.42	WK2	003129
297.58		003129
297.72		003132
297.88		003132
298.12		003132
298.21		
298.32		
298.44		
298.62		
299.29		
299.33		
299.55		
299.66		
299.78		
300.07		
300.19		
300.58		

LogCheck - [C:\LogData\AVOCA\GEOLOGY\AVC030C]

Seam Name

Tab	Del	<	>
BkTb	BkSp	Enter	

Depth

Depth	Seam	Se
294.75	WK2	00
294.89	WK2	00
295.68	WK2	00
296.45	WK2	00
297.23	WK2	00
297.42	WK2	00
297.58		00
297.72		00
297.88		00
298.12		
298.21		
298.32		
298.44		
298.62		
299.29		
299.33		
299.55		
299.66		
299.78		
300.07		
300.19		
300.58		

Seam Name

- BHWE Base of Transgres
- BHWL Water level
- BUTE Base of Conformab
- MA Mount Arthur Seam
- MAL Mount Arthur Lowe
- MAM Mount Arthur Midd
- MAU Mount Arthur Uppe
- WK1 Warkworth 1 Seam
- WK2 Warkworth 2 Seam
- WK2L Warkworth 2 Lower
- WK2U Warkworth 2 Upper
- WK3 Warkworth 3 Seam

When selecting a field that has dictionary lookups, the possible dictionary values for the field are displayed. If all the dictionary values for the field do not fit on the screen (for example, Lithology), the most recently used values are shown at the top of the list; the remaining values can be accessed by scrolling further down the list. For example:

LogCheck - [C:\LogData\AVOCA\GEOLOGY\AVC030C]

CalcThick	Depth	Seam	Horiz	SampNumb	PC	Li	LQ	Sh	Hu	Co	A1	A2	A3	A4	IF	Lithotype
0.15	294.58			003130		SS	MM	L	G	C	QZ	FS	MI	AB		
				003130							SA	BL				
				003130		SS	MM	L	G	C	QZ	FS	MI	AB		
				003130							XX	BL				
0.02	294.75	WK2		003131		CO	SY									
0.14	294.89	WK2		003131		CO	SY									
0.79	295.68	WK2		003126		CO										
0.77	296.45	WK2		003127		CO										
0.78	297.23	WK2		003128		CO										
0.19	297.42	WK2		003129		CO										
0.16	297.58			003129		SS	FF	E		G	AB	SI	BN			
0.14	297.72			003132		SS	FF	L		G	AB	XX	SI	LM		
				003132							FS	QZ				
0.16	297.88			003132		SS	FF	L		G	AB	XX	SI	LM		

Lithotype

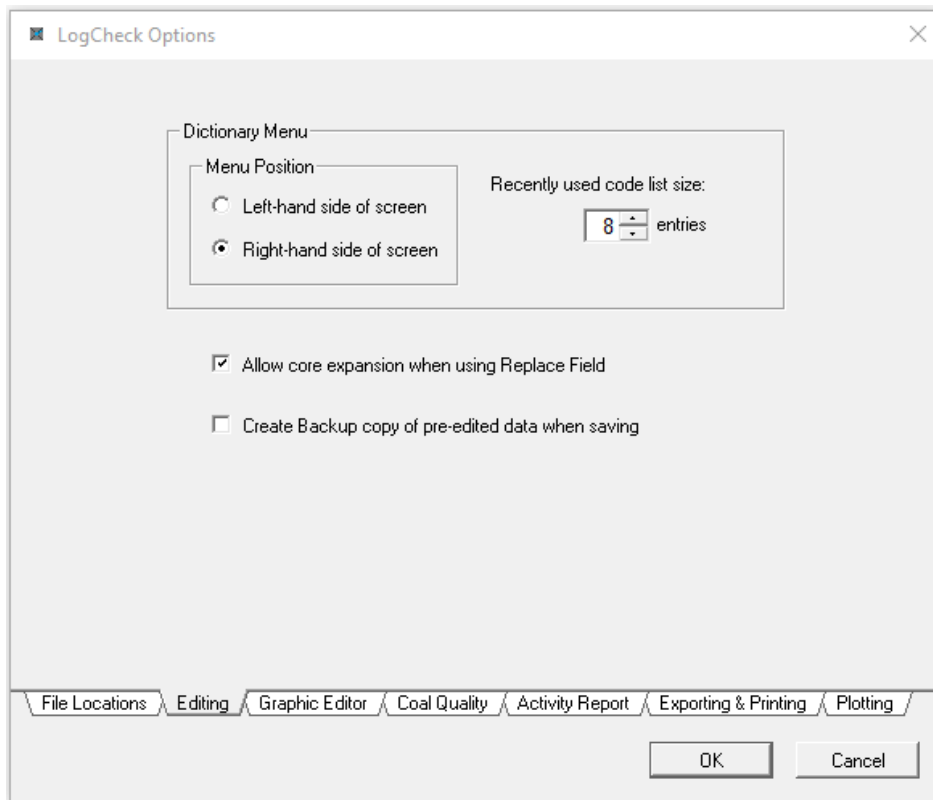
Tab	Del	<	>
BkTb	BkSp	Enter	

- BS Basalt
- CO Coal
- CS Claystone
- SS Sandstone
- ST Siltstone
- AI Acid/Felsic Intrusive
- AL Alluvium
- AN Andesite
- AV Acid/Felsic Volcanic
- BC Brown Coal
- BI Basic/Mafic Intrusive
- BO Boulders
- RD Braccia

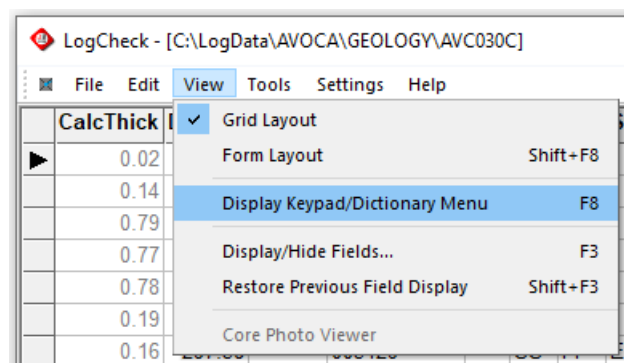
The maximum size of the Recently used code list is initially set to 8 but the user can modify this size. This is may be useful if they find there generally more or less codes that they regularly use.

The menu can be set to sit on the left or right hand side of the screen as if using a tablet, left-hand users generally prefer to have the menu on the left and right-hand users on the right so that their arms do not cover the data area of the screen.

To select whether the menu is displayed on the left or right-hand side of the screen and the size of the recently used code list, select Settings > Options from the *LogCheck* menu and then the Editing tab:

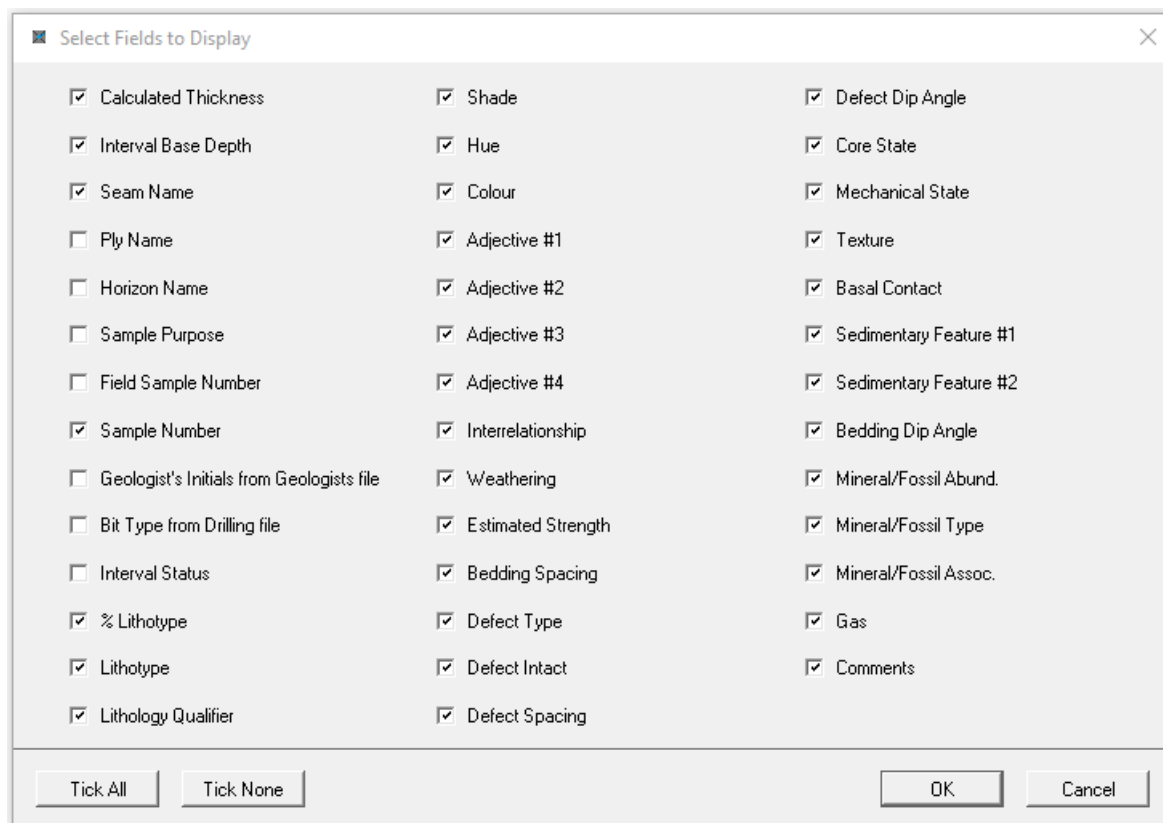


Display of the Keypad/Dictionary Menu for the *LogCheck* editor can be toggled on/off by clicking the Display Keypad/Dictionary Menu item in View menu (or F8):



7.5.2 Display/Hide Fields

The Display/Hide Fields option (F3) of the View menu allows you to select the columns to be displayed in the Editor. Tick a column to display it or untick it to hide it. The Tick All button selects all columns for display; the Tick None button de-selects all columns.



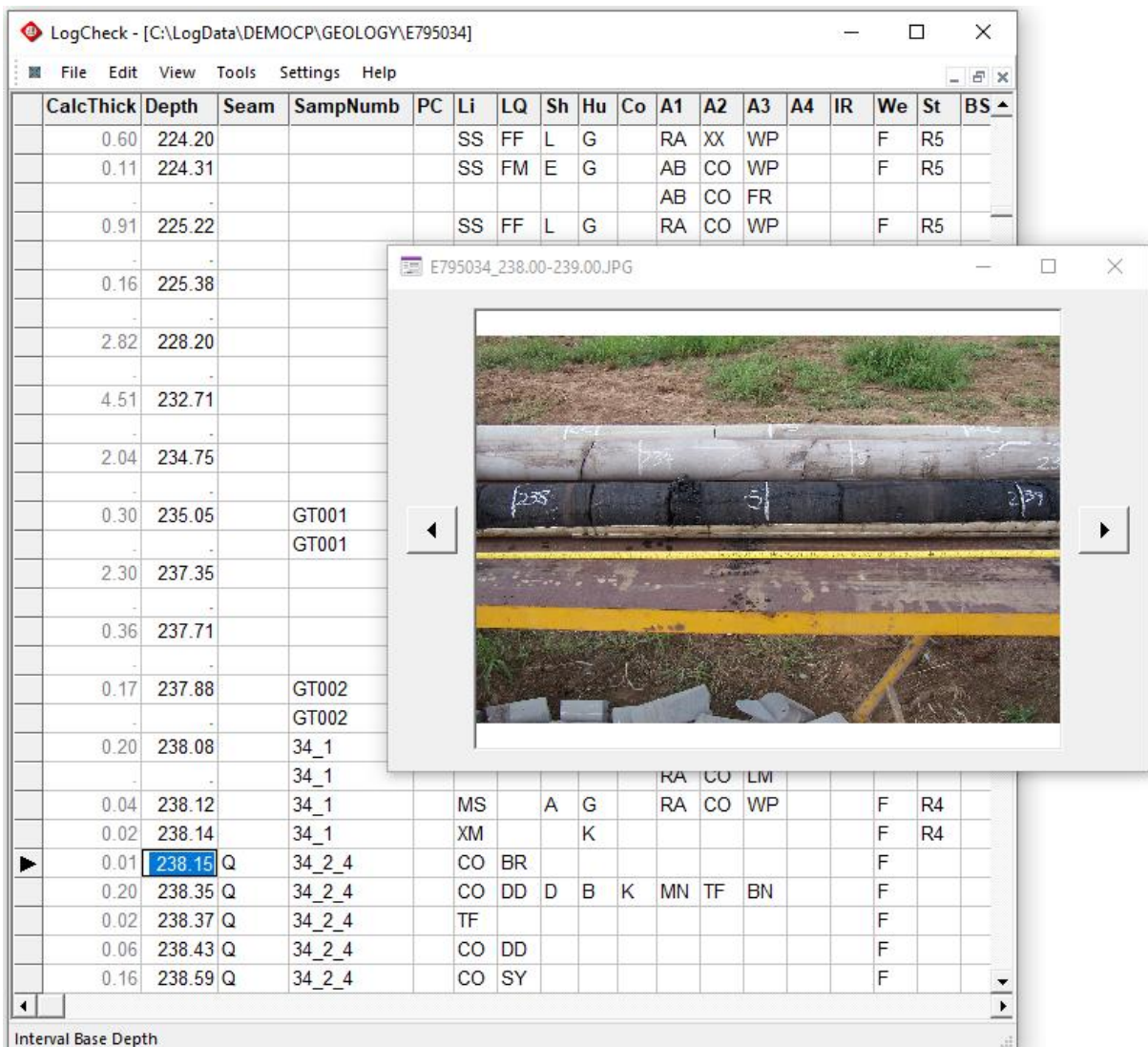
As the Sample Number, Seam and Ply are usually only filled in for coal seams, you may like to turn these off when not in a coal seam, so more of the fields are visible on the screen.

7.5.3 Restore Previous Field Display

The Restore Previous Fields option (Shift+F3) of the View menu allows you to restore the previously set columns. You can press Shift+F3 to cycle between two displays showing different columns. This is useful when moving between coal and non-coal lithologies. This will be greyed out if you haven't made any changes to which fields are displayed since *LogCheck* was last reinstalled.

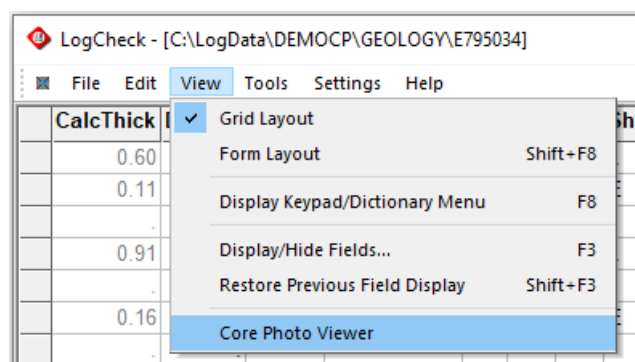
7.5.4 Core Photo Viewer

The core photo viewer displays the core photo for the current row in the data:



The Core Photo window and the editor are linked. On navigating the editor the photo will change to display the current interval. Clicking the back and forward arrows on the Core Photo window will change the photo to the previous and next photos going down the holes and the editor will automatically move to the interval in the newly displayed photo.

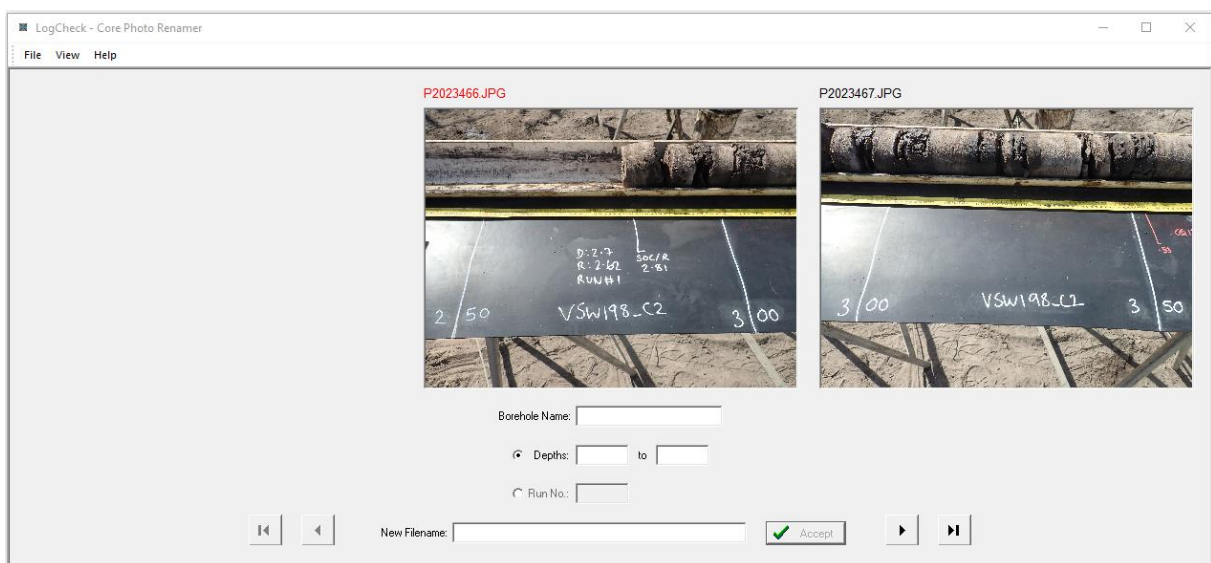
Display of the Core Photo Viewer can be toggled on/off by clicking the Core Photo Viewer item in View menu:



The Core Photo Viewer option of the View menu can only be selected when editing Geology data and there exists core photos for the hole being edited in a folder named Photos in the *LogCheck* folder for the project. The photos can be .gif, .jpg, .jpeg, .png, .bmp, .ico, .tif or .tiff files. In order to tie the photo files to the data, each photo files must be named with the name of the borehole as used in *LogCheck*, followed by an underscore, the photo's top depth, a dash and finally the photo's bottom depth. For example, the .jpg photo for depths 224.50 to 225.50 of hole DDH01 must be named DDH01_224.50-335.50.jpg.

LogCheck itself does not include a facility to assist in renaming files into this format but has a sister application called *LogCheck – Core Photo Renamer* available from the *LogCheck* distributor to assist in renaming core photos.

The Core Photo Renamer first prompts the user to select the files they would like to rename, then displays the first and second photo in the sequence:



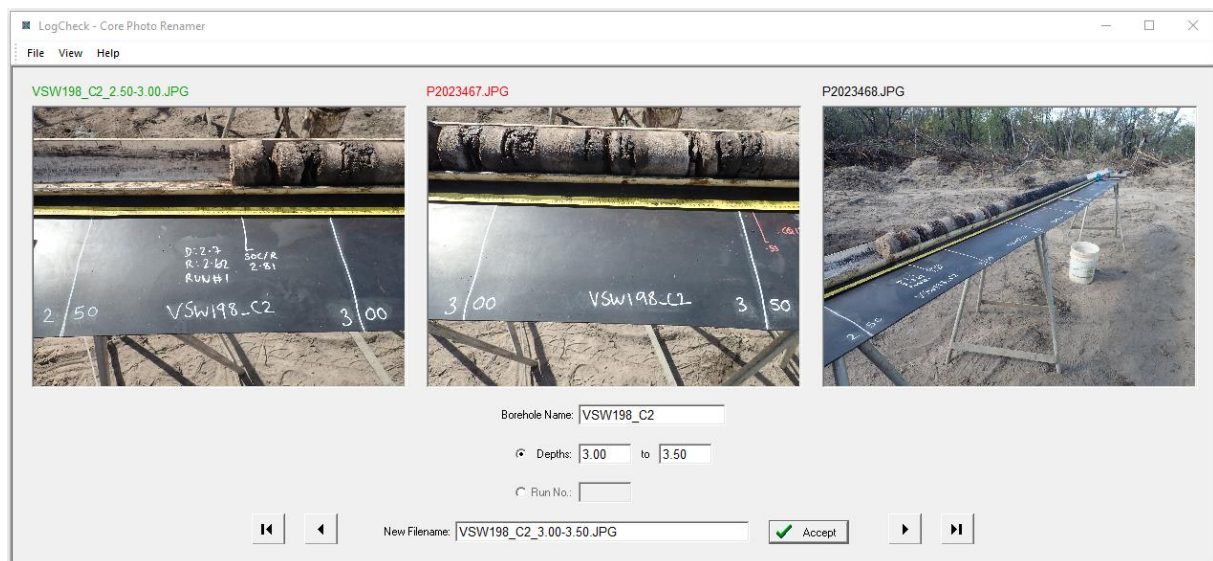
Next, enter the borehole name and top and base depths for the first photo and the appropriate file name then appears automatically in the New Filename box:



To accept the new name, click the accept button and the photos filename as shown above the photo is modified to the new name and coloured green:



To navigate to the next photo in the sequence, click the right arrow button and the next photo is displayed in the centre of the screen and using the core length and base depth of the previous photo the depths are automatically set for the new photo and the appropriate New Filename displayed:



If satisfied with the suggested depths and filename, click again the Accept button. If not, modify the depths and/or filename and then click Accept or if not wanting to rename the photo just click the right arrow button.

Once satisfied with all the renaming select File > Save or Ctrl+S to save the filename changes.

7.6 Tools Menu

The items in the Tools menu are:

- Validate revalidate the currently open data
- Compare compare the currently open data to another copy of the data to create a list of the differences between the two
- Graphic Editor open the graphical editor for adjusting the geologist's log to the geophysics
- Sort sort the currently open data on user specified fields in the data
- Filter filter the data based on a dBASE query (see Appendix B)
- Column Statistics calculate and display the statistics for any user specified column in the data
- Clear Work Files clear out the user's and project's work files

Which of these can be selected depends on the type of data that is open in the editor:

- Validate and Compare items can be selected when hole data or dictionaries are open
- Graphic Editor can only be selected when Geology data is open
- Sort and Filter items can be selected when audits or summaries are open
- Column Statistics can be selected when any data type is open
- Clear Work Files can only be selected when Project Details are open

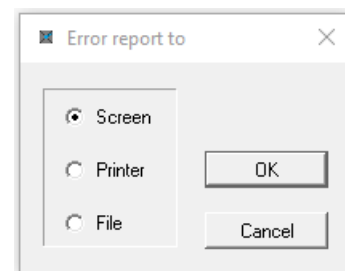
7.6.1 Validate

Validate checks all data that is currently open. It re-checks all codes against the current dictionary, plus all the checks normally performed before a save. Validate can operate on a single hole or across multiple holes. Running the Validate tool can be particularly useful after receiving data from another copy of *LogCheck* on another computer as:

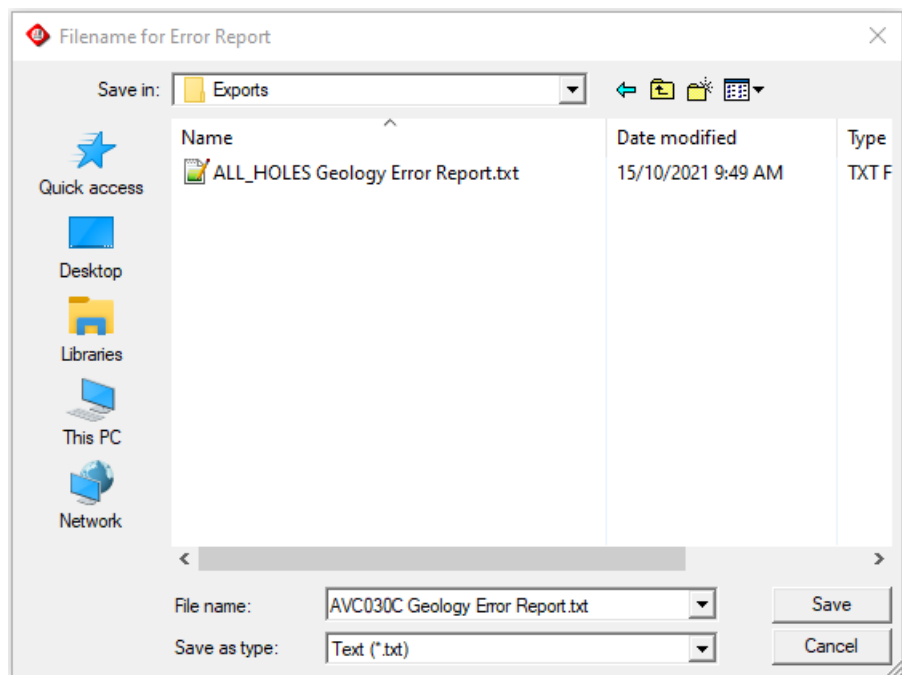
- The dictionary on the other computer may differ from that on the current one. Codes are only checked as they are entered and so even if the new data is modified and saved the codes in the data will not be rechecked against the current dictionary.
- The optional validation settings on the current computer may differ to those on the computer from which the data was sourced. For example, the optional validation that the total depth of the data must match that recorded in the header may be set to Ignore on the computer from which the data has come but set to Fatal on the current computer.
- The data may have been recorded using an older version of *LogCheck* which did not have all the validation checks that have been included over time into the current version.

It is prudent to open all holes and validate them before producing reports, plots or exporting them to another system, such as a modelling package.

When Validate is selected, the popup window shown on the right requests where the errors are to be reported:



When reporting to a file, a popup window requests a folder and file name for the errors:



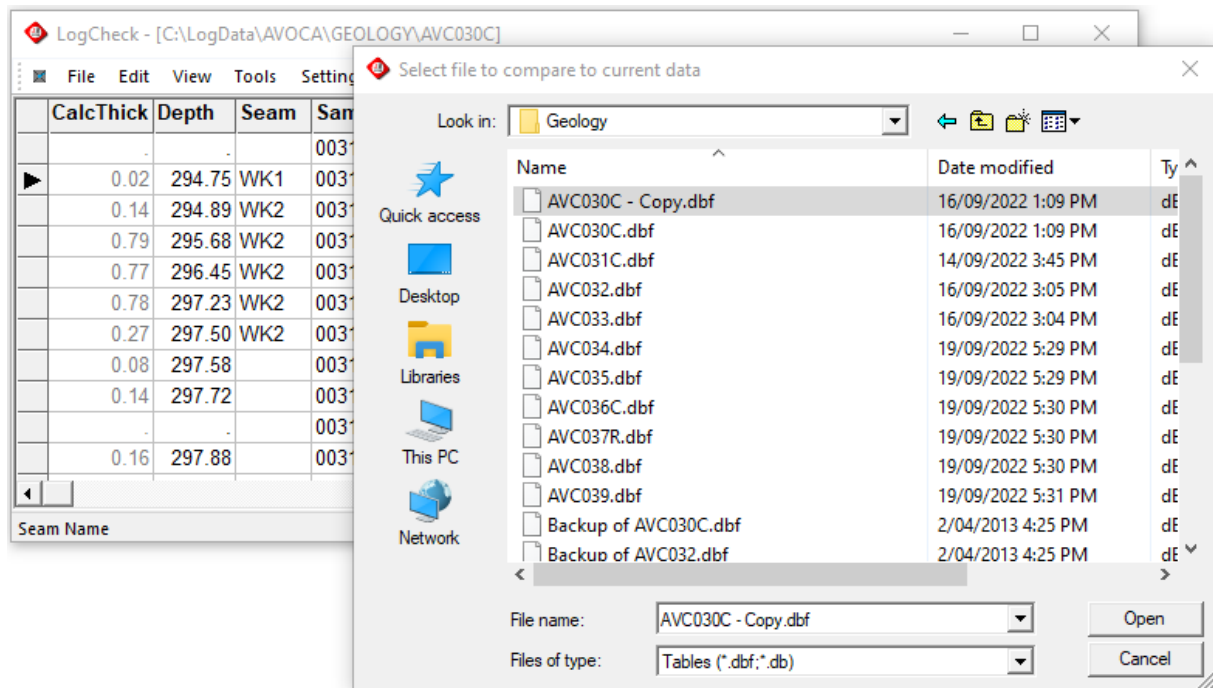
The default folder is the project's Export folder and the default file name consists of the hole name, data type and the words Error Report. In the above example, the error file is:

C:\LogData\AVOCA\Exports\AVC030C Error Report.txt

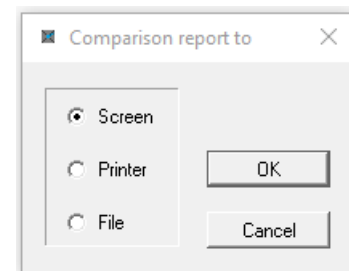
7.6.2 Compare

The Compare tool compare another copy of the current data to another copy of the data – enabling you to see the differences between the two copies. You can compare individual files, dictionaries or all files in two specified directories. As with Validate, the output can be sent to Screen, Printer or File.

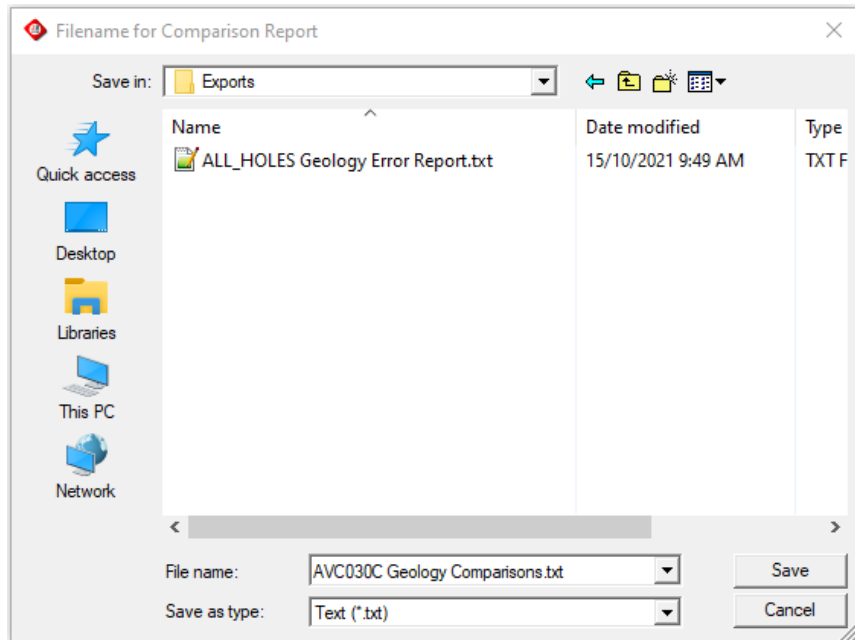
In the following example, the Geology data for hole AVC030C has been opened in *LogCheck* and another copy of this data also exists, and it is desired to find out what, if any differences exist between the two. To compare the two files, select Tools > Compare, and then select the file that is to be compared with:



Next, the popup window shown on the right requests where the differences are to be reported:



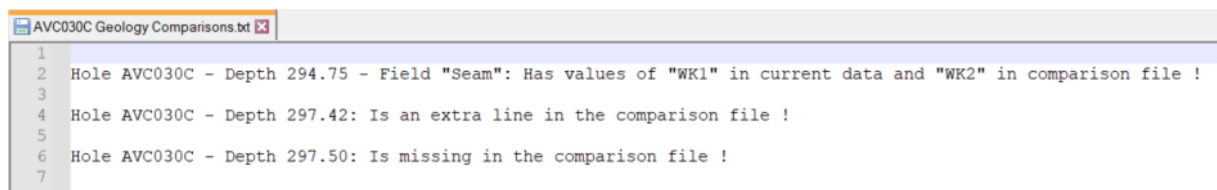
When reporting to a file, a popup window requests a folder and file name for the comparisons:



The default folder is the project's Export folder and the default file name consists of the hole name, data type and the words Comparisons. In the above example, the error file is:

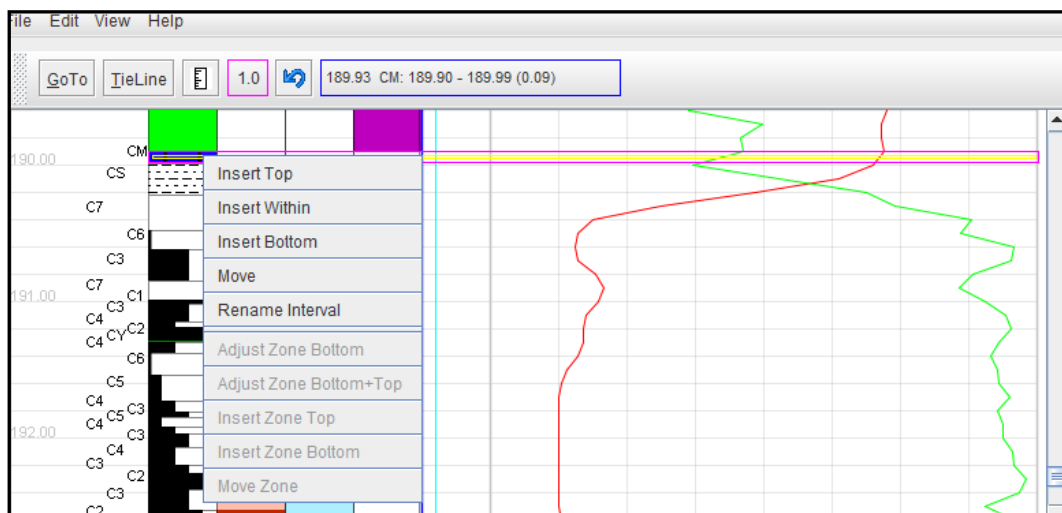
`C:\LogData\AVOCA\Exports\AVC030C Comparisons.txt`

The resulting report for the above example:



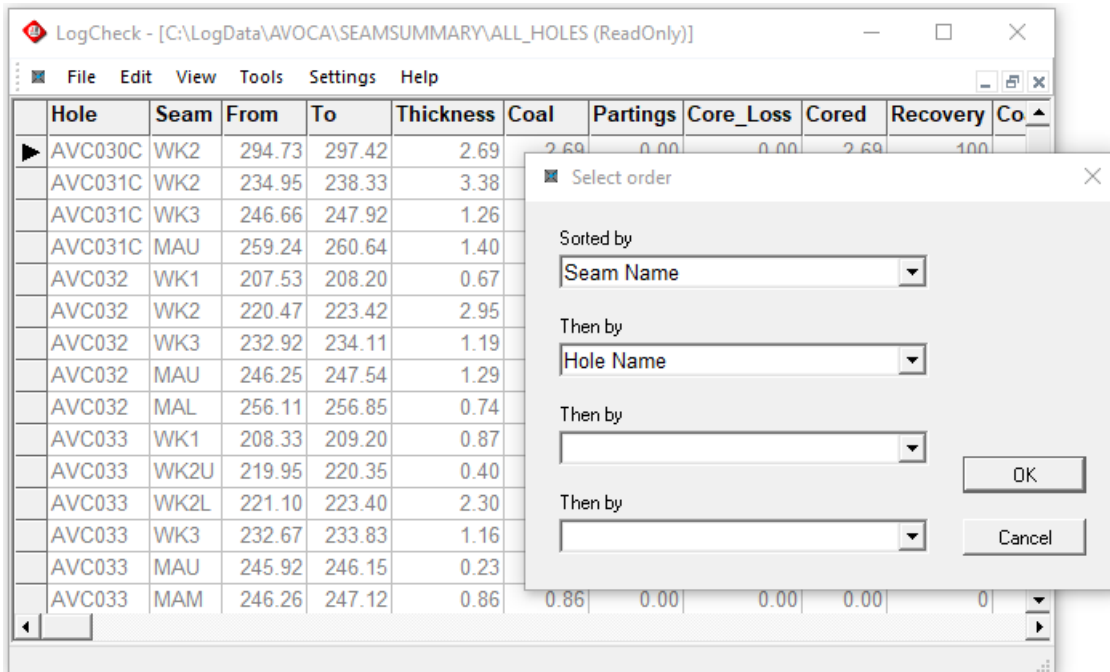
7.6.3 Graphical Editor

The Graphical Editor is an optional component of *LogCheck* that allows graphical editing of the data. It allows the depths, lithology units, seams, plies and sample numbers to be edited. It is available from the distributors of *LogCheck*.



7.6.4 Sort

Sort is only available when an audit, summary or statistics is open. They can be sorted by up to four variables. For example, the Seam summary is initially produced in Hole Name/Seam Floor Depth order but you may prefer it in Seam Name/Hole Name order. In the following Seam Summary example, select Tools > Sort from the *LogCheck* menu, and then the Select summary order popup window is displayed. In the drop-down list, select the required sort fields, as shown below, then click the OK button:



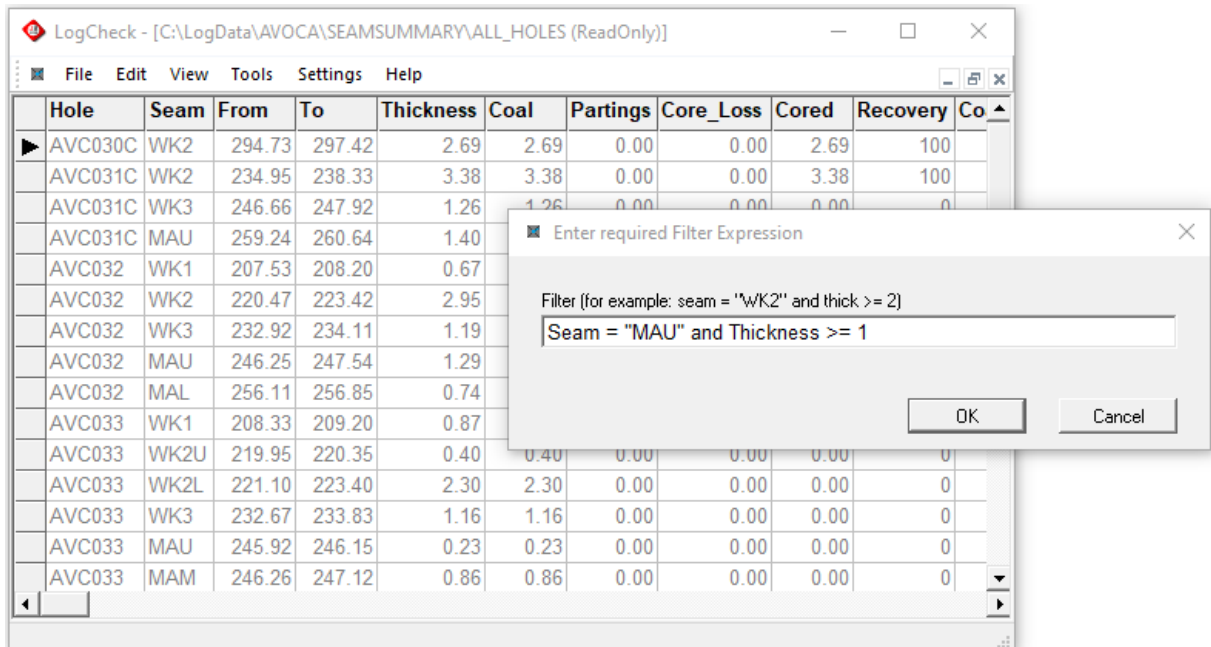
The results being:

The screenshot shows the LogCheck application window with the same data table as before, but now sorted by Seam Name and then Hole Name. The table has columns: Hole, Seam, From, To, Thickness, Coal, Partings, Core_Loss, Cored, Recovery, and Co.

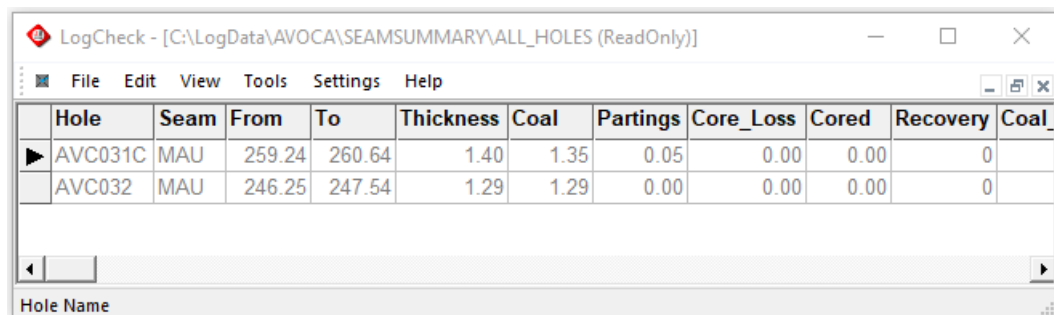
Hole	Seam	From	To	Thickness	Coal	Partings	Core_Loss	Cored	Recovery	Co
AVC038	MA	288.52	291.03	2.51	2.01	0.50	0.00	0.00	0	
AVC032	MAL	256.11	256.85	0.74	0.74	0.00	0.00	0.00	0	
AVC034	MAL	262.23	262.95	0.72	0.72	0.00	0.00	0.00	0	
AVC035	MAL	303.17	303.85	0.68	0.68	0.00	0.00	0.00	0	
AVC033	MAM	246.26	247.12	0.86	0.86	0.00	0.00	0.00	0	
AVC034	MAM	254.94	255.75	0.81	0.81	0.00	0.00	0.00	0	
AVC035	MAM	295.95	296.65	0.70	0.70	0.00	0.00	0.00	0	
AVC031C	MAU	259.24	260.64	1.40	1.35	0.05	0.00	0.00	0	
AVC032	MAU	246.25	247.54	1.29	1.29	0.00	0.00	0.00	0	
AVC033	MAU	245.92	246.15	0.23	0.23	0.00	0.00	0.00	0	
AVC034	MAU	254.30	254.61	0.31	0.31	0.00	0.00	0.00	0	
AVC035	MAU	295.05	295.60	0.55	0.55	0.00	0.00	0.00	0	
AVC032	WK1	207.53	208.20	0.67	0.58	0.09	0.00	0.00	0	
AVC033	WK1	208.33	209.20	0.87	0.69	0.18	0.00	0.00	0	
AVC035	WK1	260.80	261.30	0.50	0.50	0.00	0.00	0.00	0	

7.6.5 Filter

Filter is only available when an audit, summary or statistics is open. A dBASE query must be entered for the filter. For more information on how to write these, see Appendix B. In the following Seam Summary example, select Tools > Filter from the *LogCheck* menu, and then the Filter Expression popup window is displayed:

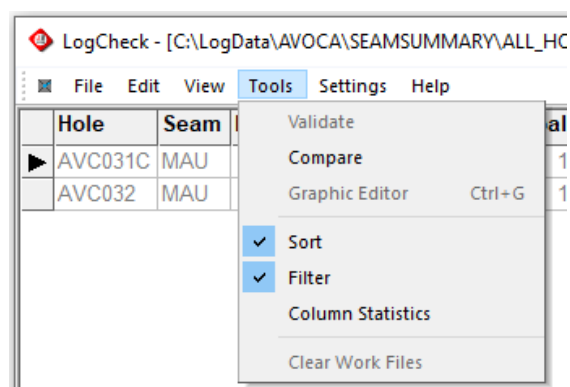


In the above example, the results will be filtered so that only records where the seam name is “MAU” and the thickness is greater than or equal to 1 metre are displayed:



To clear the results of a filter, select Tools > Filter, and delete all text in the Filter Expression dialog.

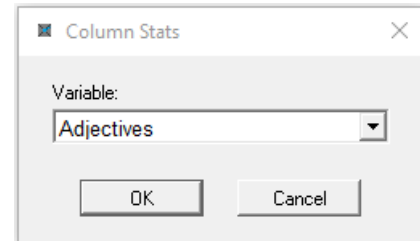
If a filter or sort has been applied to the data, the *LogCheck* menu shows a tick against the menu item, as shown on the Tools – Column Statistics



7.6.6 Column Statistics

Selecting Column Statistics displays a summary of the data in a specified column. It can be used both raw and summary data.

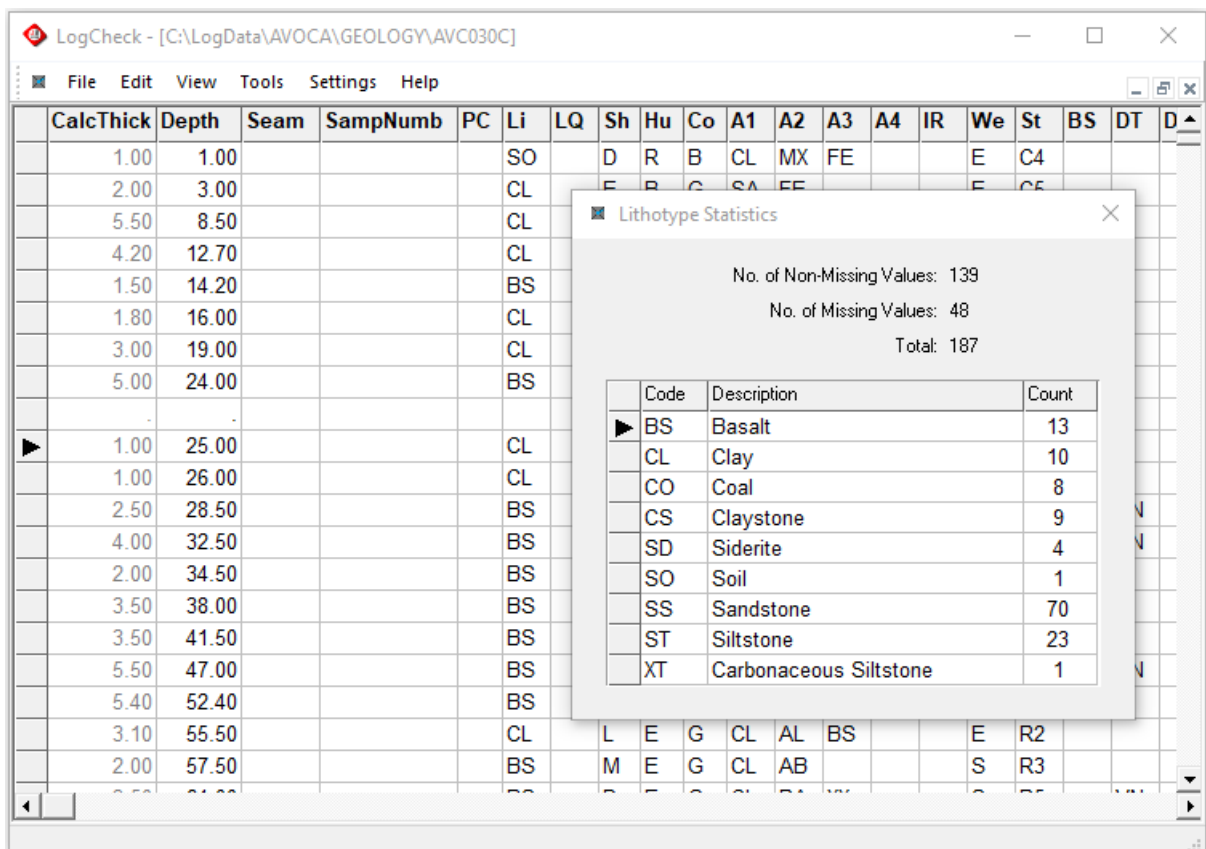
Firstly, the user is prompted for the column whose statistics are required:



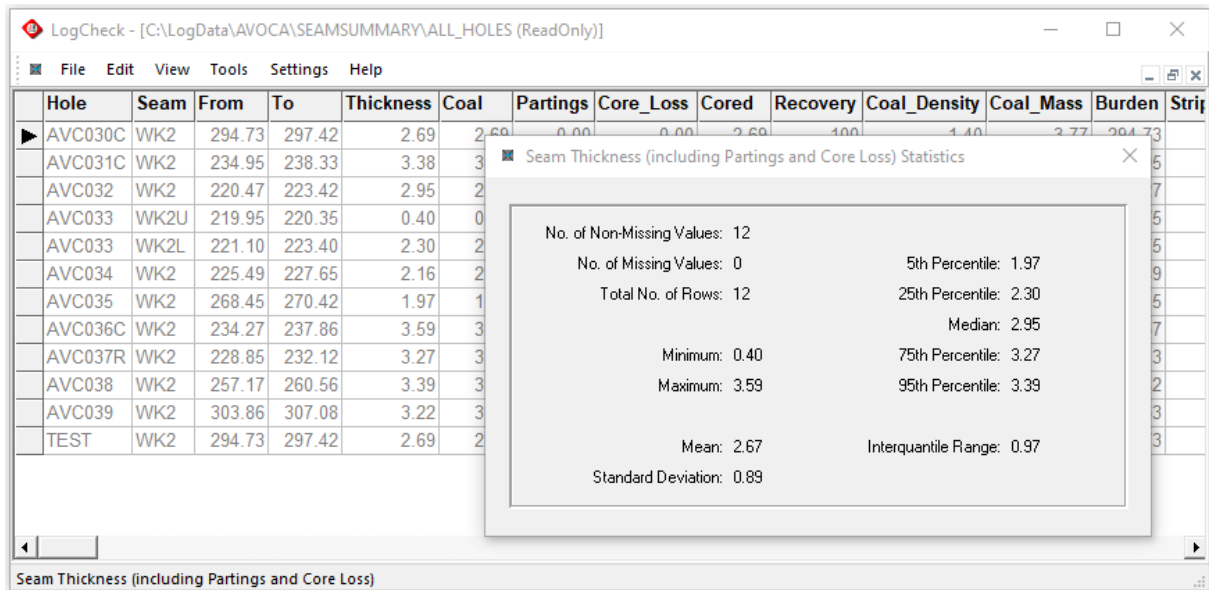
Where data contain multiple columns for the same variable, the statistics include all the columns in calculating statistics for the variable. For example, CoalLog Geology data has four columns for Adjectives (A1, A2, A3 and A4) and when calculating the statistics for Adjectives all four of these columns are included in the calculations.

The results of Column Statistics are different for coded data and numeric data.

For example, statistics on Lithotype (a coded variable) in the Geology data for AVO030C:



Whereas statistics on Seam Thickness (a numeric variable) in a Seam Summary which has been filtered on Seam = WK2:



7.6.7 Clear Work Files

LogCheck creates a numerous Work files that are preserved even after *LogCheck* has closed. These save information that *LogCheck* has calculated while accessing data and which it later uses say, when generating summaries. If these files do not exist and *LogCheck* requires them, it simply regenerates them but may take it some time. There are two folders where they are stored:

- C:\Users*userName*\AppData\Local\LogCheck\Work where *userName* is the name the user is signed onto the computer with. These files are work files specific to the user.
- C:\LogData*projectName*\Work where *projectName* is the name of a *LogCheck* project. These work files are specific to the project.

Sometimes, say if *LogCheck* crashes while accessing work files, they may become corrupted. Additionally, every *LogCheck* dictionary has an index table to speed up dictionary lookups. These indexes may also become corrupted, again say, if *LogCheck* crashes while accessing them. Clear Work Files deletes all the files in both Work folders and also recreates the indexes for all the dictionaries it accesses for a project.

If *LogCheck* is generating numerous program errors that do not normally occur, running Clear Work Files may fix the problem. In order though to run Clear Work Files, the user must first open the Project Details for the project whose Work files are to be cleared and whose dictionaries are to be reindexed.

Chapter 8

Graphic Editor

By the end of this chapter you will be able to:

- Navigate the graphical editor form.
- Modify hole data in the hole edit form.
- Insert a unit in the log.
- Replace (move) depths up or down the log.
- Delete an interval.
- Perform a thickness calculation.
- Rename a lithology, seam, ply or sample number.
- Expand/contract intervals.
- Apply tielines to perform depth corrections.
- Update any associated geotechnical data.
- View and edit multiple holes on the one plot.
- View a log of the edits that have so far been made.
- Undo the edits done in the current session.
- View/edit the dictionary.
- View the available patterns.
- Change options in the program.
- Save the changes done in the current session.
- View the current version of GeoEdit.
- Maintain graphic editor definitions.

8.1 Introduction

The Graphical Editor (GeoEdit) is used for graphically displaying hole data, and aligning depths of lithologies with the downhole geophysics. GeoEdit reads data from a hole log generated from *LogCheck*, and displays the lithology, seam, ply, sample number, mechanical state and geophysics in a graphical format. The main editing operations are:

- Moving the depth of an interval(s) either further down or up the hole,
- Inserting a new interval at the top, bottom or within an existing unit,
- Expanding or contracting units, either by a single group or a set of tielines,
- Renaming a lithology, seam, ply or sample number.

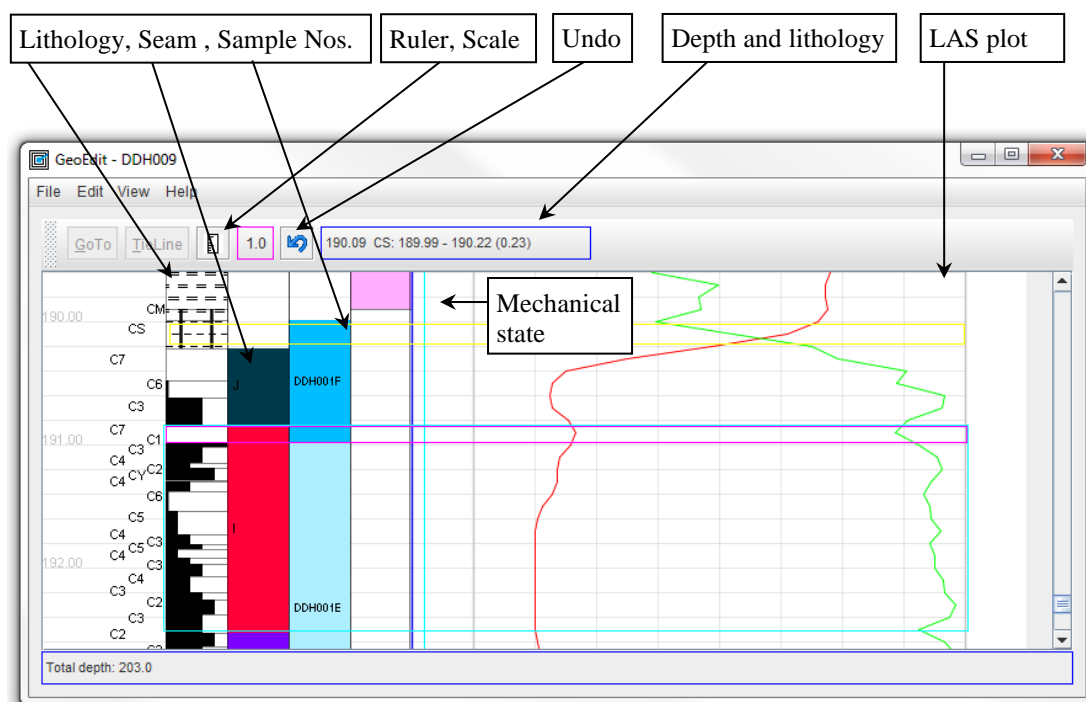
It maintains a history of edits done during the current session, and allows you to undo each edit. This documentation is available on line by going to Help > Display Manual. GeoEdit also has options to view all the available patterns, the dictionary and a log of the original hole before any modifications in GeoEdit were made.

For data formats that have defect data embedded with the geological data, a move, insert or expand/contract operation will also update the depths of any associated defect depths.

Disclaimer: this appendix is a description of the functions of GeoEdit. The examples used are illustrative only and do not intend to explain the principles of depth adjustment of lithology boundaries from LAS data.

8.2 The Editor Form

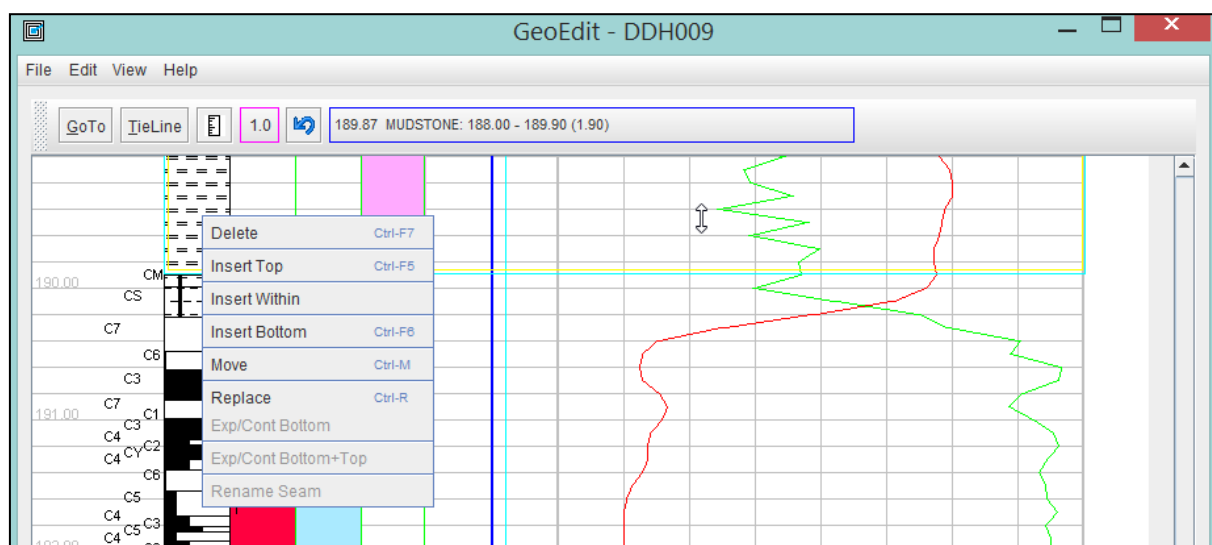
The editor form can be used to navigate the hole, insert intervals, adjust depths, and rename units. The plot includes the lithology, seam/ply, sample number, mechanical state and LAS lines. An example of a hole opened in GeoEdit, with the current lithological unit indicated by the magenta rectangle and the geophysical logs on the right, is shown below:



The menus that are available in GeoEdit:

File	Edit	View	Help
Save	Clear Depth Calcs	Log of Edits	About
Exit	Dictionary	View Tie Lines	Display Manual
	Go To Depth	Zoom In	Display Patterns
	Delete	Zoom Out	
	Insert Top	Options	
	Insert Within		
	Insert Bottom		
	Move		
	Replace		
	Undo Edit		
	Edit LAS Params		

The toolbar and the right-click popup menu provide access to the editing operations, as shown below:



These operations have been given the same shortcuts that are available in *LogCheck*, and are:

Operation	Shortcut	Description
Exp/Cont Bottom		Expand/contract units in zone by adjusting the bottom boundary.
Exp/Cont Bottom+Top		Expand/contract units in zone by adjusting the top and bottom boundary.
GoTo	Ctrl-G	Move the plot window to a specified depth.
Delete	Ctrl-F7	Delete the current unit.
Insert Top	Ctrl-F5	Insert a unit at the top of the current unit – either above or inside it.
Insert Within	Ctrl-W	Insert a unit within the current unit.
Insert Bottom	Ctrl-F6	Insert a unit at the top or bottom of the zone.
Move	Ctrl-M	Move all unit(s) up/down the hole – either the entire unit or roof only.
Rename	Ctrl-R	Rename a lithology or seam.
TC		Display the thickness calculations (ruler) of two specified points.
Tie Line		Prepare to set tielines for expansion or contraction.
Undo	Ctrl-Z	Undo the most recent edit.

The right-click popup menu is activated by right-clicking in the lithology column. Note that if the zone is not set, the zone operations are disabled, and vice versa.

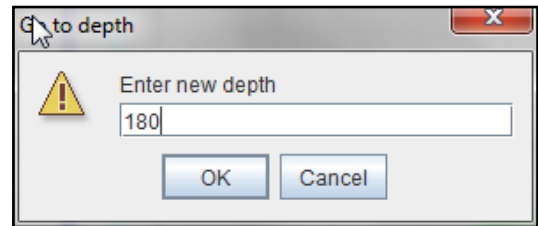
8.2.1 Navigating the Editor Form

Navigation up and down the Editor form can be achieved with the:

- GoTo button: Click this button and type the depth to move the plot window to;
- Mouse wheel: Roll the mouse wheel to scroll up or down the plot.
- Function keys: Use the function keys, as described in the following section.
- ScrollBar: Use the mouse to scroll up or down the hole, or click in the bar, or the arrows at the top/bottom of the bar.

Selecting the GoTo button displays the following dialog:

Enter the required depth, then click the OK button – GeoEdit then moves the hole log so that the specified depth is displayed at the top of the plot window.



8.2.2 Using the Function Keys

The function keys that are used in GeoEdit are as follows.

- ↑ Key: Moves the plot up incrementally.
- ↓ Key: Moves the plot down incrementally.
- Ctrl + Keys: Zoom in.
- Ctrl - Keys: Zoom out.
- End Key: Moves the plot to the end of the hole.
- Esc: Cancels the current operation; for example, setting the zone or when drawing a line (cursor becomes a +).
- F5 Key: Refreshes the display of the plot.
- Home Key: Moves the plot to the top of the hole.
- PgDn Key: Moves the plot down a “page” at a time.
- PgUp Key: Moves the plot up a “page” at a time.

8.2.3 The Current Unit

The current unit is a single unit that can be set by clicking inside a unit in the lithology column. This is indicated by a coloured rectangle that extends across the plot.

8.2.4 Zooming

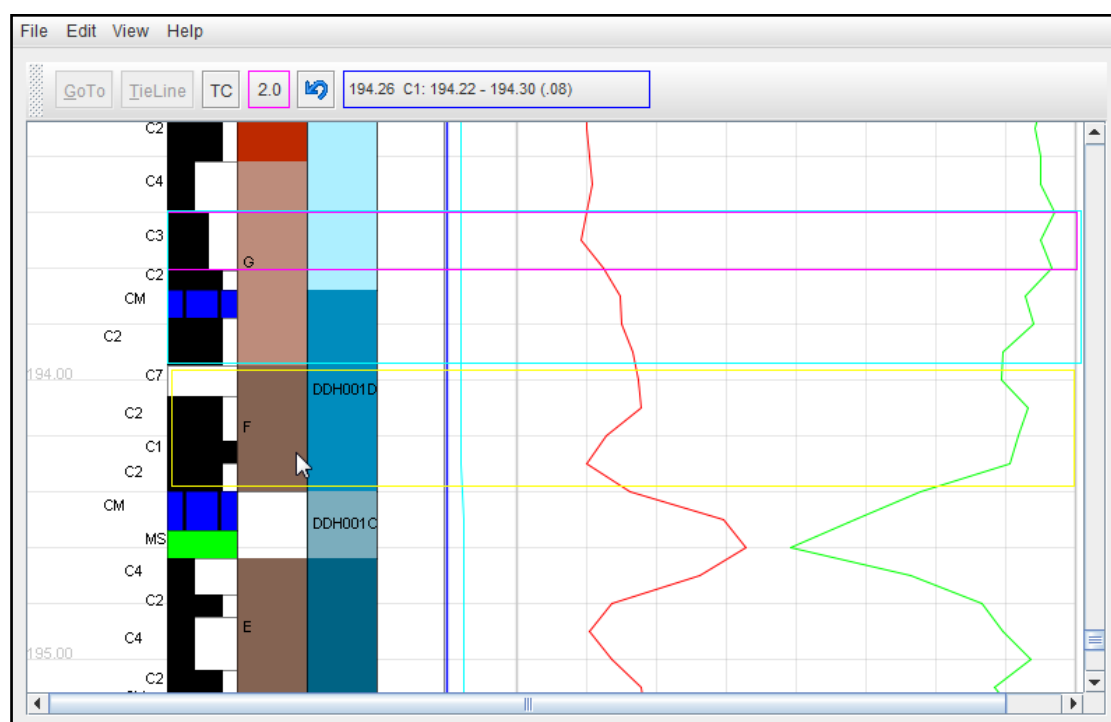
The plot can be zoomed by pressing the Ctrl key and rotating the mouse wheel. The default zoom ratios available are 0.2, 0.5, 1.0, 2.0 and 3.0. The default is 1.0, where 1 m = 100 pixels of screen resolution. These values can be edited in the GeoEdit.ini file, as described at the end of this chapter.

8.3 The Edit Zone

The Edit Zone is one or more currently selected units, and is indicated by a coloured rectangle (cyan, in the diagram below) – the top of the Edit Zone is the current unit. The Edit Zone is set by:

- Selecting the top unit of the zone
- Holding the shift key down and clicking a unit below (or above) the current unit.

Some edit operations only take place within the bounds of the Edit Zone: these are Delete, Insert, Move, Replace and Adjust Bottom+Top. In these cases, adjustment of unit boundaries only takes place within the zone. The Edit Zone is shown below:



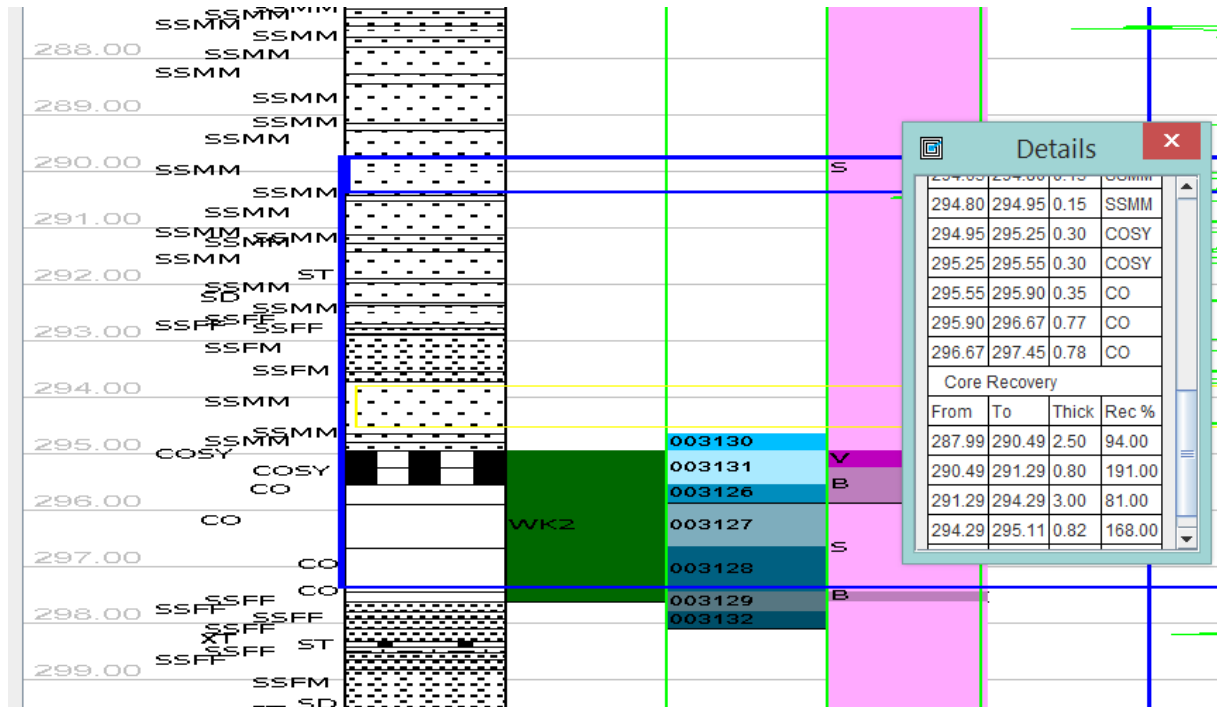
The Edit Zone can also be set by clicking in the seam, sample number or mechanical state columns. In this case, the only operation allowed is 'move by dragging'. The Edit Zone can be unset by either pressing the Esc key, or clicking outside the zone.

8.4 The Highlight Zone

A yellow highlight zone consisting of a yellow-coloured rectangle extends across the plot, and highlights the extent of the current feature. For example, if the mouse is in the lithology column, then the extent of the lithology is highlighted. This applies to the lithology, seam, sample number, and mechanical state columns. The Highlight Zone is set by moving the mouse over a column. The highlight zone is set independently of the Edit Zone.

8.5 Details Frame

The details Frame is an independent window that sits on top of the GeoEdit display. For the currently selected zone, it displays a list of the lithologies within it and the core recovery data for that zone. It can be closed if required and re-activated from the View menu. An example is shown below:



8.6 Inserting Units

A new unit can be inserted at:

- The top, bottom, or within the Current Interval, or
- The top or bottom unit within the Edit Zone.

A new unit can be inserted in the current unit, or the edit zone. The thickness can be selected by pointing at the LAS lines, then refined by updating it in the Thickness field. The lithology can be selected from its dropdown box. The seam, ply and sample numbers of the new unit can also be entered.

8.6.1 Inserting at the Top of the Current Interval

The Insert Top operation allows you to insert a unit within the current unit, extending downwards from its top boundary. When a new unit is inserted at the *top* of the Current Interval, its From depth is moved down to make way for the inserted unit. For the To depth, it can be either:

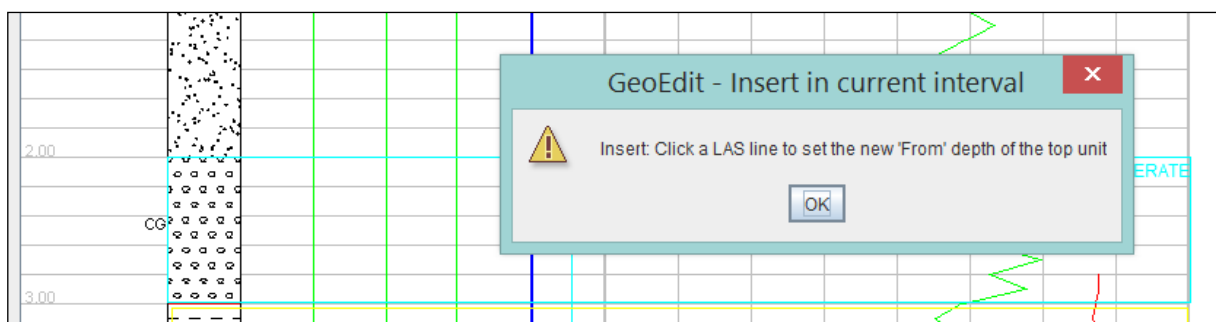
- 1) left unaltered (the default), or
- 2) moved down, and move all underlying units down to the depth of a specified unit.

8.6.1.1 Insert at Top and Inside Current Interval

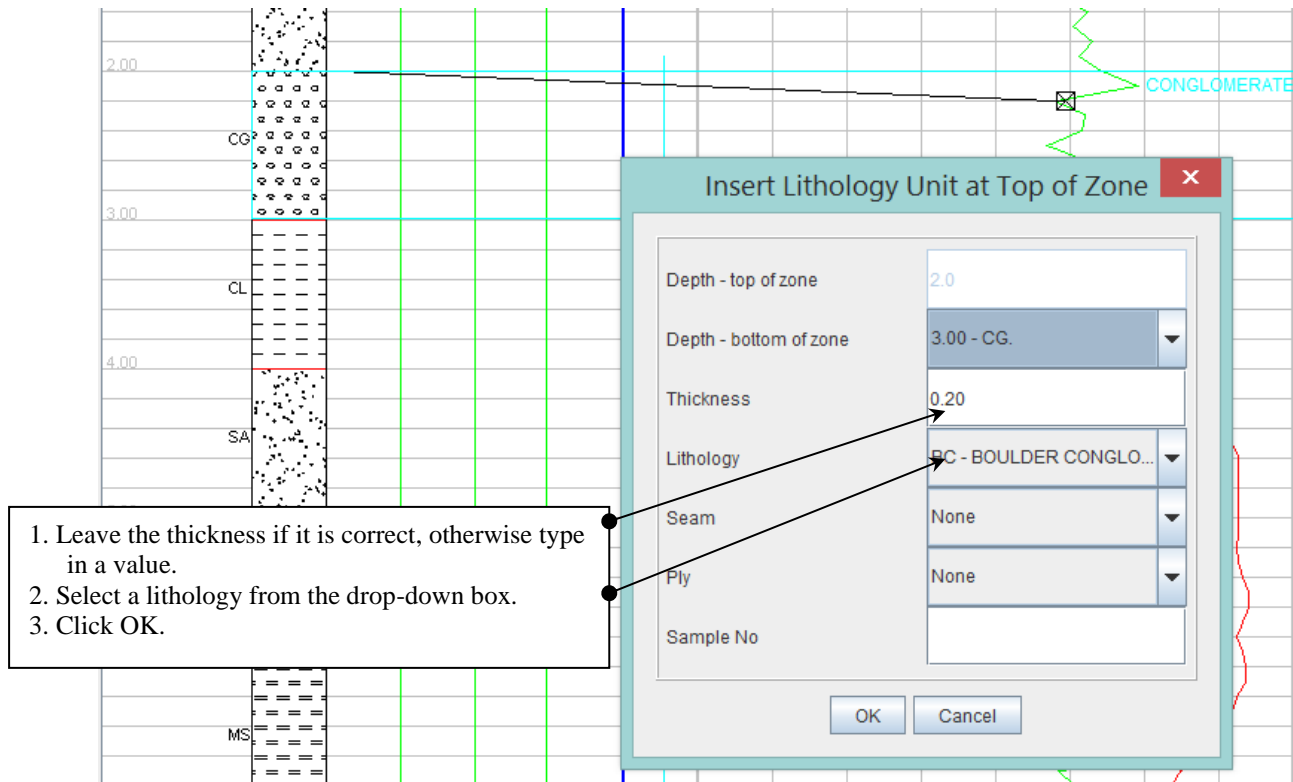
In the first of these two cases, to insert a new interval at the top and inside of the current unit, leaving its To depth unaltered:

- Select the required unit (CG in this example), right click inside the lithology column, then select the Insert Top item on the popup menu.
- Next, this dialog instructs you to indicate the new From depth of the top of the existing unit.

Note: this dialog only appears if you have the Messages option selected.



- The cursor then changes from an arrow to a cross (+). At this point, the operation can be cancelled by pressing the Esc key. Click to the right of the blue geophysics line to indicate the new From depth of the top of the Current interval. GeoEdit draws a marker line from the existing From depth to the proposed new depth, as shown below. The Insert dialog is then displayed, as shown below. The dialog proposes to insert a new unit 0.20 m thick, BC, at the top of the existing CG unit

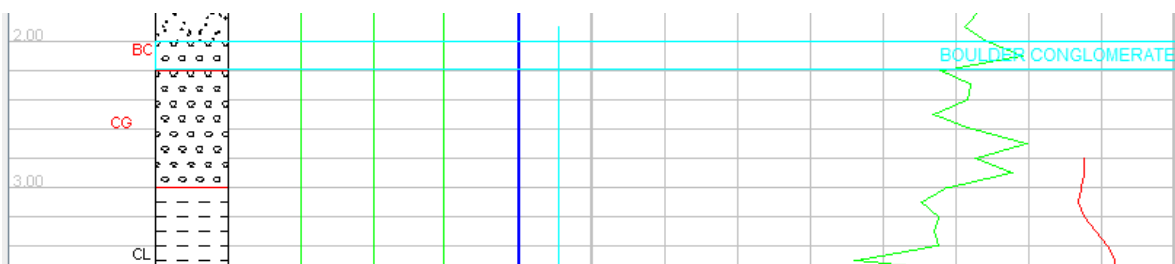


The new unit (BC) is inserted at the top and inside of the current unit.

A confirmation message is displayed, as follows:



The plot then appears as shown below:

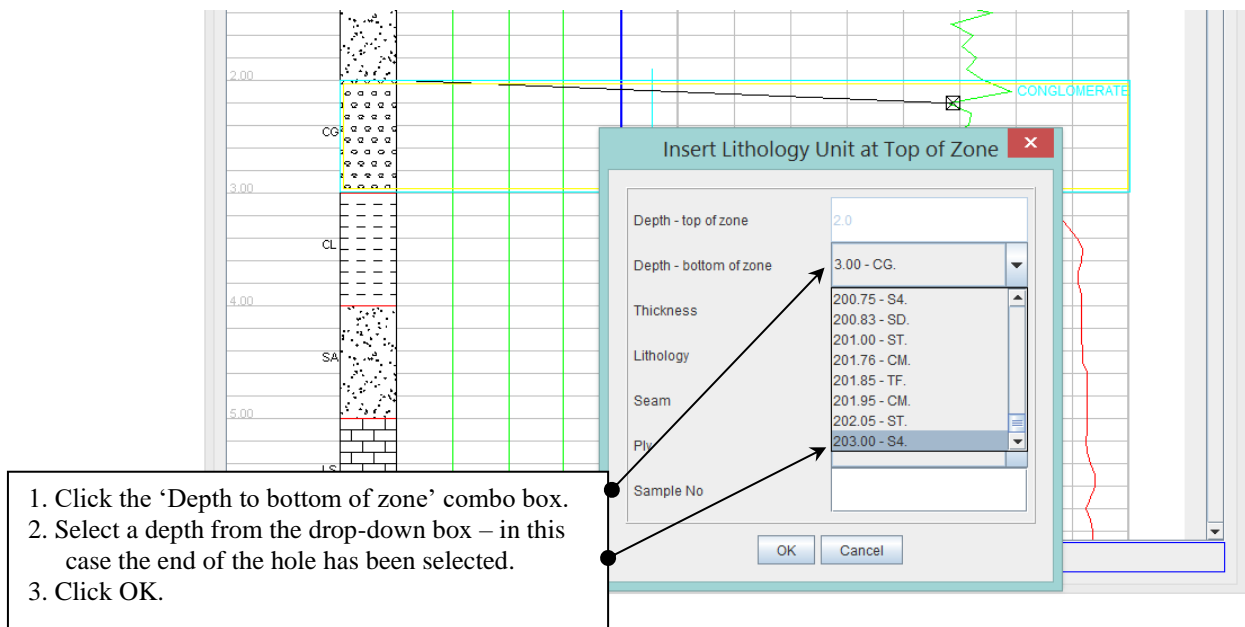


Note that the From depth of the underlying unit (CL) has not changed – the new unit displaced its thickness in the current zone. Note that any altered units have their lithology codes displayed in red.

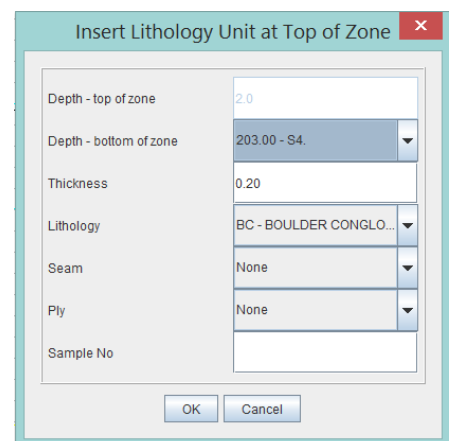
8.6.1.2 Insert at Top and Move Underlying Intervals Down

In the second of these two cases, to insert a new interval at the top of the current unit and move all underlying units down to the depth of a specified unit (using the same interval as in the previous example):

- Select the required unit (CG in this example), right click inside the lithology column, then select the Insert Top item on the popup menu.
- Next, a dialog instructs you to indicate the new From depth of the top of the existing unit, by clicking at a point on a LAS line.
- Click to the right of the blue geophysics line to indicate the new From depth of the top of the Current interval. GeoEdit draws a marker line from the existing From depth to the proposed new depth, as shown below. The Insert dialog is then displayed, as shown below. Click the 'Depth to bottom of zone' combo box, and select the required depth that the underlying units are to be moved down.



- The dialog at right is then displayed. This shows that a new interval with lithology of BC 0.20 m in thickness, will be inserted at the top of the zone, and all units down to 203.00 will be displaced downwards by 0.20 m. Note that the depth of the end of the hole cannot be altered in the Graphical Editor.



8.6.2 Inserting at the Bottom of the Current Interval

When a new unit is inserted at the *bottom* of the Current Interval the To depth of this unit is moved up to make way for the inserted unit. To insert a new unit at the bottom of the Current Interval:

- Select the required unit, then click the Insert Bottom item on the popup menu. You are then asked to indicate the new To depth of the bottom of the existing unit:
- The cursor then changes from an arrow to a cross (+). At this point, the operation can be cancelled by pressing the Esc key. Click to the right of the blue geophysics line to indicate the new To depth of the bottom of the Current Interval. GeoEdit draws a marker line from the existing To depth to the proposed new depth. The Insert dialog is then displayed, as described in the previous section.

8.6.3 Inserting Within the Current Interval

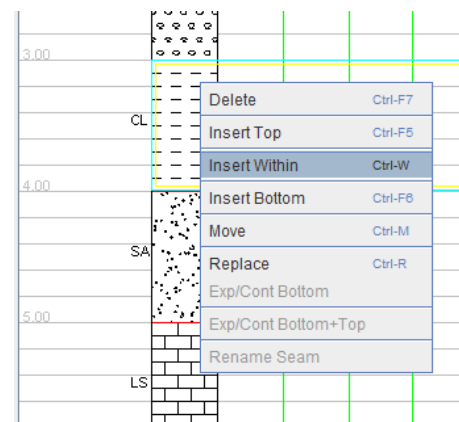
When a new unit is inserted *within* the Current Interval, the new unit is inserted somewhere between the From and To depths of the Current Interval. The new unit can be inserted either:

- 1) without displacing the From/To depths of the Current Interval (the default), or
- 2) moving all underlying units down to the depth of a specified unit.

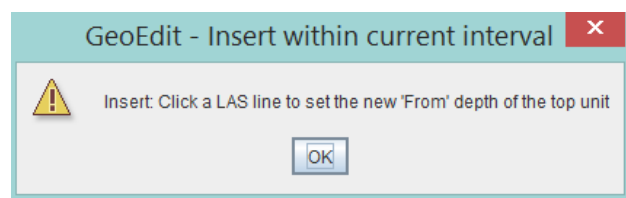
8.6.3.1 Insert Within and Inside Current Interval

When a new unit is inserted *within* and inside the Current Interval, the From depth and To depth of the Current Interval remain unaltered. To insert a new interval, such as a core loss within the current unit:

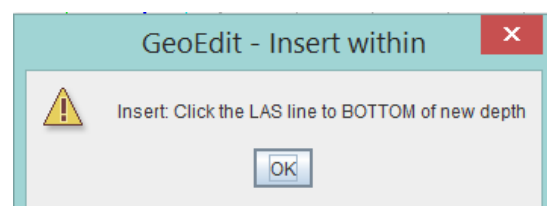
- Select the required unit, then click the Insert Within item on the popup menu.



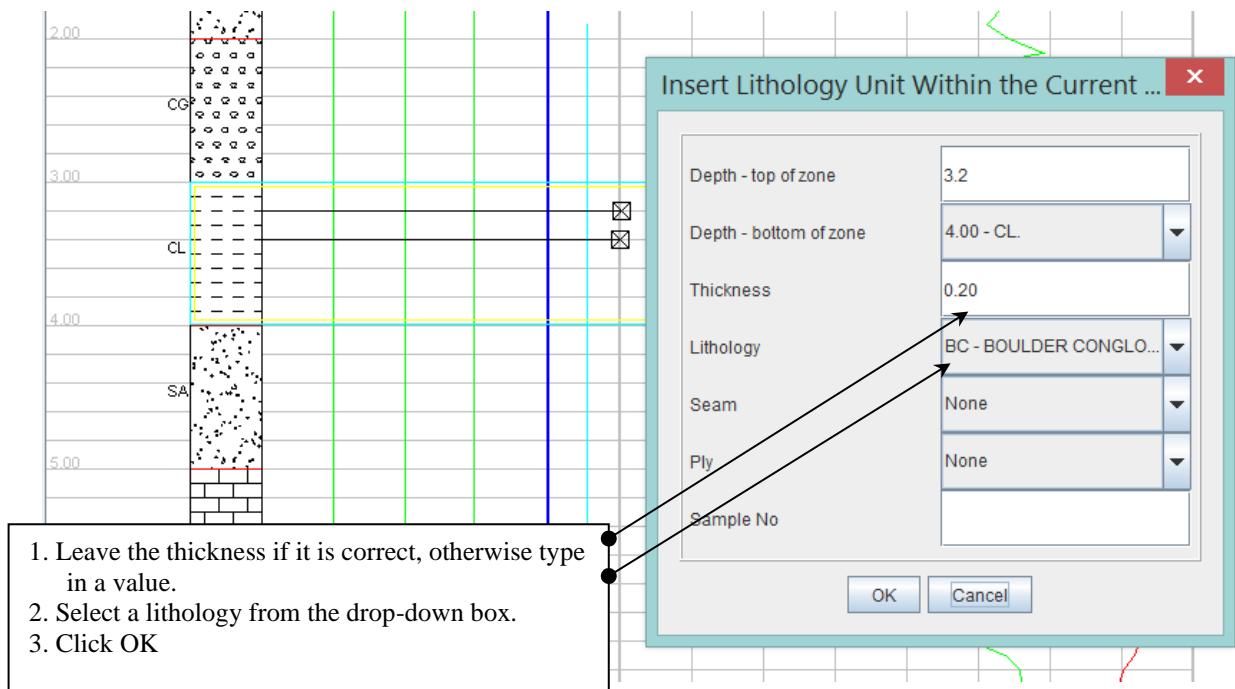
- Firstly, the From depth of the new unit is set. If the Messages option is set, the Insert dialog on the right is displayed. The cursor then changes from an arrow to a cross (+). Click to the right of the blue geophysics line to indicate the new From depth of the unit to be inserted.



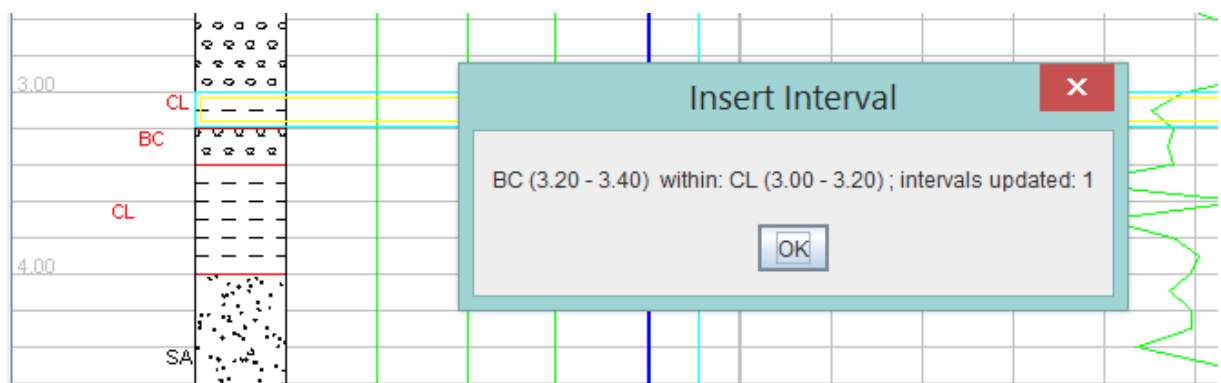
- After setting the From depth by clicking at the required point on the LAS lines, the bottom (To depth) of the new interval is then set.



- GeoEdit draws lines to the proposed new From/To depths, as shown below and displays the Insert dialog:



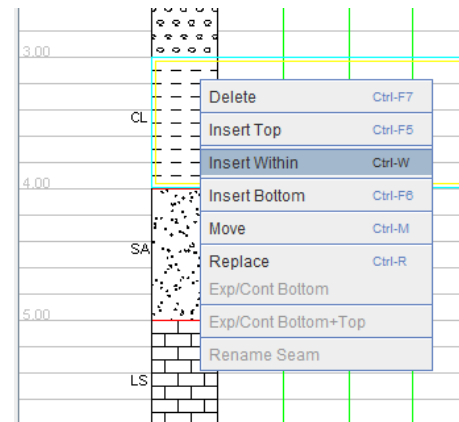
- If the OK button in the dialog above is clicked, the result of inserting the BC within the CL unit is shown below with a confirmation dialog is displayed:



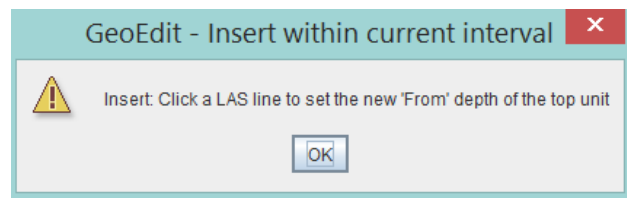
8.6.3.2 Insert Within Current Interval and Move Underlying Units Down

When a new unit is inserted *within* the Current Interval, the From depth and To depth of the Current Interval remain unaltered. To insert a new interval, such as a core loss within the current unit:

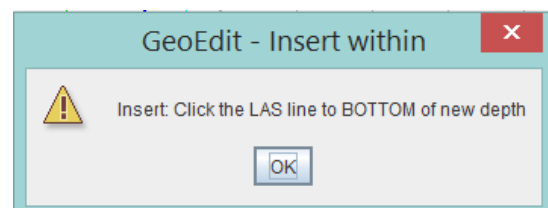
- Select the required unit, then click the Insert Within item on the popup menu.



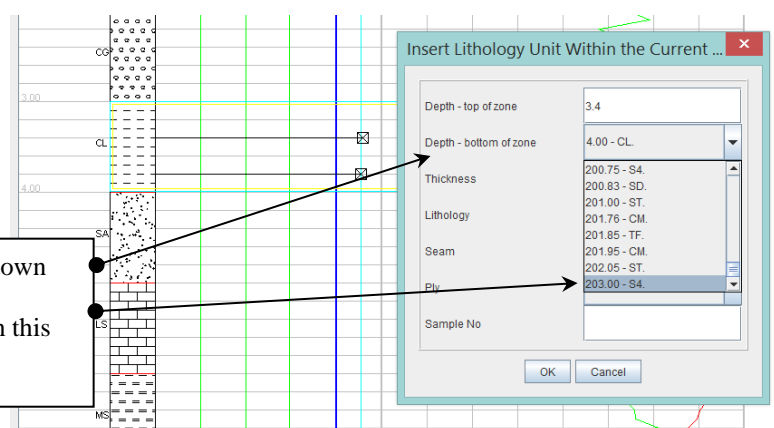
- Firstly, the From depth of the new unit is set. If the Messages option is set, the Insert dialog on the right is displayed. The cursor then changes from an arrow to a cross (+). Click to the right of the blue geophysics line to indicate the new From depth of the unit to be inserted.



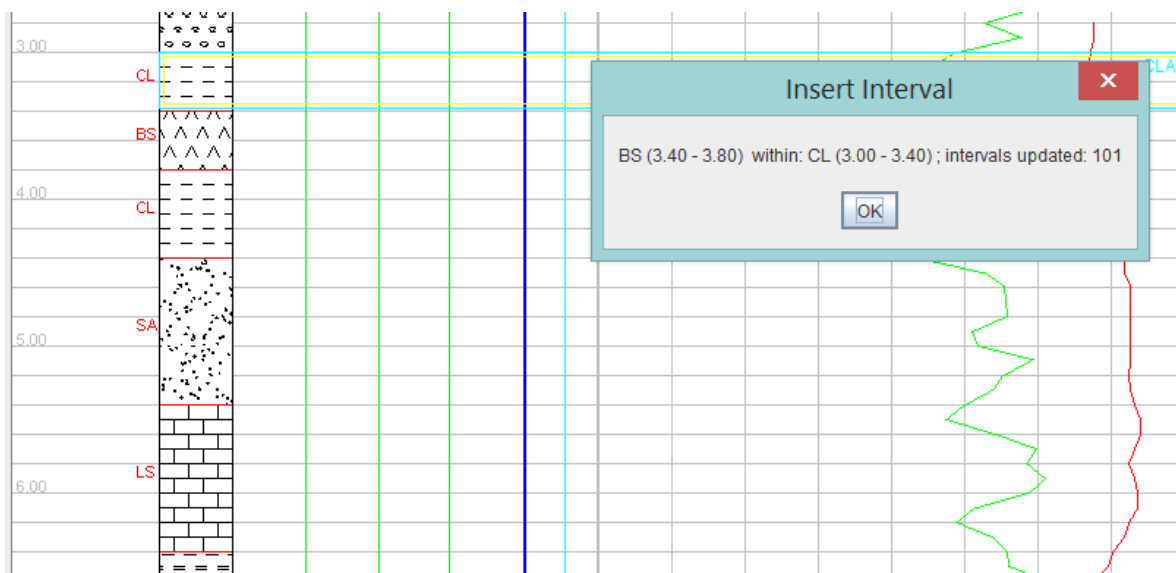
- After setting the From depth by clicking at the required point on the LAS lines, the bottom (To depth) of the new interval is then set.
- GeoEdit draws lines to the proposed new From/To depths, as shown below and displays the Insert dialog.



- Click the 'Depth to bottom of zone' drop-down box.
- Select a depth from the drop-down box – in this case the end of the hole has been selected.
- Click OK.



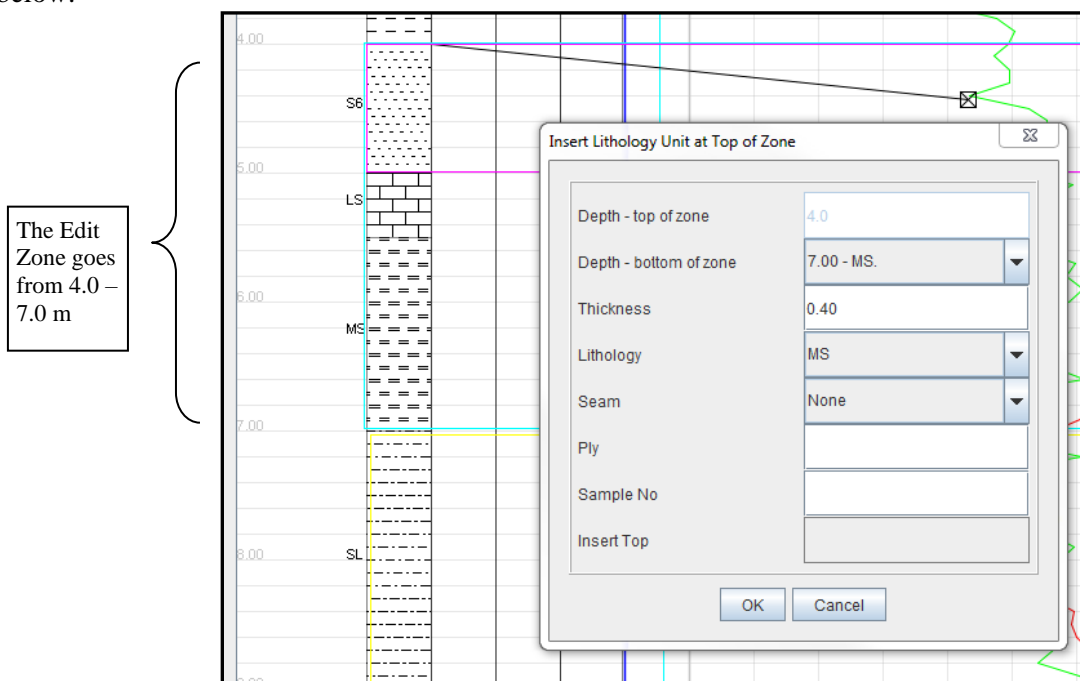
- If the OK button in the dialog above is clicked, the result of inserting the BS within the CL unit is shown below. Note that the combined thickness of the two CL units is the same as the original CL unit, and all units down to the end of the hole have been moved downwards, with the roof of the last unit being moved down to accommodate the inserted unit.



8.6.4 Inserting in the Edit Zone

A new unit can be inserted at the top or bottom of the Edit Zone. When inserting a new unit at the top of the Edit Zone, all underlying units down to the bottom of the Edit Zone are moved down to accommodate the new unit. To insert a new unit into the top of the Edit Zone:

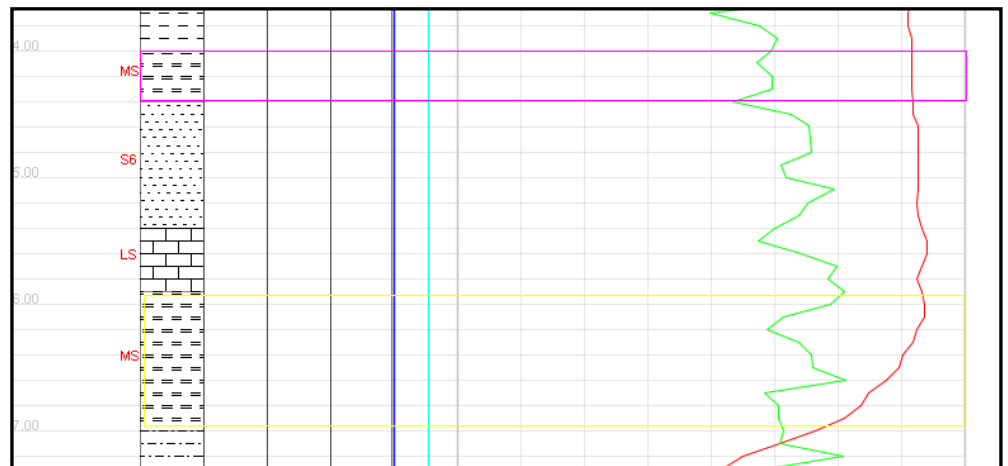
- Define the Edit Zone, as described previously and click the Insert Top item.
- Click in the region to the right of the blue geophysics line to indicate the new From depth. The following dialog is displayed. Select the required lithology and thickness of the new unit, as shown below:



- The following dialog is displayed, confirming the results of the operation:



After clicking OK, the results of the Insert Zone operation are as shown below:

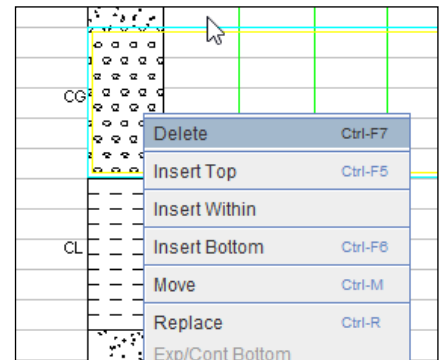


In the above example, the inserted unit (MS) has been inserted at the top of the S6 unit. The thickness of the S6 and LS2 units remain unchanged, although their boundary depths have been moved down by 40 cm. The thickness of the unit (MS) at the bottom of the edit zone has been reduced by 40 cm and its From depth is lowered by 40 cm, but its To depth remains the same.

8.7 Deleting Units

The Current Interval can be deleted – in this case, the underlying unit is moved up to replace the deleted unit. To delete a unit:

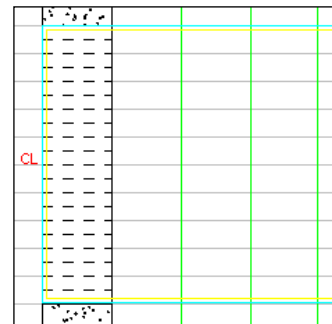
- Select the required unit (CG in this example), right click inside the lithology column, then select the Delete item on the popup menu.



- You are then asked to confirm the deletion:



- The underlying CL unit moves up to fill the gap left by the deleted unit.



8.8 Moving Depths

The Move Depth operation (*in the LogCheck editor, this is equivalent to the Replace command*) allows you to move the Edit Zone up or down the hole, by either selecting the Move item from the popup menu, or dragging the selected unit(s). When a unit(s) is/are moved, either the unit(s) is/are moved entirely (*unit fixed*), and the units above and below are lengthened/shortened, or the roof is fixed and the floor is moved (*floor only moved*). This is determined by:

- **Options:** In View/Options the default option of Floor Only or Unit Fixed can be selected.
- **Replace Form:** For each individual move operation, when the Move/Replace form is displayed, Roof Fixed or Unit Fixed buttons can be selected to override the default option.
- **Dragging:** If the Control key is held down while dragging, only the floor is moved, and the roof remains fixed – this overrides the default behaviour.

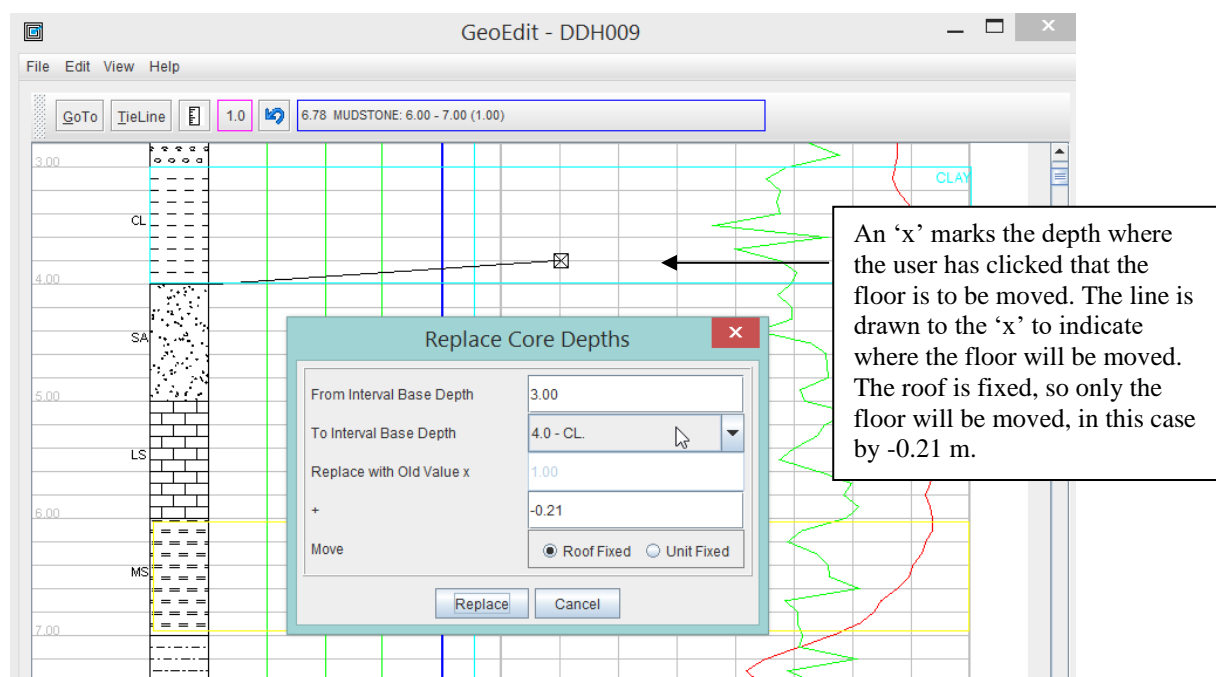
8.8.1 Moving the Current Unit

For the Move operation, when applied to the current unit, there are two choices:

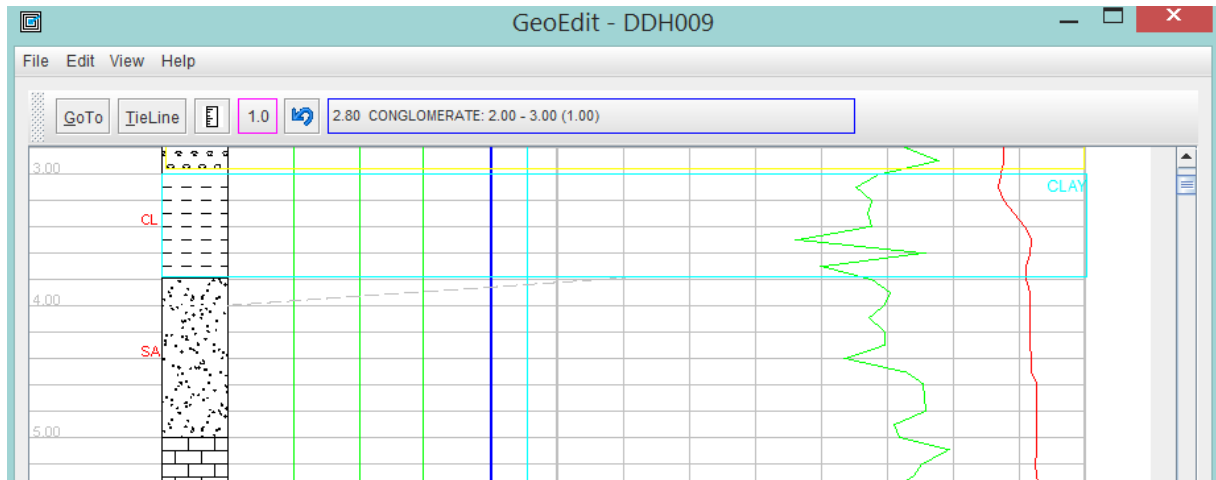
1. Move the entire unit, or
2. Move only the floor of the current unit, by leaving the roof fixed.

The following example demonstrates the first choice. To move the current interval up/down, right click the lithology column and select the Move item from the popup menu. In the example shown below, CL is the current unit.

The cursor then changes from an arrow to a cross (+). At this point, the operation can be cancelled by pressing the Esc key. After clicking on the required depth in the geophysics, a line is drawn to indicate the changes that will be made, and the following dialog is displayed:



After clicking the Move button, the display of the log is updated and a confirmation message is displayed:

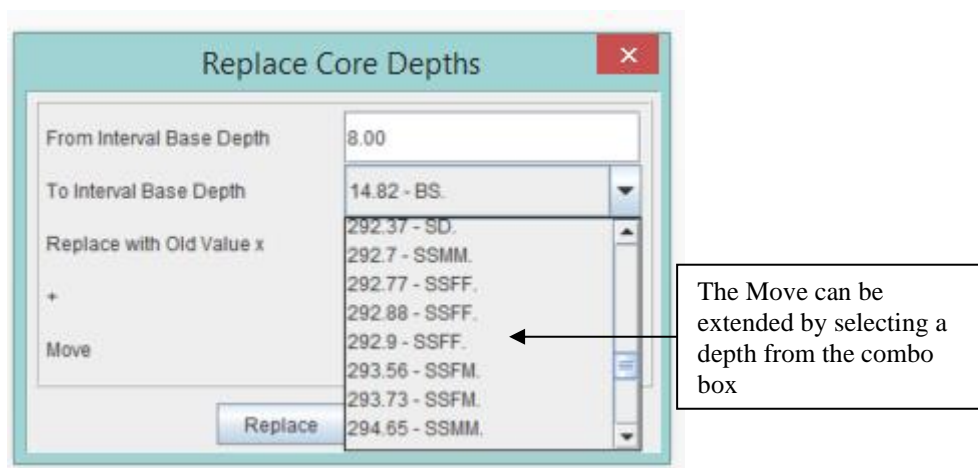


Notice that the floor of the CL unit has been moved up 0.21m. The unit below it (SA) has had its From depth moved up to 3.79 m and its thickness increased by 0.21 m.

Note: if moving the boundary up the hole, you can't move the boundary by an amount that exceeds the thickness of the overlying unit and if moving the boundary down the hole, it can't be moved more than the thickness of the current interval.

8.8.2 Extending the Range of the Move

The To depth of the move operation can be increased by clicking in the To Interval Base Depth combo box, and selecting one of the available intervals. In this case, all depths down to the specified interval will be moved; this allows you to move all depths down to the bottom of the hole, as can be done in the *LogCheck* editor. The depth required can be selected from the drop-down box as shown below::



8.8.3 Moving the Edit Zone

The depths of all units that have been defined in the Edit Zone can be moved up or down the hole in the one operation. To move all units in the Edit Zone:

- Define the Edit Zone, as described previously.
- Right click the lithology column and select the Move item from the popup menu:
- The cursor then changes from an arrow to a cross (+). At this point, the operation can be cancelled by pressing the Esc key. After clicking on the required depth in the geophysics plot, a line is drawn from the top (From) of the Edit Zone to that depth to indicate the changes that will be made.
- Then a dialog requesting the amount to replace depths with is displayed.

After clicking the Move button, operation is completed and a confirmation message is then displayed:

8.8.4 Moving and Deleting

When moving the floor of the Edit Zone, if the thickness of the requested move equals the thickness of the unit at the opposite end of the zone, you are asked if you want to delete it.

8.8.5 Moving by Dragging

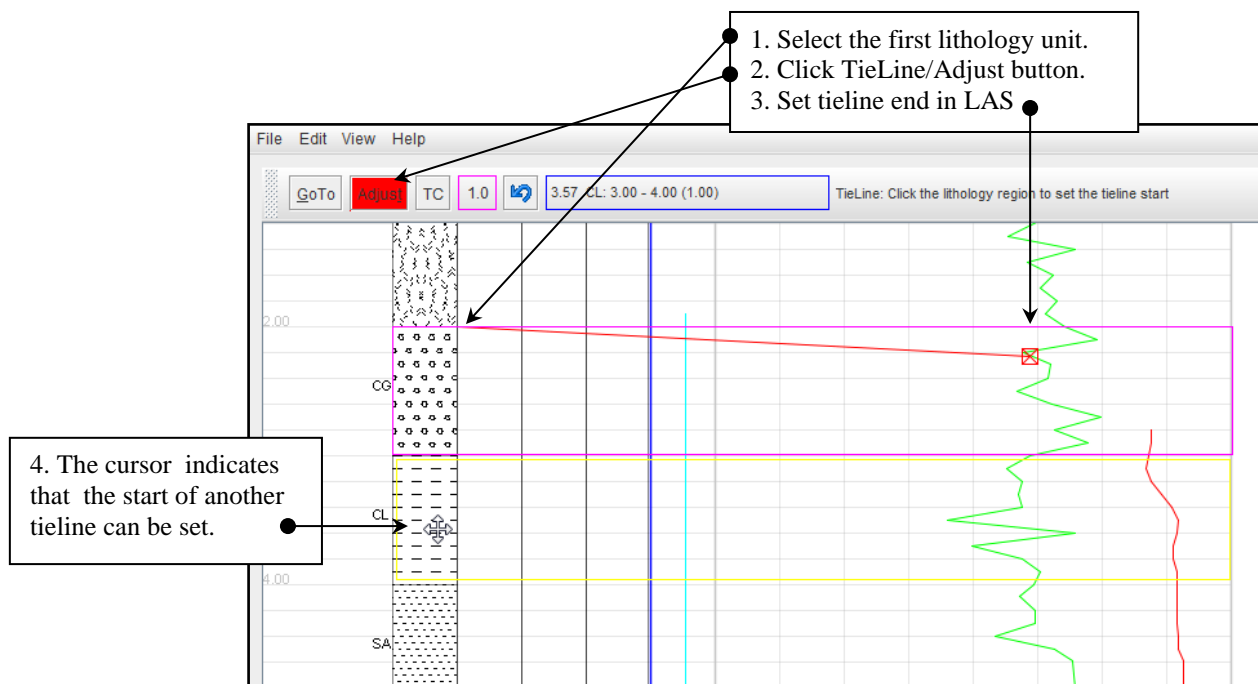
The current unit, or the edit zone, if it is defined, can be moved by dragging with the mouse. This can be done by clicking within the lithology column, holding the left mouse button down, and dragging up or down to the required depth, and releasing the mouse button. This method is much simpler – no lines are drawn to the LAS region and only a confirmation dialog is displayed.

Note: when moving the current unit by dragging, only the roof is moved, however when dragging the edit zone, the roof and floor of the edit zone are moved.

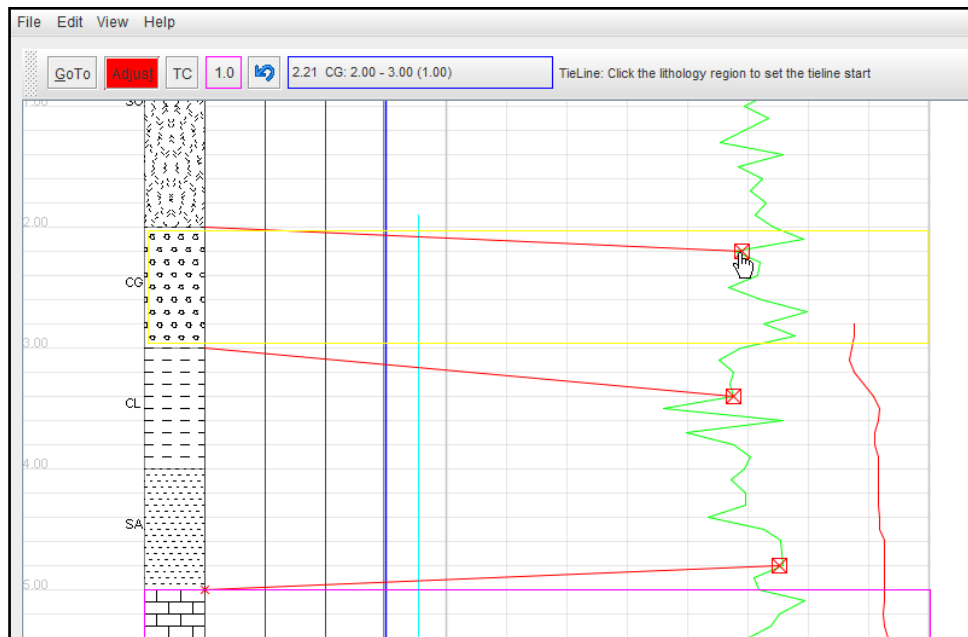
8.9 Setting Tielines

Tielines can be set by clicking the *TieLine* button on the GeoEdit toolbar. When in tieline state, the button turns red, and the caption changes to *Adjust*. To start setting tielines click the TieLine button, then:

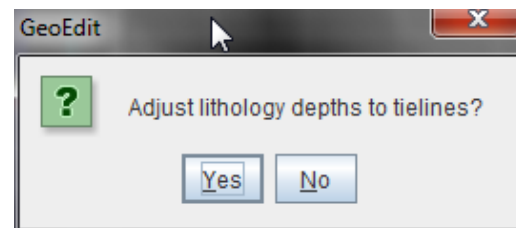
1. Set the start of the first tieline by clicking a lithology unit. The start of a tieline is always the top of the currently selected unit.
2. Click the Adjust button. The cursor then changes to a thin crosshair cursor, which
3. Set the end of the tieline by clicking at a relevant point on a LAS line. This line and the cursor then changes to the move cursor (a thick cross with directional arrows) draws
4. Click on a unit in the lithology column to set the start of another line.
5. Repeat steps 3-4 until all tielines are set.
6. When all tielines have been set, to adjust the tielines, click the Adjust button again – this then adjusts all units within the tielines to the depth indicated on the LAS lines.



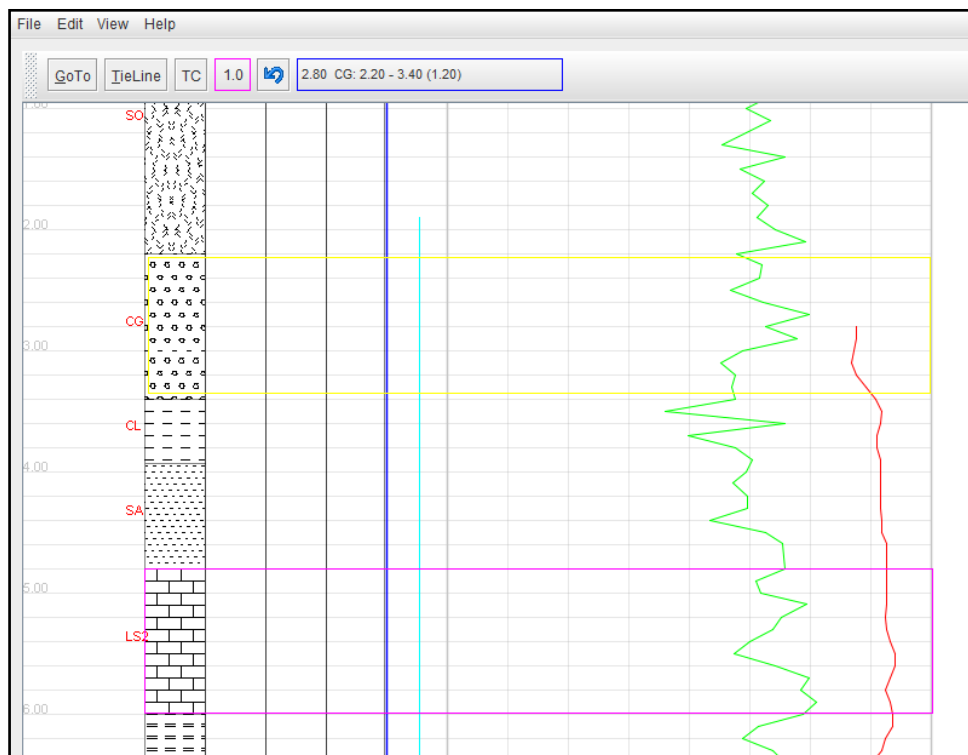
This figure shows three tielines that have been set:



To complete the process, click the Adjust button – a dialog confirming whether to proceed or not is displayed. Clicking the Yes button adjusts units within each set of tielines to match the depths set the LAS region.



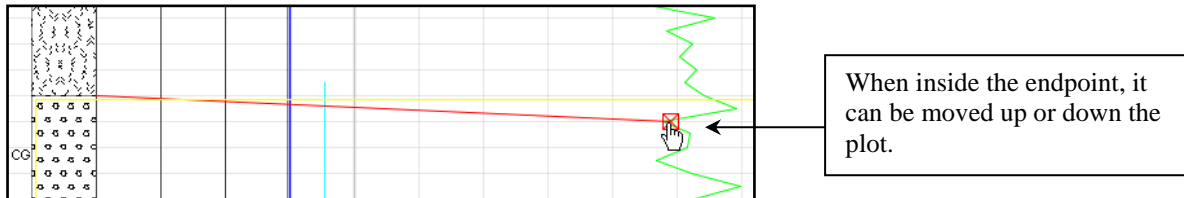
a
in



The adjustment process uses the same method to adjust the depths as that outlined in the Expand/Contract section of this chapter.

8.10 Moving Tielines

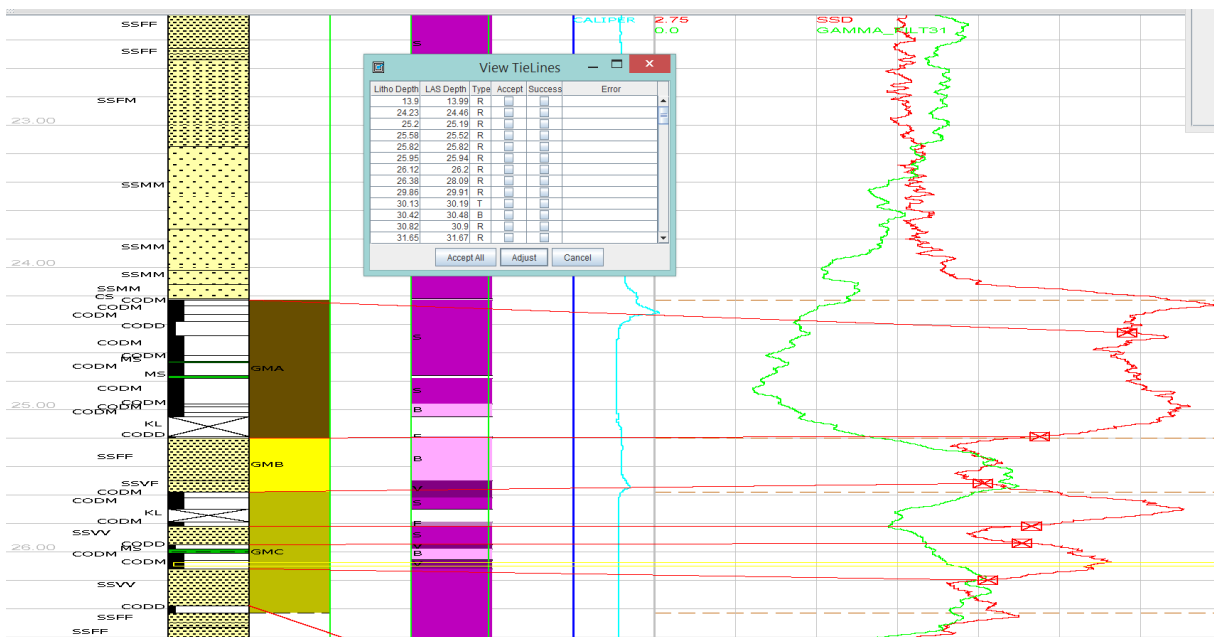
After a tieline has been set, the LAS endpoint can be moved up or down the plot before the final adjustment. Place the cursor inside the box that marks the endpoint. The cursor then changes to a hand cursor and the point can then be dragged to the required location:



After moving tielines, the plot can be refreshed by pressing the F5 function key. All tielines can be cleared and the operation cancelled by pressing the “Esc” key, or pressing Ctrl+K.

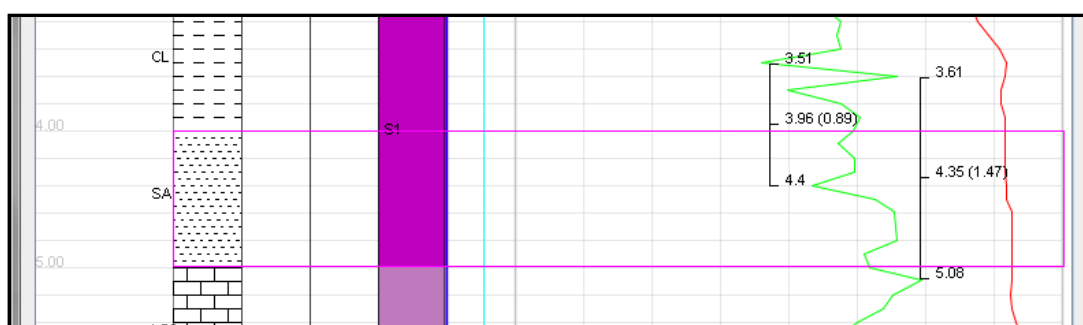
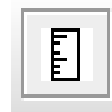
8.11 Automated TieLines

LogCheck can send a list of tielines that are calculated on the slopes of the LAS lines to GeoEdit. When it is initially invoked, the following dialog allows the tielines to be accepted or not. Clicking the Adjust button then attempts to perform the selected depth adjustments.



8.12 Thickness Calculations – Using the Ruler

Thickness calculations can be made by clicking the Ruler (TC) button on the toolbar. The first endpoint is set by clicking on the plot to the right of the blue geophysics line, then clicking at the other endpoint. A ruler is drawn on the plot that represents the thickness of the line; it displays the start, midpoint and end depths. Multiple calculations can be performed; they can be cleared by pressing the Control+K key combination. Two examples are shown below:



8.13 Renaming a Lithology/Seam

The rename operation has three contexts:

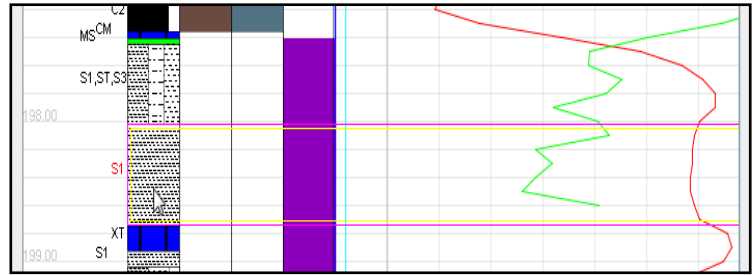
1. Rename the current interval – the lithology, seam, ply and sample number can be edited.
2. Rename a seam when the mouse is in the seam column – this affects all lithology units with that seam name. Only the seam name is edited.
3. Rename when the edit zone is set – renames all seams or no seams to the one seam name defined by the edit zone.

8.13.1 Renaming the Current Interval

Renaming the current interval allows the lithology, seam, ply and sample number to be edited. In the following example, the lithology of the current unit (ST) is to be renamed. Right-click the lithology column somewhere in ST, and select Rename Interval from the popup menu.

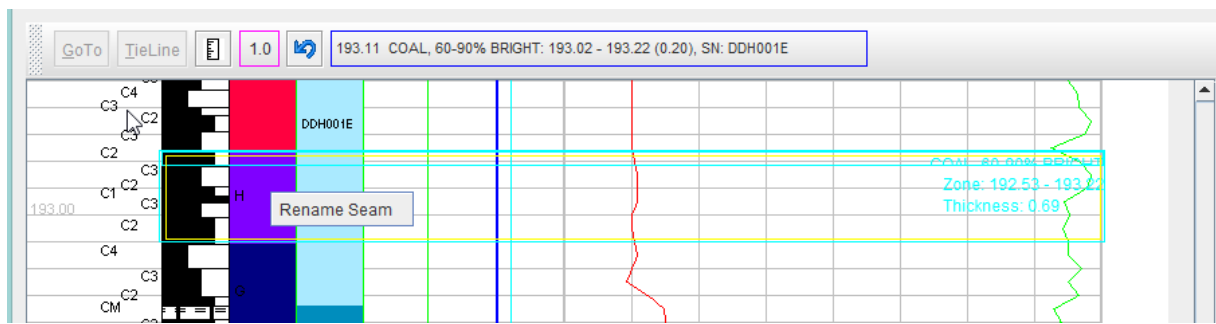
The existing lithology and seam are displayed, and a drop-down list box provides the lithology codes available in the *LogCheck* dictionary, that the existing code can be renamed to. In this example, ST is to be changed to S1. Clicking OK will update the log; clicking Cancel leaves the existing code unchanged.

The updated log is shown on the right. Note that if a lithology unit does not have a seam, one can be applied in this dialog. When an interbedded unit is renamed, any interbedded units can be merged into a single unit, or left as interbedded units, where only the first lithology is renamed (the other lithologies can be renamed in *LogCheck*).

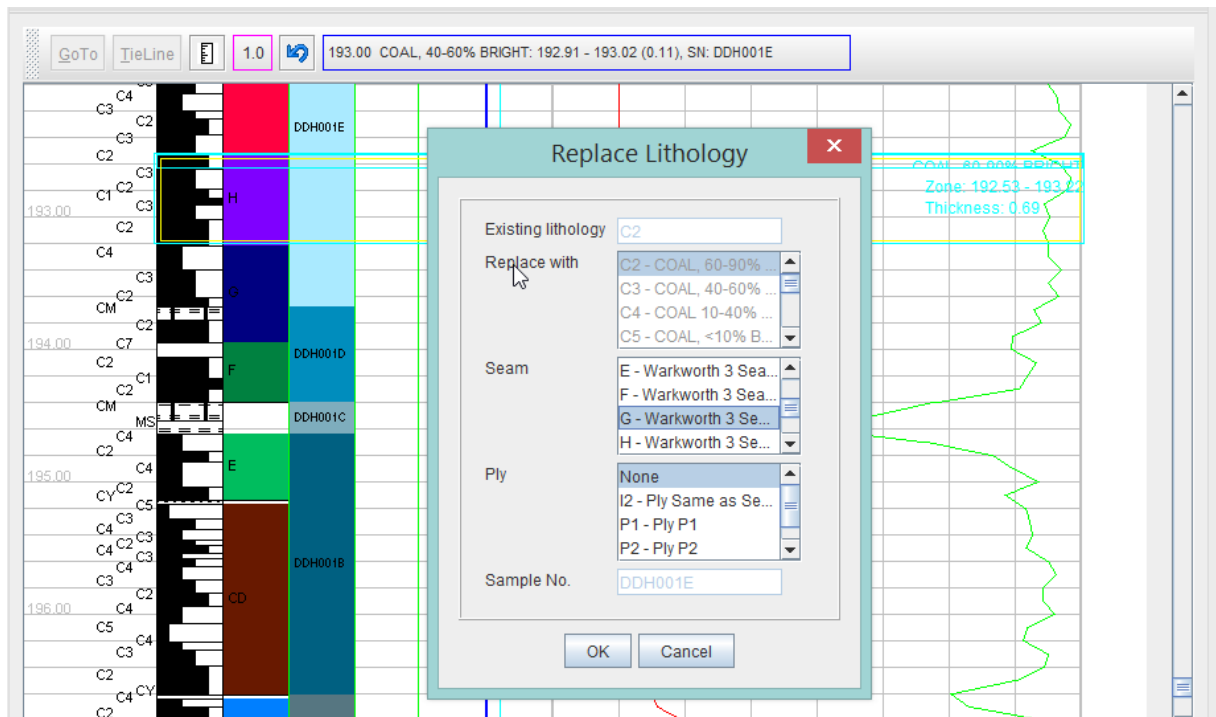


8.13.2 Renaming an Entire Seam

An entire seam can be renamed – in the previous section, only a lithology and its associated seam could be renamed. To rename an entire seam, right click in the seam column, and select the Rename Seam item:



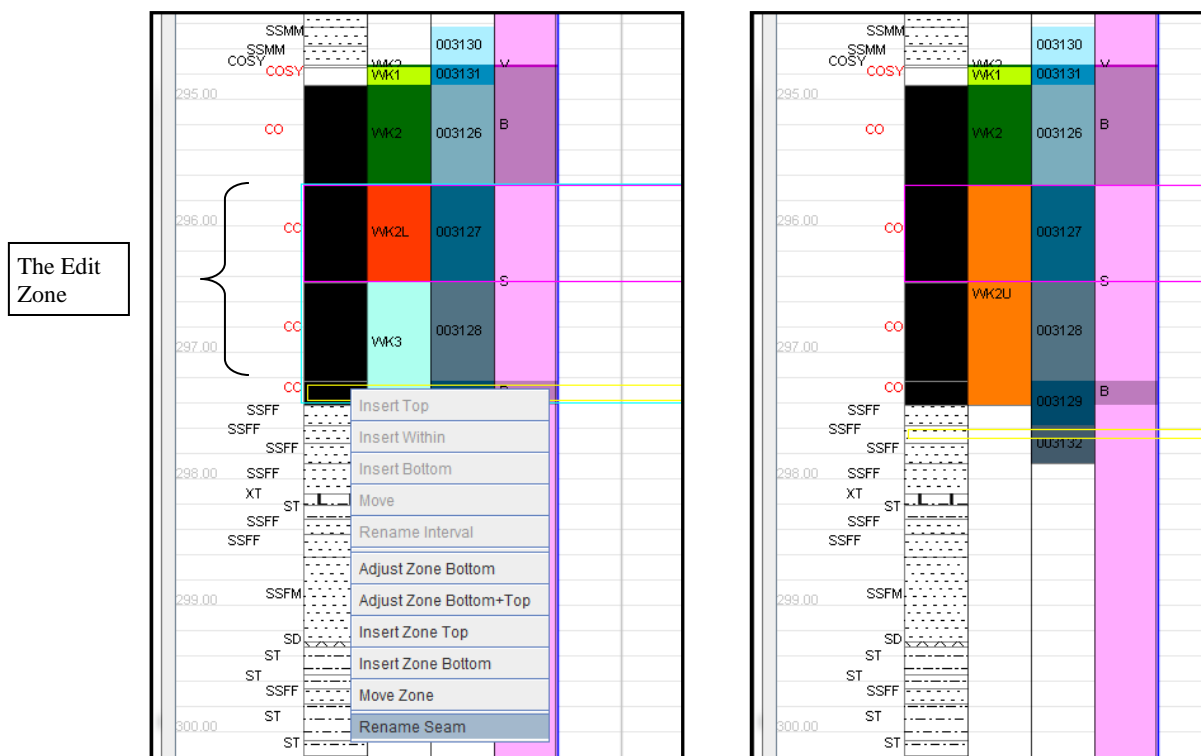
In the Rename dialog shown on the right, enter the new seam name (for example, G) in the Seam list box:



After clicking the OK button all lithology units have their seam name updated from H to G.

8.13.3 Renaming all Seams within the Edit Zone

By selecting an edit zone, all seams, as well as units with no seam within the edit zone can be renamed to the same name. In the example below, the edit zone extends from the roof of the WK2L seam to the base of the WK3 seam, as shown in the figure on the left. Right-clicking in the lithology column, then selecting Rename Seam from the popup menu, and changing the seam name to WK2U results in the figure on the right:



8.14 Expanding/Contracting Units

Units in the Edit Zone can be expanded or contracted by the same algorithm that is used in the *LogCheck* editor. These edits are better suited to non-core sampled holes. The choices are:

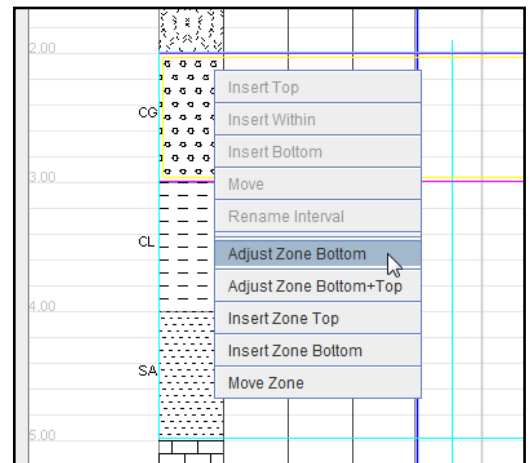
- **Adjust Zone Bottom:** Expand/contract all units in zone by adjusting the bottom boundary.
- **Adjust Zone Bottom+Top:** Expand/contract all units in zone by adjusting the top and bottom boundary.

In both cases, you draw a line to the geophysics plot that indicates how far you want the interval to be moved.

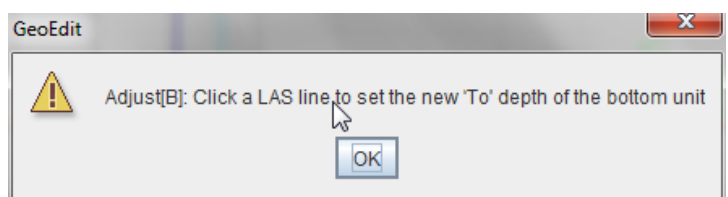
8.14.1 Expanding/Contracting the Edit Zone Bottom

To expand/contract all units in the Edit Zone by adjusting the bottom boundary:

- Define the Edit Zone, as described previously.
- Click the **Adjust Zone Bottom** item from the right click popup menu.

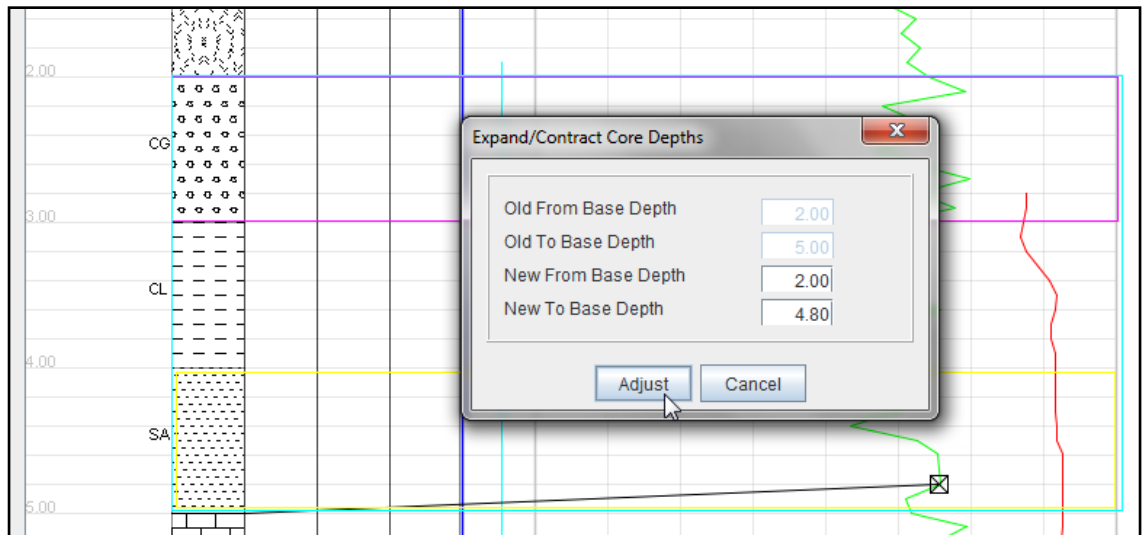


- If the Messages option is checked, the following message is displayed:

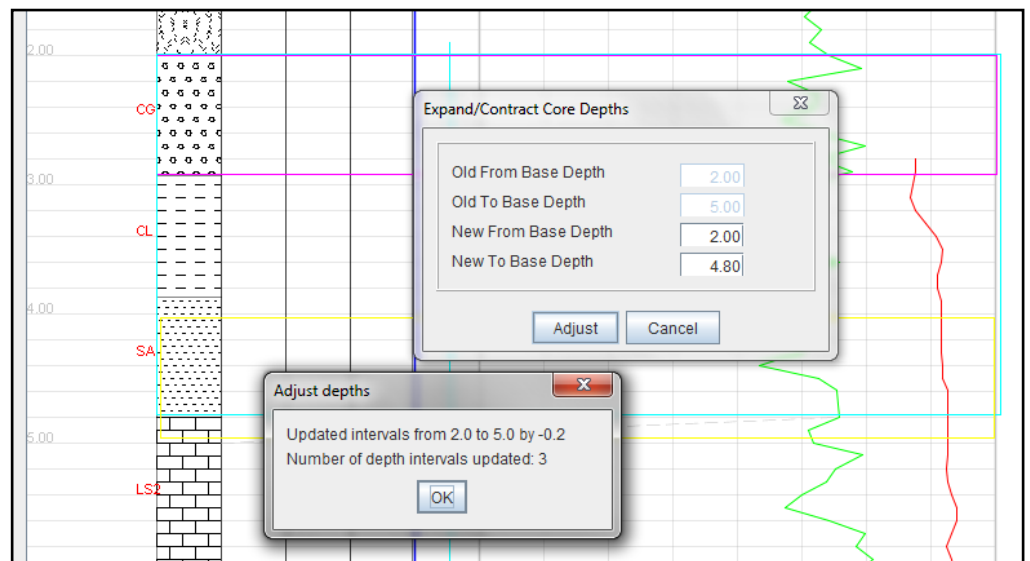


- The cursor then changes from an arrow to a cross (+). After clicking on the required depth on the blue geophysics line, a line is drawn from the top (From) of the Edit Zone to the depth on the geophysics line to indicate the changes that will be made.

- Then a dialog requesting the amount to expand / contract depths by. In this example, the Edit Zone extends from 2.0-5.0m. The From depth of 2.0m will be unaltered; the remaining intervals will be proportionately compressed, and the To depth of the unit at the bottom of the zone will be raised by 0.2m to 4.8m:



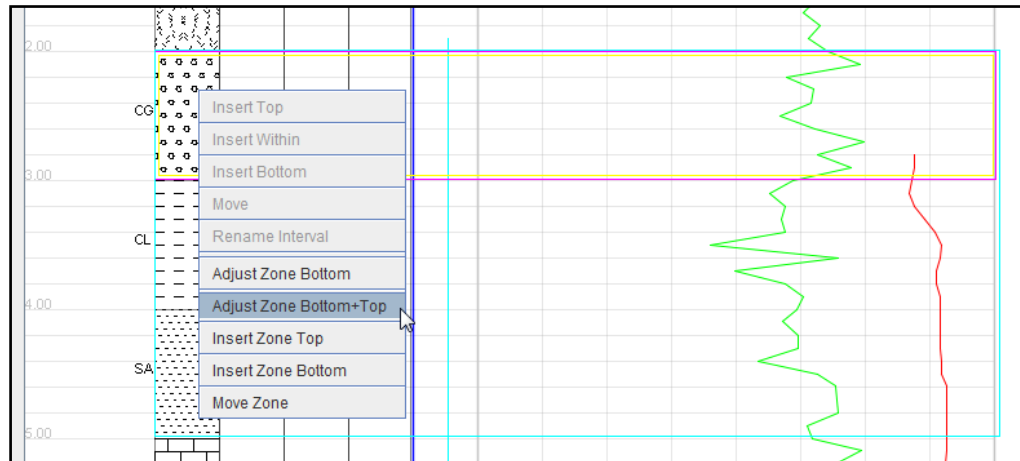
A confirmation message is displayed – the results of this edit are shown below:



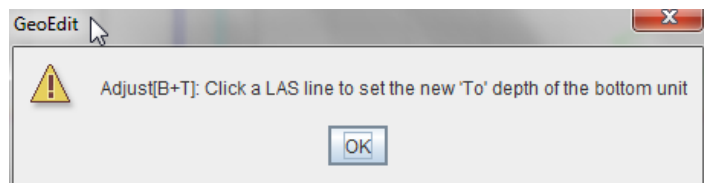
8.14.2 Expanding/Contracting the Edit Zone Bottom+Top

Units can be expanded/contracted from both the top and bottom unit of the Edit Zone in the one operation. To expand/contract all units in the Edit Zone by adjusting the bottom and top boundaries:

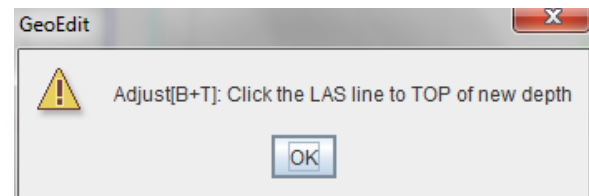
- Define the Edit Zone, as described previously.
- Select the Adjust Zone Bottom+Top item from the popup menu,:



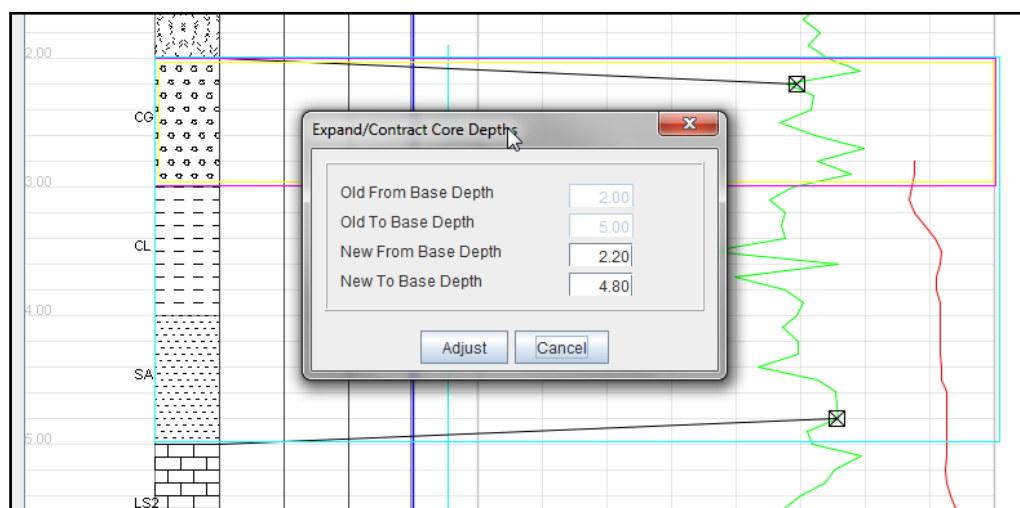
- If the Messages option is checked, the following message is displayed to remind the user to set the To depth of the bottom unit:



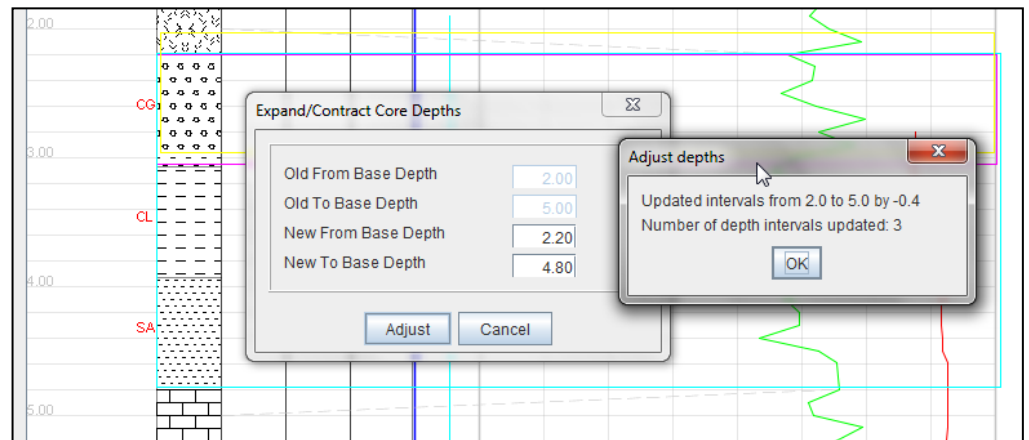
- After the bottom line is set, if the Messages option is checked, the following message is displayed, to remind the user to set the From depth of the top unit:



- After the two lines are drawn the following dialog is displayed, that requests the new From depth of the top of the zone, and the new To depth of the bottom of the zone. Click the Adjust button to complete the operation:



- The results of this operation are to move the From depth of the top of the zone down to 2.20m and move the To depth of the base of the unit up by 0.2m, and proportionately compress the units in between, as shown below. Then a confirmation message is displayed:



The dashed grey lines are retained to indicate the amount of the adjustment.

8.14.3 Validation

The following validations are applied when replacing depths:

- The first (top) interval in a hole can't be replaced.
- The replace operation will not proceed if the required thickness to be adjusted is greater than the thickness of the bottom unit in the edit zone.

8.15 Updating Defects

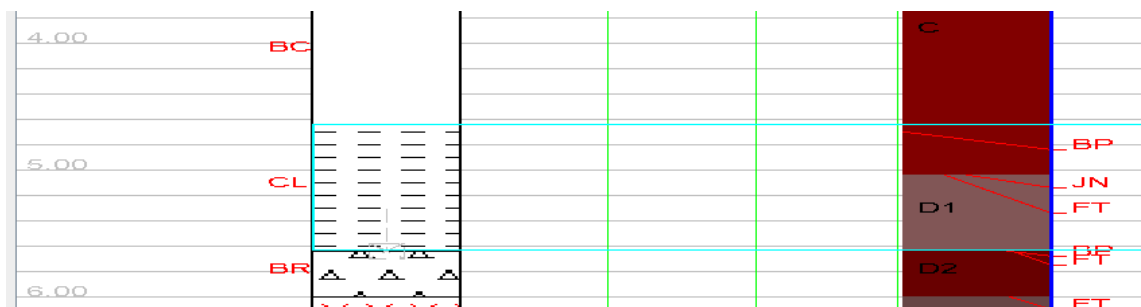
Where geotechnical data (RMUs and defects) is present for a hole, the GeoEdit will attempt to update any changes in the depths of lithology units with corresponding depths of the geotechnical data, where appropriate. On saving and returning to *LogCheck*, any changes will also be made in the *LogCheck* data file for that hole. The figures shown below are artificially composed to illustrate the main points.

8.15.1 Moves

The depths of any corresponding geotechnical data are moved proportionately with the movements of the lithology units. The figure below shows the CL unit and its associated defects before the move:



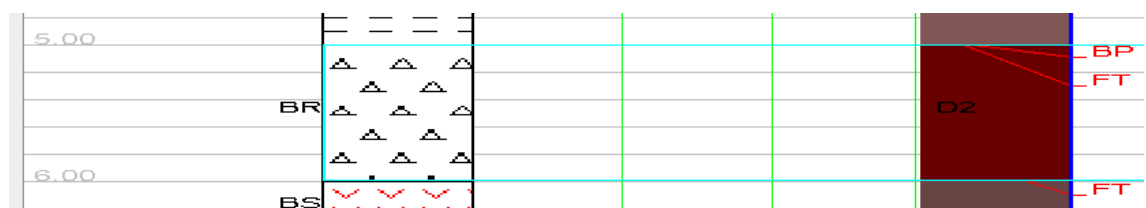
The figure below shows the CL unit after it has been moved down 20 cm. The RMU D1 has also been moved down, and RMU C and D2 adjusted proportionately:



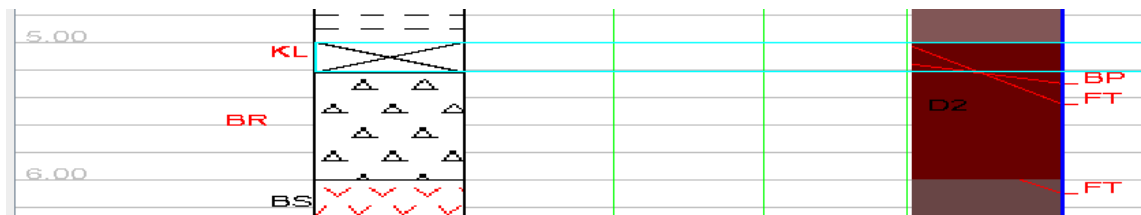
8.15.2 Inserts

If a lithology is inserted into the current unit or zone, the position of geotechnical data is preserved, unless it is a core loss. Where a core loss is inserted:

- Inserting at top of Current Interval: the RMU depths are preserved, however any defects are moved proportionately down the hole so that they don't coincide with the core loss. The figure below shows the BR unit and its associated defects before the insertion:



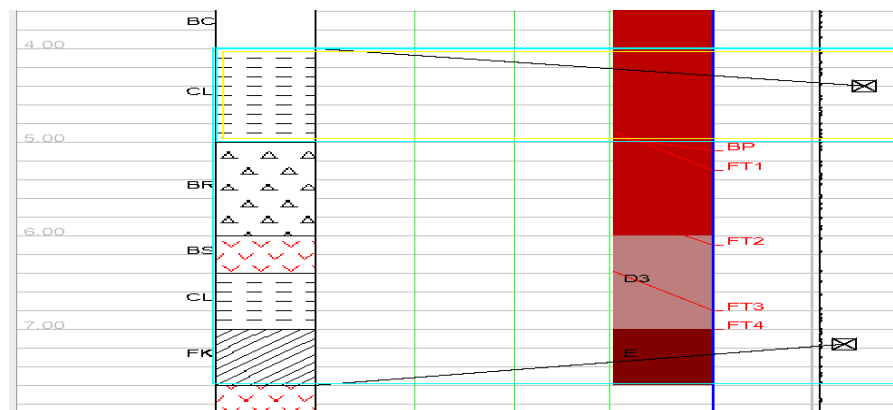
The figure below shows the BR unit after the insertion of a core loss. Defects BP and FT have been moved down proportionately:



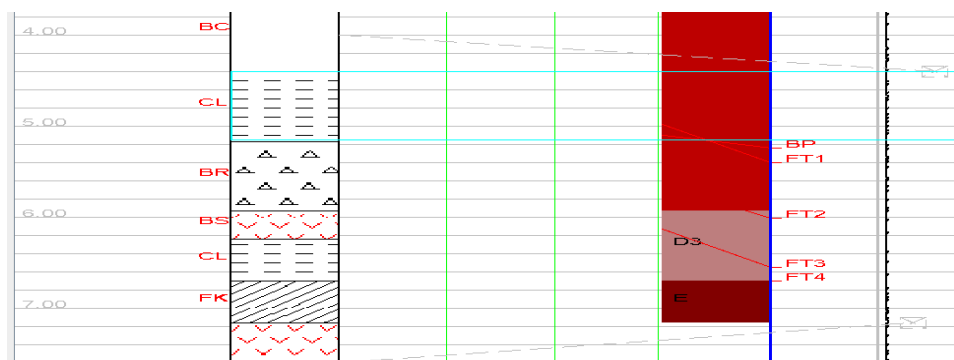
- b) Inserting at bottom of Current Interval: the RMU depths are preserved, however any defects are moved proportionately up the hole so that they don't coincide with the core loss.
- c) Where RMU boundaries do not correspond to the roof/floor of a lithology, the defects are not adjusted.

8.15.3 Expand/Contract Operations

The depths of any corresponding geotechnical data are adjusted proportionately with the expansion/contraction of the lithology units. The figure below shows the units CL – FK and their associated defects before the contraction:



The figure below shows the units CL – FK after the contraction. The geotechnical data has been adjusted proportionately:

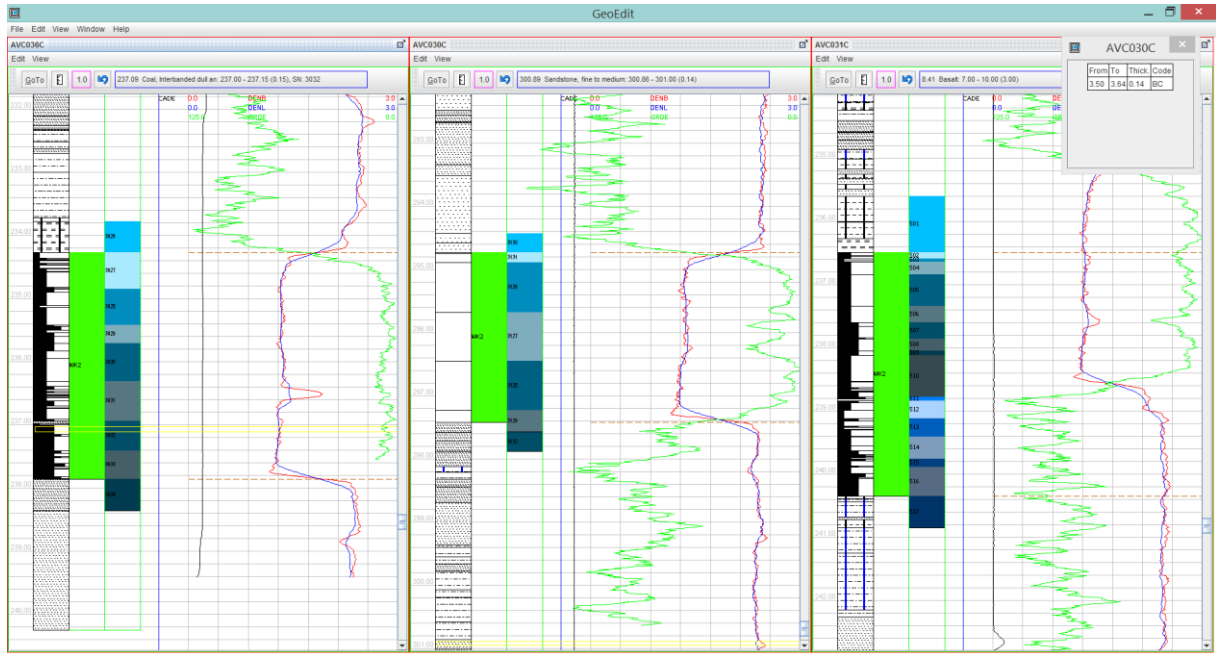


8.15.4 Delete

Where a lithology unit is deleted, any geotechnical data will remain unaltered.

8.16 Displaying Multiple Holes

Multiple holes can be displayed in GeoEdit. Up to six holes can be displayed in the same frame, as shown below:



It is necessary to select the holes in *LogCheck* before entering *GeoEdit*. Each hole can be scrolled independently of the other holes. Note that it is not a geological cross section. Additional options are added to the View menu that allow the holes to be:

- Aligned along the current depth.
- Aligned with the current unit and
- Aligned with a selected seam.

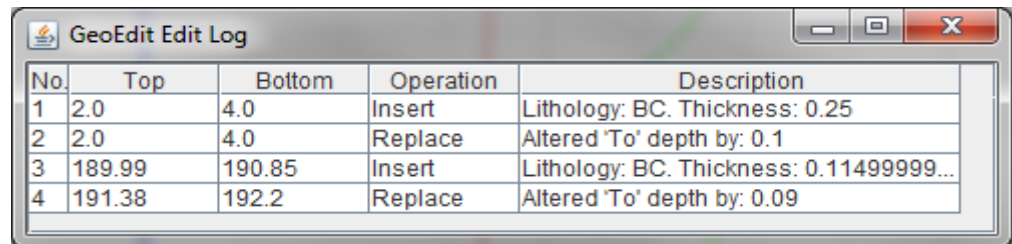
8.17 The View Menu

The View menu contains the following items:

- Log of Edits: Displays sequence of edits in the current session;
- View Tie Lines: Displays a copy of the original hole before any edits were made in *GeoEdit*; this is useful for comparing the original hole with the edited version
- View Patterns: View the available lithology patterns;
- Options: Displays *GeoEdit* options;

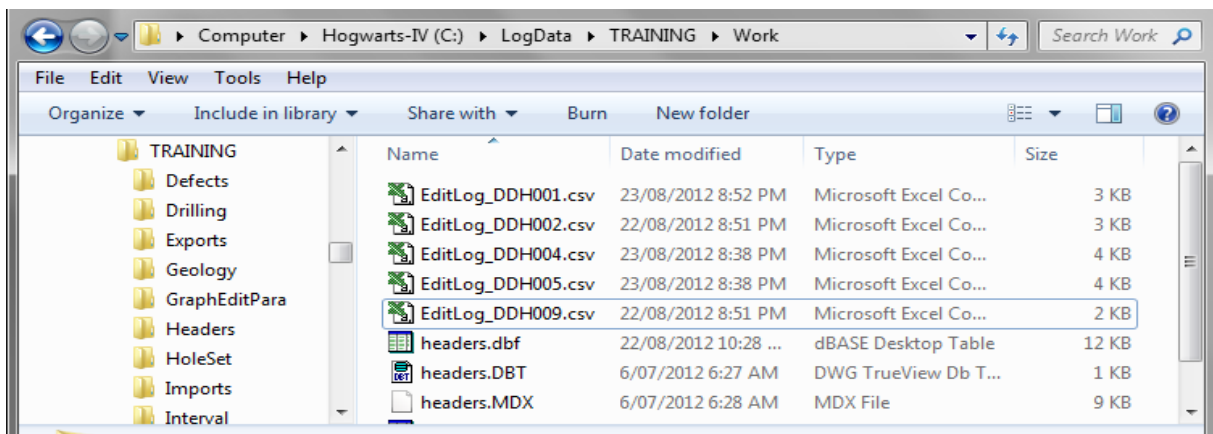
8.18 View the Log of Edits

GeoEdit keeps track of every edit operation that you make. An example of the log of edits form is shown below. The edits are arranged chronologically:

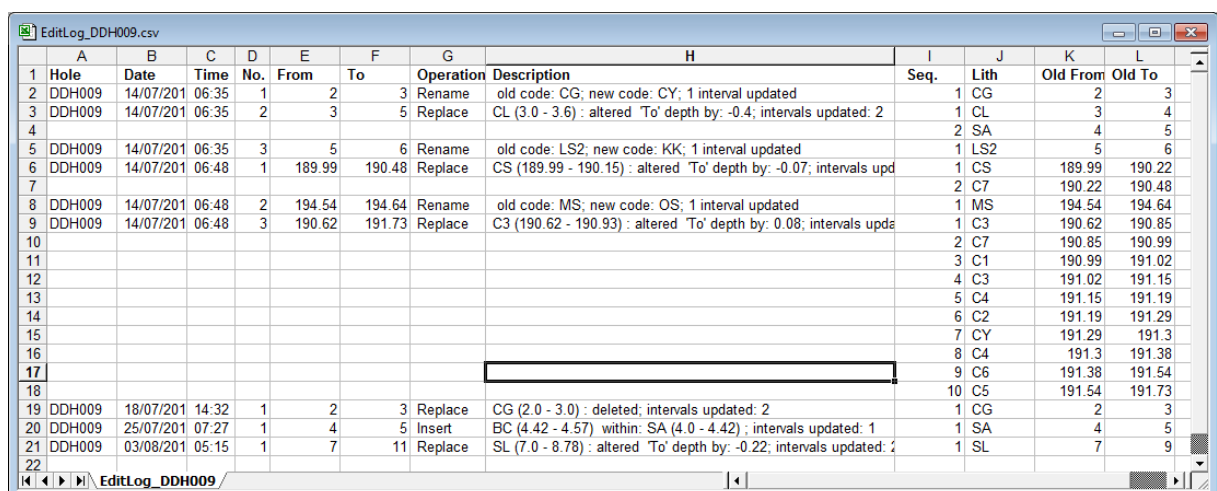


No.	Top	Bottom	Operation	Description
1	2.0	4.0	Insert	Lithology: BC. Thickness: 0.25
2	2.0	4.0	Replace	Altered 'To' depth by: 0.1
3	189.99	190.85	Insert	Lithology: BC. Thickness: 0.11499999...
4	191.38	192.2	Replace	Altered 'To' depth by: 0.09

When undoing an edit, it is always the last edit that is undone. In addition to this summary log, as each hole is saved, a text file is generated that records the alterations that were done to a hole. The file is saved as a CSV file in the Work folder under the project name, for example for a project named Training, it is saved to C:\LogData\Training\Work, and the format of the file name is *EditLog_HoleName.csv*. For example, the following diagram shows log files for DDH001, DDH002, DDH004, DDH005 and DDH009:



The log file for hole, being saved in CSV format can be opened in any text editor, or Microsoft Excel. For example for EditLog_DD*009 when opened in Excel is:



	A	B	C	D	E	F	G	H	I	J	K	L
	Hole	Date	Time	No.	From	To	Operation	Description	Seq.	Lith	Old From	Old To
1	DDH009	14/07/201	06:35	1	2	3	Rename	old code: CG; new code: CY; 1 interval updated	1	CG	2	3
2	DDH009	14/07/201	06:35	2	3	5	Replace	CL (3.0 - 3.6) : altered 'To' depth by: -0.4; intervals updated: 2	1	CL	3	4
3									2	SA	4	5
4	DDH009	14/07/201	06:35	3	5	6	Rename	old code: LS2; new code: KK; 1 interval updated	1	LS2	5	6
5	DDH009	14/07/201	06:48	1	189.99	190.48	Replace	CS (189.99 - 190.15) : altered 'To' depth by: -0.07; intervals upd	1	CS	189.99	190.22
6									2	C7	190.22	190.48
7	DDH009	14/07/201	06:48	2	194.54	194.64	Rename	old code: MS; new code: OS; 1 interval updated	1	MS	194.54	194.64
8	DDH009	03/08/201	05:15	1	190.62	191.73	Replace	C3 (190.62 - 190.93) : altered 'To' depth by: 0.08; intervals upda	1	C3	190.62	190.85
9									2	C7	190.85	190.99
10									3	C1	190.99	191.02
11									4	C3	191.02	191.15
12									5	C4	191.15	191.19
13									6	C2	191.19	191.29
14									7	CY	191.29	191.3
15									8	C4	191.3	191.38
16									9	C6	191.38	191.54
17									10	C5	191.54	191.73
18	DDH009	18/07/201	14:32	1	2	3	Replace	CG (2.0 - 3.0) : deleted; intervals updated: 2	1	CG	2	3
19	DDH009	25/07/201	07:27	1	4	5	Insert	BC (4.42 - 4.57) within: SA (4.0 - 4.42) : intervals updated: 1	1	SA	4	5
20	DDH009	03/08/201	05:15	1	7	11	Replace	SL (7.0 - 8.78) : altered 'To' depth by: -0.22; intervals updated: 2	1	SL	7	9
21												
22												

The columns in this are:

- Hole: The hole number.
- Date: The date the edit was saved.
- Time: The time the edit was saved.
- No.: A sequence number for a particular session.
- From: The from depth that the operation started.
- To: The to depth that the operation ended.
- Operation: The type of operation, for example, *move*, *rename*, *insert* or *adjust*.
- Description: The description of the operation.
- Seq.: For a given operation, a sequence number that is the count of intervals affected by that operation.
- Lith: The lithology of the unit.
- Old From: The from depth before the operation took place.
- Old To: The to depth before the operation took place.

8.19 Undoing Edits

Each edit that is done is recorded in a list. Edits can be undone one edit at a time, starting with the most recent edit, and working backwards in the list by either:

- Clicking the Undo button on the Toolbar, or
- Pressing the Ctrl+Z key combination.



Confirmation of the action is requested before GeoEdit proceeds with the undo.

8.20 View/Edit a Dictionary

To view or edit the colours in the Lithology Dictionary, go to the Edit > Dictionary menu. The colours are the ones that were entered in the *LogCheck* dictionary. The lithology dictionary is as shown below on the left. A colour can be changed by the following steps:

Dictionary Colour Editor Form

AutoCAD Colours Form

1. Double-clicking in the Colour column.

2. This brings up an AutoCAD colour palette (shown below) from which an AutoCAD colour can be selected by clicking on a colour with the mouse, or typing a number in the Colour Number field.

3. Click the OK button

4. Click the Save button

Any changes to the colours are not (yet) updated in the *LogCheck* dictionary.

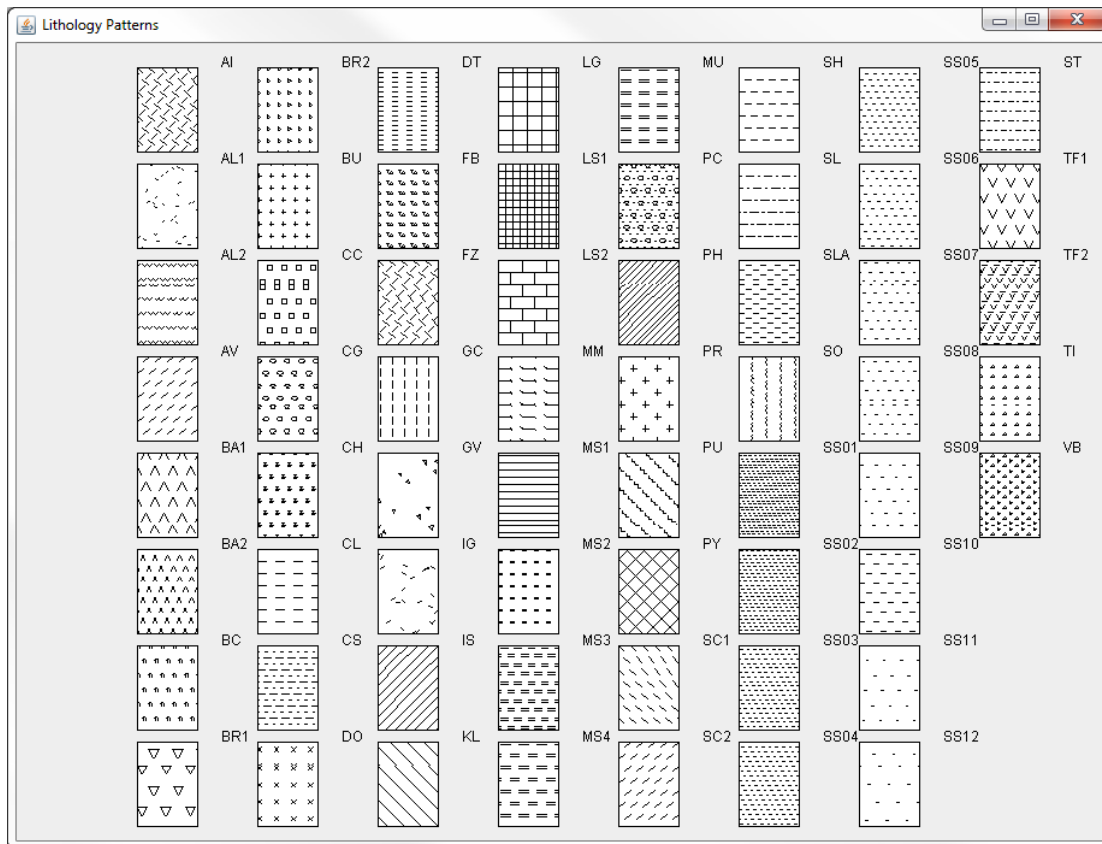
Code	Description	Colour #	Colour
LI	Limonite	7	
LO	Loam	7	
LS	Limestone	7	
MA	Mount Arthur Seam	150	
MAL	Mount Arthur Lower Seam	230	
MAM	Mount Arthur Middle Seam	240	
MAU	Mount Arthur Upper Seam	10	
MD	Mud	7	
MM	"Metamorphic Rock, undifferen..."	7	
MS	Mudstone	7	
NL	Not Logged	7	
NR	No Recovery	7	
OS	Oil Shale	7	
OW	Old Workings	7	
PE	Peat	7	
PH	Phyllite	7	
PY	Pyrite	7	
QT	Quartzite	7	
QZ	Quartz	7	
RH	Rhyolite	7	
SA	Sand	7	
SACL	"Sand, clayey"	7	
SAGV	"Sand, gravelly"	7	
SASA	"Sand, sandy"	7	
SASI	"Sand, silty"	7	
SC	Silcrete	7	
SD	Siderite	7	
SH	Shale	0	
SI	Silt	7	
SICL	"Silt, clayey"	7	
SIGV	"Silt, gravelly"	7	
SISA	"Silt, sandy"	7	
SISI	"Silt, silty"	7	
SL	Slate	7	
SO	Soil	7	
SS	Sandstone	7	
SSCC	"Sandstone, coarse grained"	7	

Save Cancel

Enter colour number (0-255): 140 OK Cancel

8.21 Viewing the Patterns

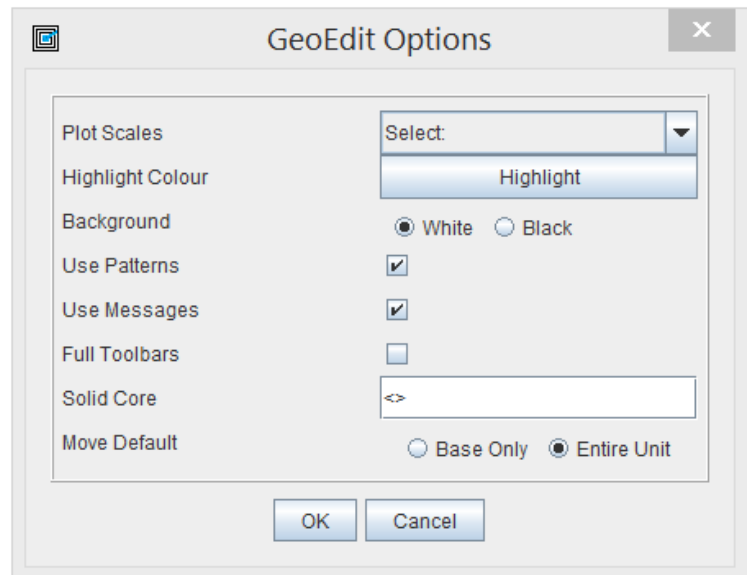
To view the available lithology patterns, go to the View > View Patterns menu, as shown below:



8.22 GeoEdit Options

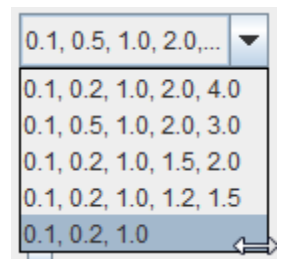
The GeoEdit options can be accessed from the View > Options menu. The options available in GeoEdit are:

- Plot Scales,
- Highlight Colour,
- Background,
- Use Patterns,
- Use Messages,
- Full Toolbars,
- Solid Core,
- Move Default.



8.22.1 Plot Scales

Various sets of plot scales are available, as shown on the right. After a plot scale is selected, the changes don't take place until the Graphic Editor is re-started. If long holes cause an out-of-memory error, it will be necessary to choose the bottom set of three scales (it may be necessary to open a shorter hole first, select the set of three scales, exit the Graphic Editor, then open the long hole).

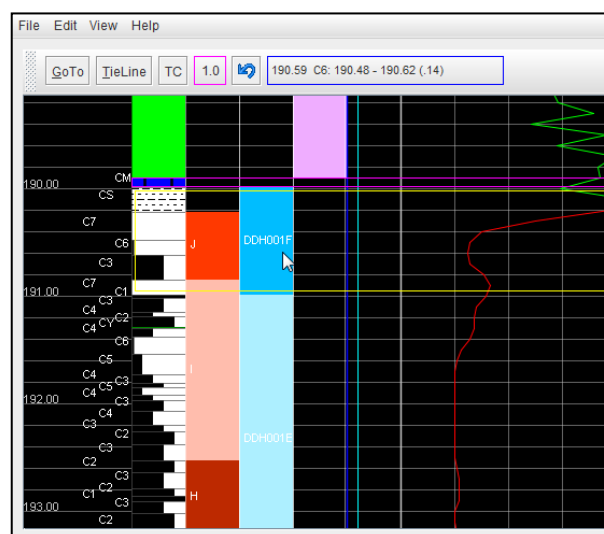


8.22.2 Highlight Colour

Selecting this option allows you to specify the colour of the rectangle that highlights the currently selected unit, by displaying the Autocad colour palette from which the desired colour can be selected.

8.22.3 Background Colour

The plot background can be altered between a white background and a black background. Go to the View > Options menu, and select either the black or the white option.



8.22.4 Use Patterns

The display of the lithology units can be altered between colours and patterns, which are determined by the *LogCheck* dictionary. Go to the View > Options menu, and tick the Use Patterns checkbox to

display the lithology as a pattern. Mostly, you will want this feature checked – especially if not all lithologies have been allocated a colour.

8.22.5 Use Messages Option

If the Use Messages option is checked, then additional help dialogs and confirmation messages are displayed. This is useful for users who are new to using GeoEdit. However as a user gains more editing proficiency, unchecking this option improves the performance and efficiency of editing.

8.22.6 Full Toolbars Option

Checking this option enables the display of the full toolbar menu – changes to this option don't take effect until you re-open GeoEdit. Usually, the right-click popup menu provides faster access to the editing commands.

8.22.7 Solid Core Option

Any lithology units that have a Mechanical State code that matches one of the codes entered here as being solid core, will remain unaffected as a result of an expansion/contraction or insertion operation. Also, if a move is attempted that involves an overlying or underlying unit that matches a solid core code, the move is not allowed.

8.22.8 Move Default

The default move operation can be set by selecting either Base Only or Entire Unit. This default can be overridden in the Move unit dialog (see Section 3.8).

8.23 Data Input

GeoEdit reads the geology, geophysics, parameters and dictionary data that is output from the *LogCheck* editor. The files are:

- Fills: GraphicEditorFills.csv
- Geology: GraphicEditorGeology.csv
- Geophysics: GraphicEditorLasData.csv
- Parameters: GraphicEditorParameters.csv
- Patterns: GraphicEditorPatterns.csv
- Dictionary: GraphicEditorLithologyDictionary.csv

.

To obtain a meaningful LAS plot, the LAS parameters need to be set in *LogCheck* before invoking GeoEdit.

8.24 Saving Your Data

Changes made during the current session can be saved. Go to File > Save. This data is then imported back into *LogCheck*. Also, a log of all the edits performed on a hole are saved in a text file, that is located in the Work folder of the current project.

The file is named as: *EditLog_HoleName.csv*, for example, *EditLog_MO11-67.csv*, as shown below:

8.25 Zooming Your Plot

The plot can be zoomed in or out by holding the Ctrl key and rotating the mouse wheel, or the Ctrl+ or Ctrl- keyboard combinations to zoom in/out. Each click of the wheel moves to the next scale. The scales at which the plot is displayed can be specified by the user either by selecting one of the sets from View > Options, or edit the applications initialisation file. To do this, make sure you are not in GeoEdit, then go to:

C:\ProgramData\Logcheck\Work

and edit the *GeoEdit.ini* file in Notepad. Something like the following will be displayed:

```
#Mon Nov 28 13:56:54 EST 2011
patterns=yes
messages=no
toolbars=no
scales=0.2, 0.5, 1.0, 2.0, 3.0
invert=no
```

You can alter any of the 5 scales – for now GeoEdit expects 5 values separated by commas. For example, to make the last scale bigger, you could alter the 5th line to:

```
scales=0.2, 0.5, 1.0, 2.0, 4.0
```

You will only see the 5th line, if you have already run GeoEdit at least once. If it is not there, you can add it in. If you make any changes to it, they will only take place the next time you run GeoEdit.

8.26 The About Box

The About box is available from the Help menu. It displays the product name and version number and build date.

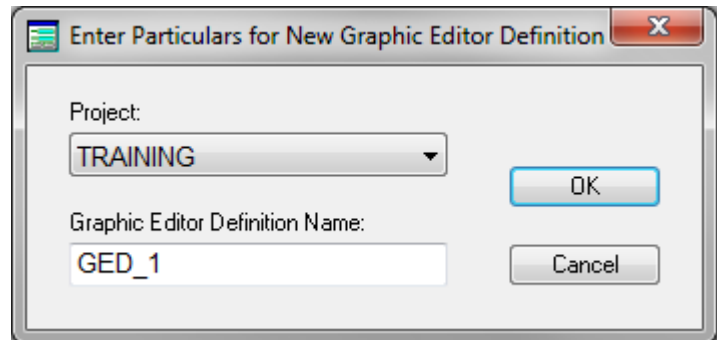


8.27 Displaying the Manual

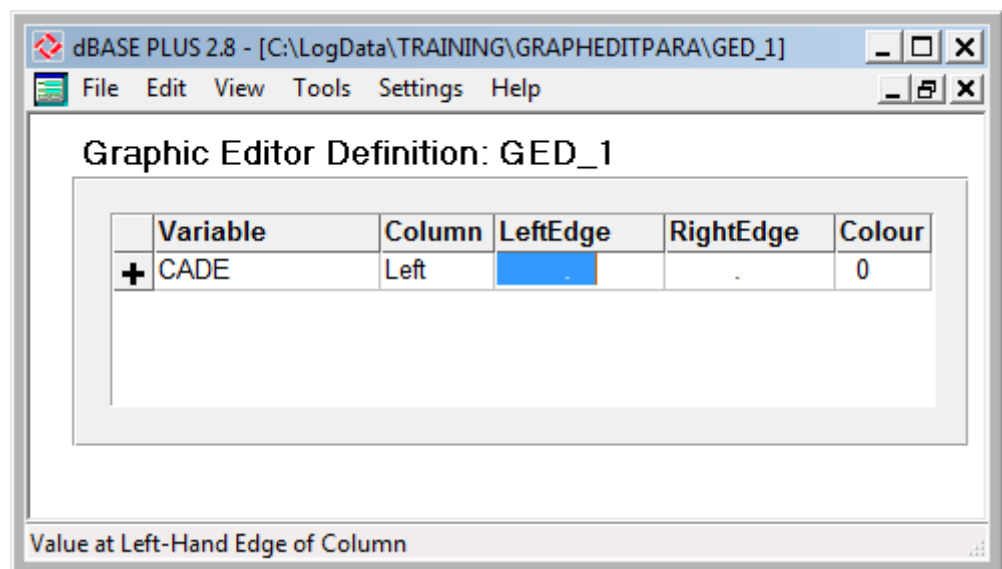
This documentation can be viewed as a PDF file by selecting the Display Manual item from the Help menu.

8.28 Graphic Editor Definitions

A Graphical Editor Definition file determines which LAS lines will be displayed in GeoEdit. Before GeoEdit will run, it is necessary to define at least one Graphical Editor Definition (GED) file in *LogCheck*. To create a new GED, go to the File > New > Graphical Editor Definition menu item; then give it a name in the following dialog:



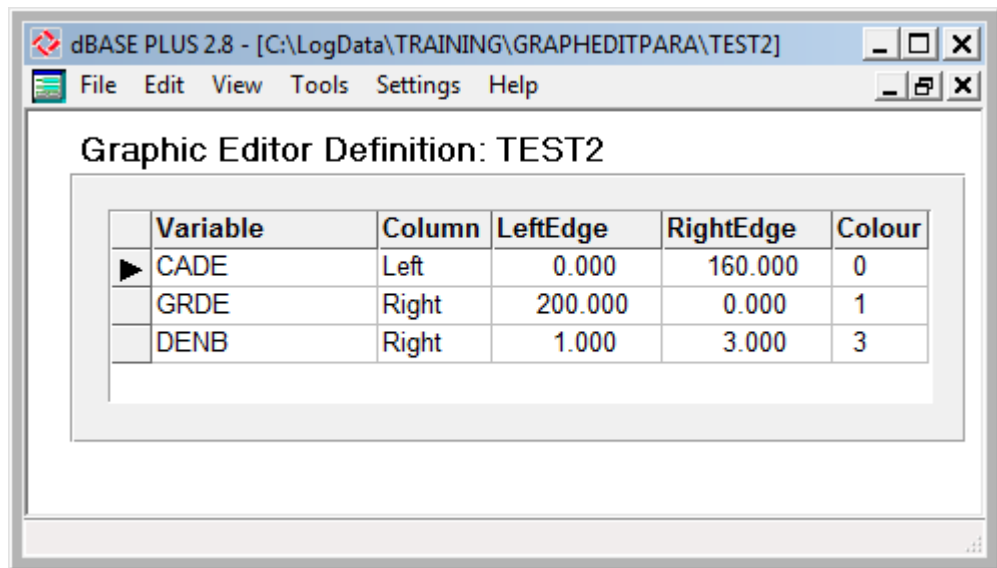
The following form is then displayed:



For each LAS line, the columns to be completed are:

- **Variable:** The name of the LAS line to be plotted.
- **Column:** Whether the line is to be displayed in the left or right area of the plot.
- **LeftEdge:** The minimum value of a variable to be displayed on the left hand axis of the plot.
- **RightEdge:** The maximum value to be displayed on the right axis of the plot.
- **Colour:** The AutoCAD colour number for the LAS line.

Note that the minimum/maximum values can be reversed for the LeftEdge/RightEdge. A completed example is shown below:



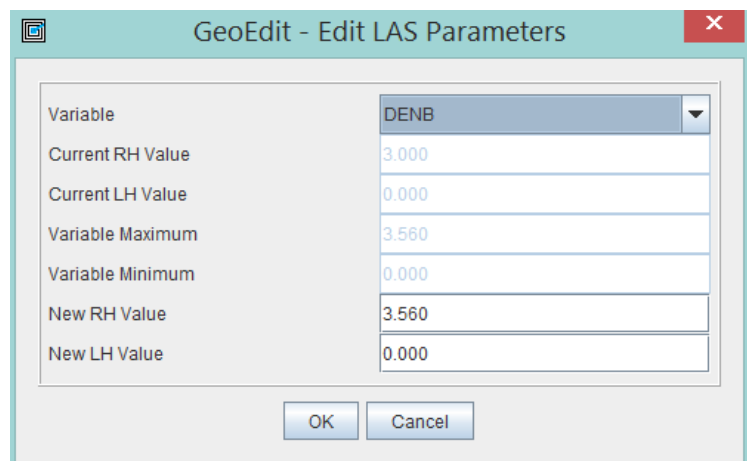
An existing GED can be viewed or updated by going to File > Open > Graphical Editor Definition.

To determine the settings for a GED, the maximum and minimum values can be determined from the LAS statistics option in *LogCheck* (see Section 8.4.2 – Las Variable Statistics).

8.29 Updating LAS Parameters within GeoEdit

The scale of the LAS parameters can be modified from within GeoEdit. From the main menu, select the Edit /Edit LAS Parameters item to display the following dialog:

Select the required LAS variable from the dropdown box. It displays the current values, and then the maximum and minimum values encountered in the data, and suggests these as the new values. Enter the required values, then select OK, or Cancel to exit without modifying the LAS plot scales.



8.30 Graphic Editor Fails to Launch

If the Graphic Editor fails to launch, the most likely possibilities are:

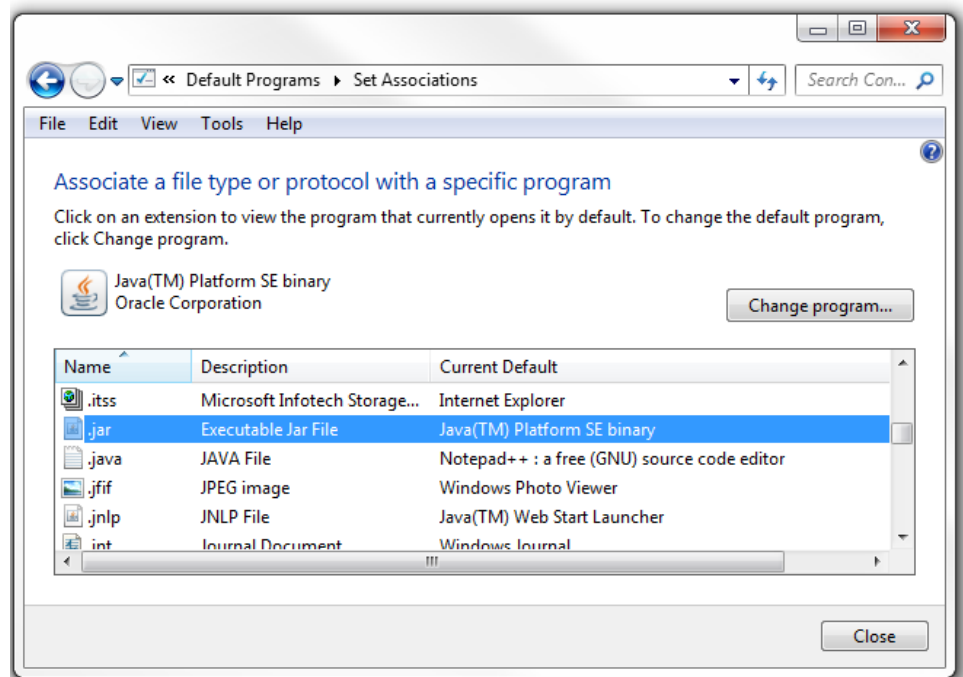
- The Java Runtime is not installed on your computer – see Chapter 2 of the LogCheck User Manual for further instructions.
- If the Java Runtime has been installed, you need to add a JAR file association.

If you have Java installed on your system, but the file association is not working, continue with the following steps for adding the JAR file association on Microsoft

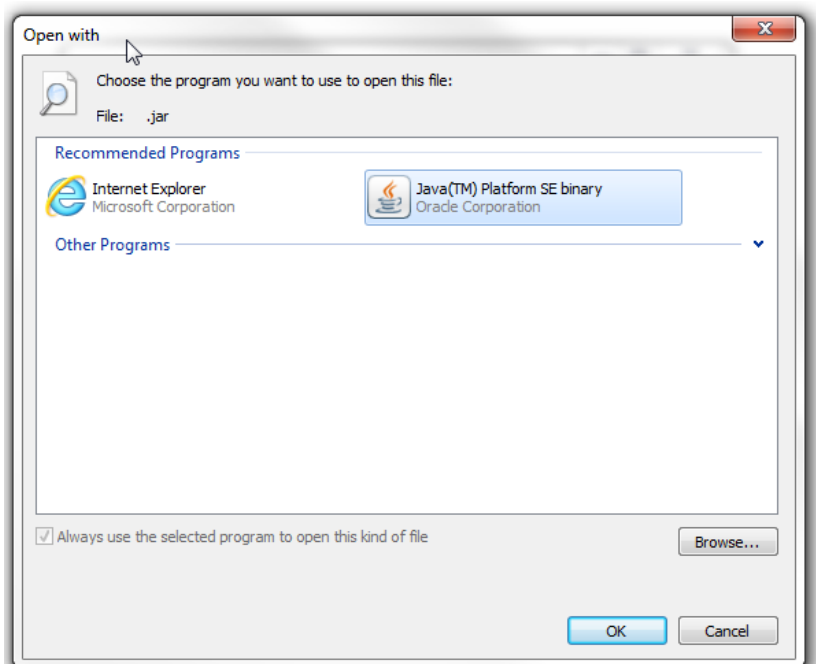
1. Choose Start > Control Panel.
2. Click Default Programs and select Associate a file type or protocol with a program.
3. In the Registered File Types list, select the .jar extension (Executable JAR File).

Click the Change Program button.

Click the Change Program button.



4. In the Open With dialog box, select Java Platform SE Binary.
5. Click OK to exit the Open With dialog box. Click Close to exit the Associate a file type or protocol.



Chapter 9

Audits, Summaries and Statistics

By the end of this chapter you will be able to:

- Audit *LogCheck* data.
- Summarise *LogCheck* data.
- View statistics for coded data and LAS variables.

9.1 Introduction

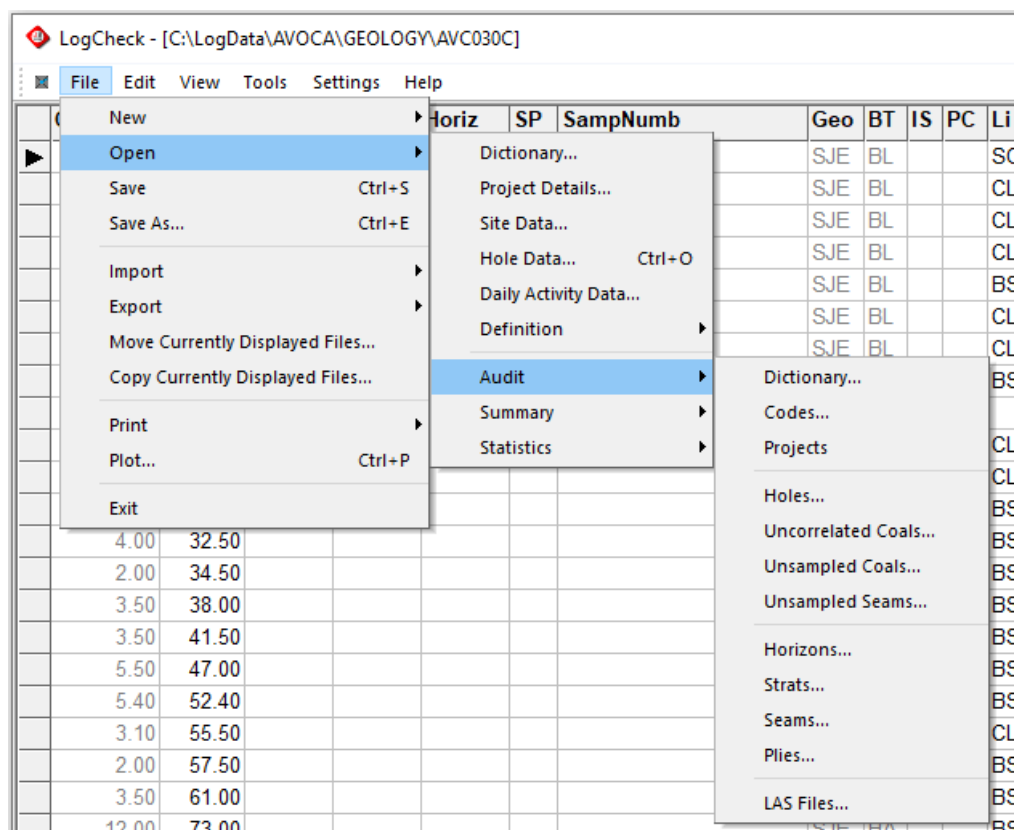
Audits of drill holes are performed to verify the consistency and accuracy of the data, as opposed to Summaries, which are usually for reporting or exporting information to other software.

The audits, summaries and statistics available in *LogCheck* are:

Audits	Summaries	Statistics
<ul style="list-style-type: none"> • Dictionaries • Codes • Projects • Holes • Uncorrelated Coals • Unsampled Coals • Unsampled Seams • Horizons • Strats • Seams • Plies • LAS files 	<ul style="list-style-type: none"> • Holes • Drilling • Seam/Horizon Picks • Seams/Plies • Samples 	<ul style="list-style-type: none"> • Coded Data Frequencies • Interval Thickness Statistics • LAS Variables

9.2 Audits

To open an audit select File > Open > Audit from the *LogCheck* menu:



9.2.1 Dictionary Audit

The Dictionary Audit analyses a selected dictionary and determines how many times a code has been used in a selected dataset in a project. A dictionary audit is useful when cleaning up dictionaries as you can see if a code has been used at all, before deleting it.

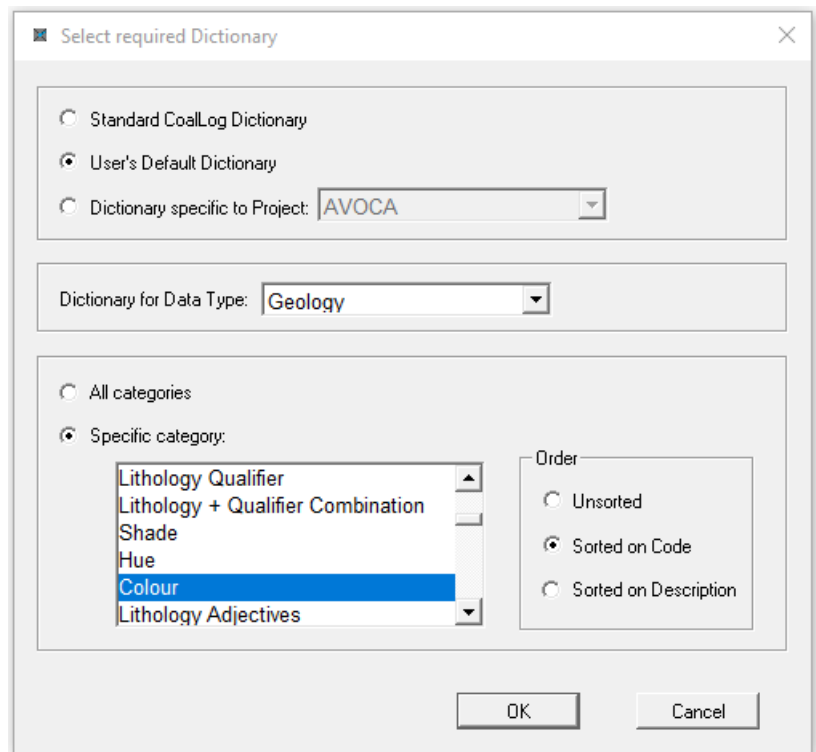
LogCheck only checks that an entered code is in the current dictionary when it is actually entered or if the Tools > Validate is selected from the *LogCheck* menu (see Section 7.6.1 Validate for more information). It is therefore possible for there to be codes in the data that are not in the current dictionary. This can occur for a couple of reasons:

- The code has been deleted from the dictionary after it has been entered.
- The data files have been copied directly from *LogCheck* on another computer whose dictionary is different from that on the current computer.

In this case, the code will be included in the audit but will display “MISSING FROM DICTIONARY” in the Desc column.

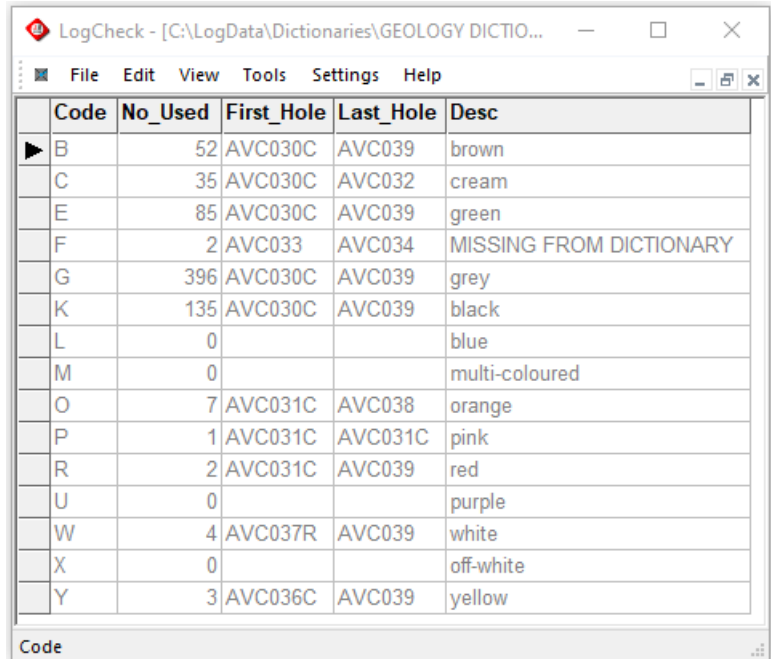
To create a Dictionary Audit, select Files > Open > Audit > Dictionary, Next, *LogCheck* prompts for the dictionary and category within this dictionary to audit:

In this example, the Colour category has been selected for the Geology dictionary in the Dictionaries folder, sorted by code:



Then select the required holes and intervals from the standard hole selection popup window.

The audit of the Colour dictionary for the selected holes and intervals is then displayed:



The screenshot shows the LogCheck application window with the title bar 'LogCheck - [C:\LogData\Dictionary\GEOLOGY DICTIO...'. The menu bar includes File, Edit, View, Tools, Settings, and Help. The main area displays a table with the following data:

	Code	No_Used	First_Hole	Last_Hole	Desc
▶	B	52	AVC030C	AVC039	brown
	C	35	AVC030C	AVC032	cream
	E	85	AVC030C	AVC039	green
	F	2	AVC033	AVC034	MISSING FROM DICTIONARY
	G	396	AVC030C	AVC039	grey
	K	135	AVC030C	AVC039	black
	L	0			blue
	M	0			multi-coloured
	O	7	AVC031C	AVC038	orange
	P	1	AVC031C	AVC031C	pink
	R	2	AVC031C	AVC039	red
	U	0			purple
	W	4	AVC037R	AVC039	white
	X	0			off-white
	Y	3	AVC036C	AVC039	yellow

The status bar at the bottom of the window displays the word 'Code'.

This includes the fields:

- **Code** Dictionary code
- **No_Used** Number of times the code was used
- **First_Hole** First hole in the list of holes where the code occurs
- **Last_Hole** Last hole in the list of holes where the code occurs
- **Desc** Description for this code

In the above example, the colour orange appears 7 times in the hole logs, with the first occurrence in hole AVC031C and the last occurrence in AVC038. One can further “drill down” into this information by doing a code audit (see next section), which will display where selected codes have been used in selected group of holes.

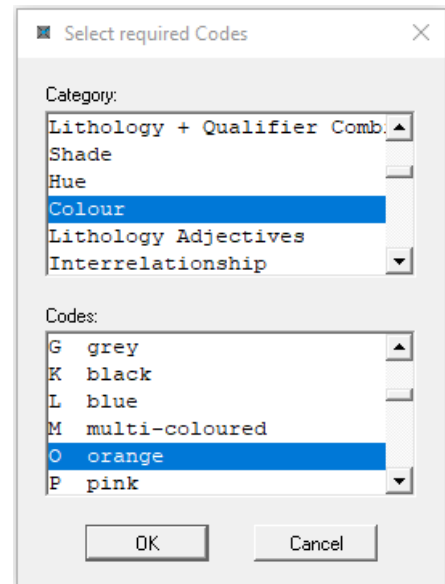
9.2.2 Codes Audit

A Codes Audit displays where a particular dictionary code has been used in a selected group of holes.

To create a Codes Audit, select **Files > Open > Audit > Codes** from the *LogCheck* menu, then select the required holes and intervals to be searched from the standard hole selection popup window.

Then from the popup window shown on the right select the category of the required code(s), and then select the required code(s):

Note that more than one code can be selected using the Shift and Ctrl keys.



In the previous Dictionary Audit section, it was determined that there were 7 instances of Colour orange. To find where they occur, select **Geology and All Holes**, and then with category of Colour and code O (orange), and the audit displays the 7 occurrences of orange in the project:

Hole	From	To	Variable	Code
AVC031C	10.00	13.00	Co	O
AVC031C	14.00	18.00	Co	O
AVC035	2.00	14.00	Co	O
AVC035	14.00	24.00	Co	O
AVC037R	2.00	5.00	Co	O
AVC037R	16.00	17.00	Co	O
AVC038	1.00	22.00	Co	O

This includes the fields:

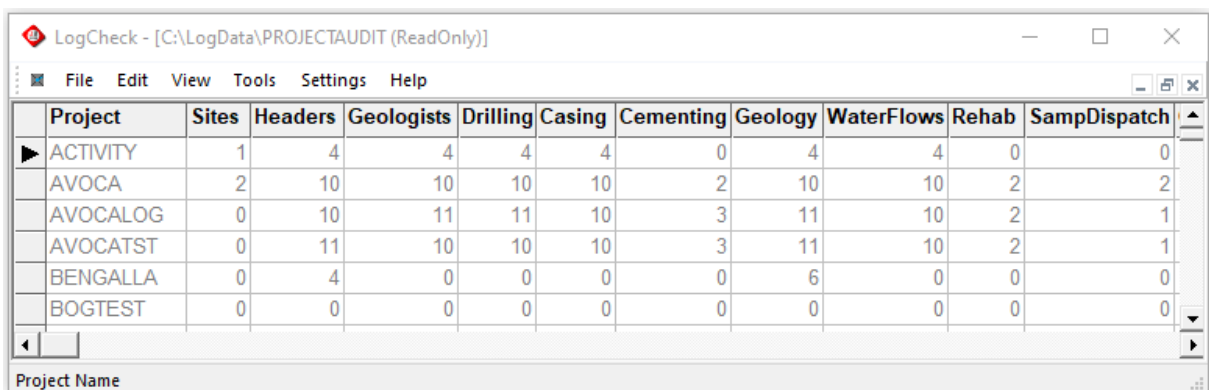
- **Hole** Hole name of hole where the code occurs
- **From** From depth of the unit where the code occurs
- **To** To depth of the unit where the code occurs
- **Variable** Name of variable where the code occurs. With most categories they apply to only a single variable but categories such as Lithological Adjective apply to multiple variables.
- **Code** The found code. This is only relevant where the user has selected more than one code to be search for.

9.2.3 Projects Audit

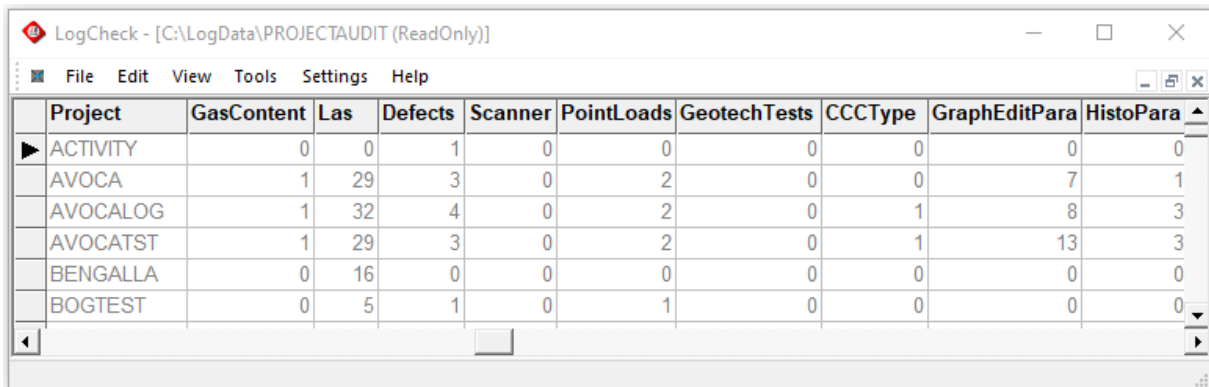
A Projects Audit displays a list of all projects on your computer. If you have a number of copies of *LogCheck* on your computer for handling different data formats, it only displays the projects for the version that you are currently using. It displays for each Data Type the number of holes stored on the computer for the project and for each Definition Type the number of definitions stored on the computer for the project.

Project audits are useful to quickly see if you have the same number of holes for each Data Type and that these match the number of holes that were drilled.

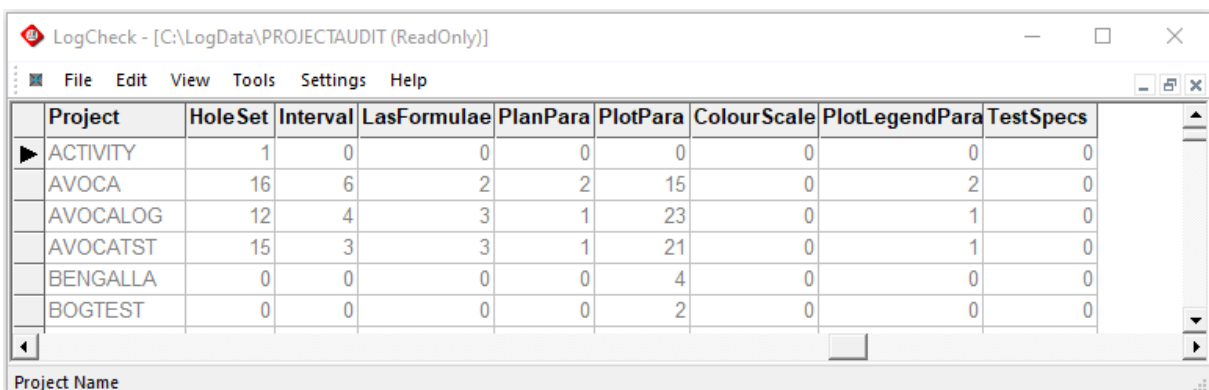
To create a Projects Audit, select **Files > Open > Audit > Projects** from the *LogCheck* menu. An example Project Audit is shown below, Due to the large number of columns, the display has been divided up into three figures:



Project	Sites	Headers	Geologists	Drilling	Casing	Cementing	Geology	WaterFlows	Rehab	SampDispatch
ACTIVITY	1	4	4	4	4	0	4	4	0	0
AVOCA	2	10	10	10	10	2	10	10	2	2
AVOCALOG	0	10	11	11	10	3	11	10	2	1
AVOCATST	0	11	10	10	10	3	11	10	2	1
BENGALLA	0	4	0	0	0	0	6	0	0	0
BOGTEST	0	0	0	0	0	0	0	0	0	0



Project	GasContent	Las	Defects	Scanner	PointLoads	GeotechTests	CCCType	GraphEditPara	HistoPara
ACTIVITY	0	0	1	0	0	0	0	0	0
AVOCA	1	29	3	0	2	0	0	7	1
AVOCALOG	1	32	4	0	2	0	1	8	3
AVOCATST	1	29	3	0	2	0	1	13	3
BENGALLA	0	16	0	0	0	0	0	0	0
BOGTEST	0	5	1	0	1	0	0	0	0



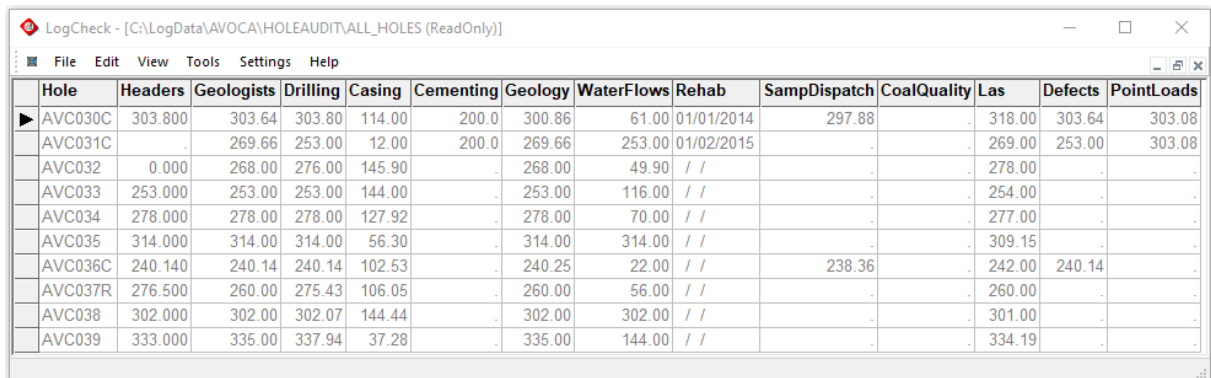
Project	HoleSet	Interval	LasFormulae	PlanPara	PlotPara	ColourScale	PlotLegendPara	TestSpecs
ACTIVITY	1	0	0	0	0	0	0	0
AVOCA	16	6	2	2	15	0	2	0
AVOCALOG	12	4	3	1	23	0	1	0
AVOCATST	15	3	3	1	21	0	1	0
BENGALLA	0	0	0	0	4	0	0	0
BOGTEST	0	0	0	0	2	0	0	0

9.2.4 Holes Audit

The Holes Audit displays the total depth in each data type's data for the selected drill holes. It enables you to detect any types of data for a specific hole that were only partially entered or not entered at all. For example, the top part of a hole may have been entered but the lower part, which was recorded on a different day or by a different geologist may have accidentally not been.

To create a Holes Audit, select **Files > Open > Audit > Holes** from the *LogCheck* menu, then select the required holes and intervals to be searched from the standard hole selection popup window.

The results of a Holes Audit are:



Hole	Headers	Geologists	Drilling	Casing	Cementing	Geology	WaterFlows	Rehab	SampDispatch	CoalQuality	Las	Defects	PointLoads
AVC030C	303.800	303.64	303.80	114.00	200.0	300.86	61.00	01/01/2014	297.88	.	318.00	303.64	303.08
AVC031C	.	269.66	253.00	12.00	200.0	269.66	253.00	01/02/2015	.	.	269.00	253.00	303.08
AVC032	0.000	268.00	276.00	145.90	.	268.00	49.90	/ /	.	.	278.00	.	.
AVC033	253.000	253.00	253.00	144.00	.	253.00	116.00	/ /	.	.	254.00	.	.
AVC034	278.000	278.00	278.00	127.92	.	278.00	70.00	/ /	.	.	277.00	.	.
AVC035	314.000	314.00	314.00	56.30	.	314.00	314.00	/ /	.	.	309.15	.	.
AVC036C	240.140	240.14	240.14	102.53	.	240.25	22.00	/ /	238.36	.	242.00	240.14	.
AVC037R	276.500	260.00	275.43	106.05	.	260.00	56.00	/ /	.	.	260.00	.	.
AVC038	302.000	302.00	302.07	144.44	.	302.00	302.00	/ /	.	.	301.00	.	.
AVC039	333.000	335.00	337.94	37.28	.	335.00	144.00	/ /	.	.	334.19	.	.

Hole AVC031C has no entry for the Headers column telling the user that no Header data has been entered for this hole whereas Hole AVC032 has an entry of 0.0 telling the user that Header data has been entered for this hole but no Total Depth was entered in the Header.

Some observations that can be made from this audit include:

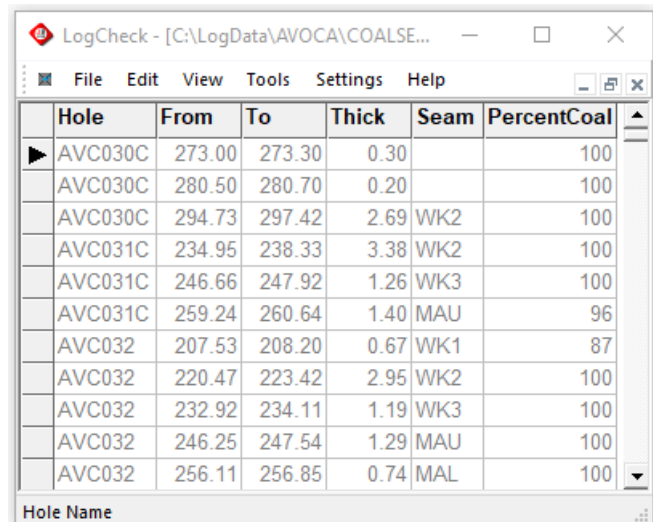
- The Coal Quality column is entirely empty indication that no Coal Quality has been entered for any of the holes.
- Hole AVC030C has a total depth of 303.80 in the Header and Drilling data but only 300.86 in the Geology data suggesting that the Geology for the last 2.94 metres of the hole was either not recorded or not entered into *LogCheck*.
- The Las data for hole AVC030C goes to 318.00m which is 14.2m past the end of the drilling as shown in the Drilling column! This would be an issue that should be investigated.
- The last Point Load base depth for holes AVC030C and AVC031C is 303.08m for both holes, suggesting that possibly the Point Load data entered for the two holes is actually only the Point Load data for one of the holes and has been accidentally entered into the system for the other.

9.2.5 Uncorrelated Coals Audit

The Uncorrelated Coals Audit analyses each the selected holes and intervals and shows the top and bottom depth of each seam and any instances of coal that occurs outside these seams. The audit also shows the thickness of these coals and the percentage of the units that are coal, so that you can determine how significant they are.

To create an Uncorrelated Coals Audit, select **Files > Open > Audit > Uncorrelated Coals** from the *LogCheck* menu, then select the required holes and intervals to be searched from the standard hole selection popup window.

An example Uncorrelated Coals Audit:



Hole	From	To	Thick	Seam	PercentCoal
AVC030C	273.00	273.30	0.30		100
AVC030C	280.50	280.70	0.20		100
AVC030C	294.73	297.42	2.69	WK2	100
AVC031C	234.95	238.33	3.38	WK2	100
AVC031C	246.66	247.92	1.26	WK3	100
AVC031C	259.24	260.64	1.40	MAU	96
AVC032	207.53	208.20	0.67	WK1	87
AVC032	220.47	223.42	2.95	WK2	100
AVC032	232.92	234.11	1.19	WK3	100
AVC032	246.25	247.54	1.29	MAU	100
AVC032	256.11	256.85	0.74	MAL	100

This includes the fields:

- **Hole** Hole name of the hole
- **From** From depth of coal unit or seam
- **To** To depth of coal unit or seam
- **Thick** Thickness of coal unit or seam
- **Seam** Seam names of each seam in the hole
- **PercentCoal** Percent coal in the unit or seam.

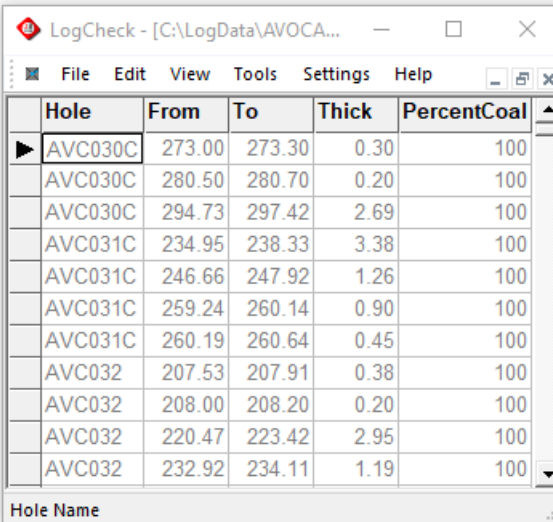
From the above audit it can be seen that in hole AVC030C there are two strata of 30 and 20cms above the WK2 seam that are 100% coal but have not been given a seam name.

9.2.6 Unsourced Coals Audit

The Unsourced Coals Audit analyses each of the selected holes and intervals and shows the intervals where coal has been logged as a lithotype but no sample number has been entered for the unit. This may be useful for detecting coals that have accidentally not been sampled or whose sample numbers have accidentally not been entered into *LogCheck*. Again, it determines that a lithology is coal from the Group column of its dictionary entry.

To create an Unsourced Coals Audit, select **Files > Open > Audit > Unsourced Coals** from the *LogCheck* menu, then select the required holes and intervals to be searched from the standard hole selection popup window.

An example Unsourced Coals Audit:



The screenshot shows the LogCheck application window with the title bar 'LogCheck - [C:\LogData\AVOCA...'. The menu bar includes File, Edit, View, Tools, Settings, and Help. The main window displays a table with the following data:

Hole	From	To	Thick	PercentCoal
AVC030C	273.00	273.30	0.30	100
AVC030C	280.50	280.70	0.20	100
AVC030C	294.73	297.42	2.69	100
AVC031C	234.95	238.33	3.38	100
AVC031C	246.66	247.92	1.26	100
AVC031C	259.24	260.14	0.90	100
AVC031C	260.19	260.64	0.45	100
AVC032	207.53	207.91	0.38	100
AVC032	208.00	208.20	0.20	100
AVC032	220.47	223.42	2.95	100
AVC032	232.92	234.11	1.19	100

Below the table is a text field labeled 'Hole Name'.

This includes the fields:

- **Hole** Hole name of the hole
- **From** From depth of coal unit or seam
- **To** To depth of coal unit or seam
- **Thick** Thickness of coal unit or seam
- **PercentCoal** Percent coal in the unit or seam.

As coals in open holes will generally not be sampled, one may want to use a Hole Set containing just holes that have cored intervals to select the holes. To see more about defining Hole Sets see Section 6.5 – Creating/Editing a Hole Set Definition.

An example of such a Hole Set Definition for CoalLog data would be:

Hole Set Definition: Cored

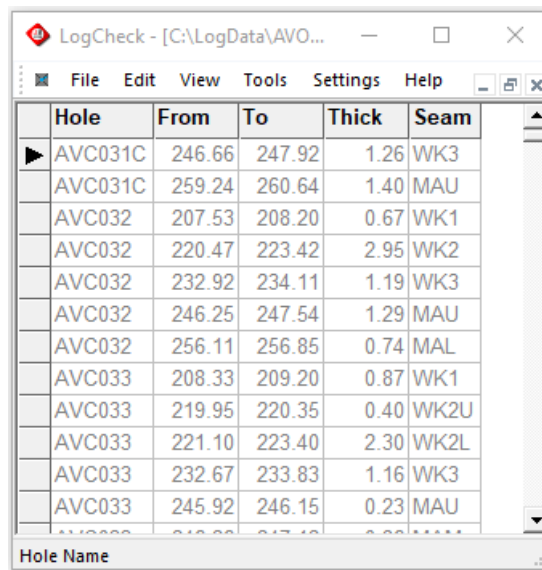
<input type="checkbox"/> Select by picking from list	<input type="checkbox"/> Select by section						
<div>All Holes AVC030C AVC031C AVC032 AVC033 AVC034 AVC035 AVC036C AVC037R AVC038 AVC039</div> <div>Selected Holes (<input type="checkbox"/> Sorted)</div> <div>Add to Selection ▶ Remove from Selection ▶</div>	<div>Section Type</div> <div><input type="radio"/> East-West Section with Northing: 0.00</div> <div><input type="radio"/> North-South Section with Easting: 0.00</div> <div><input type="radio"/> Oblique Section: <table><tr><td>Left End:</td><td>Easting: 0.00</td><td>Northing: 0.00</td></tr><tr><td>Right End:</td><td>0.00</td><td>0.00</td></tr></table></div> <div><input type="radio"/> Section between holes: AVC030C AVC030C</div> <div>Section Corridor Tolerance: ± 0.00</div>	Left End:	Easting: 0.00	Northing: 0.00	Right End:	0.00	0.00
Left End:	Easting: 0.00	Northing: 0.00					
Right End:	0.00	0.00					
<input checked="" type="checkbox"/> Select using a query							
Data Type Drilling ▼	Query, for example: date >= ctod("1/6/2003") and date <= ctod("30/6/2003") bt = "PC" or bt = "DW" or bt = "TC"						

9.2.7 Unsampled Seams Audit

The Unsampled Seams Audit analyses each of the selected holes and intervals and shows seams or parts of seams where no sample number has been entered. This may be useful for detecting where seams or parts of seams have accidentally not been sampled or whose sample numbers have accidentally not been entered into *LogCheck*.

To create an Unsampled Seams Audit, select **Files > Open > Audit > Unsampled Seams** from the *LogCheck* menu, then select the required holes and intervals to be searched from the standard hole selection popup window.

An example Unsampled Seams Audit:



The screenshot shows a window titled "LogCheck - [C:\LogData\AVO...". The window contains a table with the following data:

Hole	From	To	Thick	Seam
AVC031C	246.66	247.92	1.26	WK3
AVC031C	259.24	260.64	1.40	MAU
AVC032	207.53	208.20	0.67	WK1
AVC032	220.47	223.42	2.95	WK2
AVC032	232.92	234.11	1.19	WK3
AVC032	246.25	247.54	1.29	MAU
AVC032	256.11	256.85	0.74	MAL
AVC033	208.33	209.20	0.87	WK1
AVC033	219.95	220.35	0.40	WK2U
AVC033	221.10	223.40	2.30	WK2L
AVC033	232.67	233.83	1.16	WK3
AVC033	245.92	246.15	0.23	MAU

Below the table, there is a text field labeled "Hole Name" with a small icon to its right.

This includes the fields:

- **Hole** Hole name of the hole
- **From** From depth of coal unit or seam
- **To** To depth of coal unit or seam
- **Thick** Thickness of coal unit or seam
- **Seam** Seam name of interval that has not been sampled

As coals in open holes will generally not be sampled, one may want to use a Hole Set containing just holes that have cored intervals to select the holes. See the previous section Unsampled Coals Audit to see how to do this.

9.2.8 Horizons, Strats, Seams and Plies Audits

In some *LogCheck* formats, Horizons, such as Base of Tertiary, are stored in the Seam column of the geological data, on a unit with the same base depth as the preceding unit and blanks in all the remaining columns. Other *LogCheck* formats, such as CoalLog have separate Seam and Horizon columns.

The Seam column can also include Strats – a strat is a unit that is to be used for correlation purposes, as opposed to a seam, which only refers to a coal-bearing unit. It is distinguished from a coal seam by having the word STRAT in the Group column of the Seam category of the current Seams Dictionary.

Horizon, Strat, Seam and Ply audits are all similar in their output format.

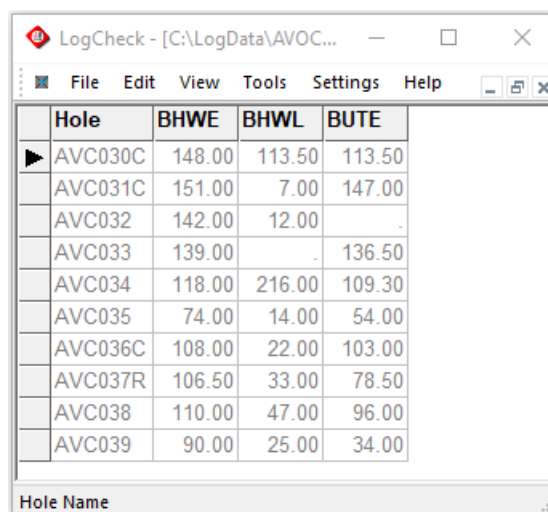
For each audit, each row is a hole and each column is a horizon, strat, seam or ply that occurs in at least one of the holes you have requested. The value in each cell is the depth for the horizon audit and thickness for the remainder.

9.2.8.1 Horizons Audit

This can be used to identify missing horizons. For example, the engineer may need a model of the Base of Tertiary. If a Base of Tertiary that should have been there has been omitted, it may corrupt the model. If there is no Base of Tertiary in a particular hole as with hole AVC032 in the example below, it could be because the geologist forgot to identify it, or that the hole may have been in rock the whole way. This would need to be checked before it was modelled.

To create a Horizons Audit, select Files > Open > Audit > Horizons from the *LogCheck* menu, then select the required holes and intervals to be searched from the standard hole selection popup window.

An example of a Horizon audit:



Hole	BHWE	BHWL	BUTE
AVC030C	148.00	113.50	113.50
AVC031C	151.00	7.00	147.00
AVC032	142.00	12.00	.
AVC033	139.00	.	136.50
AVC034	118.00	216.00	109.30
AVC035	74.00	14.00	54.00
AVC036C	108.00	22.00	103.00
AVC037R	106.50	33.00	78.50
AVC038	110.00	47.00	96.00
AVC039	90.00	25.00	34.00

In this audit, the value in each cell is the depth of the horizon. Each horizon has its own column – in this case, there are three: BHWE, BHWL and BUTE. A full description for the current column can be found in the bottom left corner of the screen.

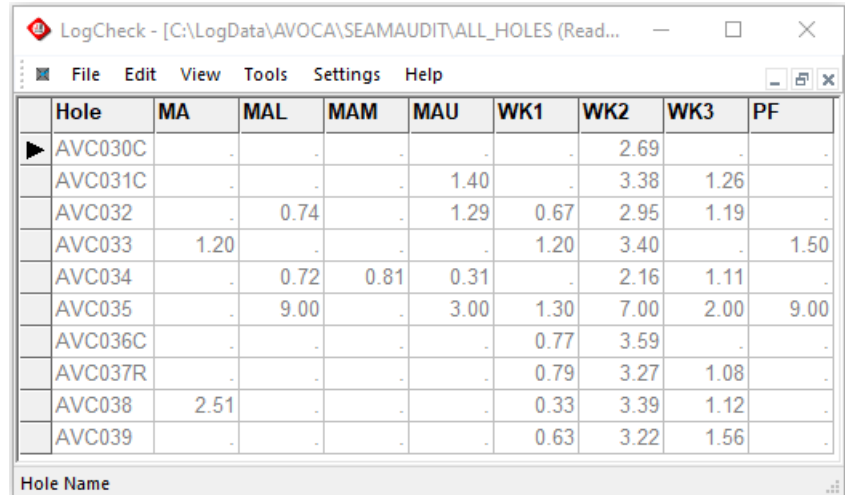
9.2.8.2 Seams Audit

The Seams Audit shows the thickness of each seam in each hole. A seam is distinguished from a strat by the word SEAM in the Group column of its entry in the dictionary. The Seam Audit can show up where a seam is missing from a hole or where it is atypically thicker or thinner than other instances across the

project. The seams are displayed in the audit in stratigraphic order as defined by their order in the Seams Dictionary.

To create a Seams Audit, select **Files > Open > Audit > Seams** from the *LogCheck* menu, then select the required holes and intervals to be searched from the standard hole selection popup window.

An example of a Seams audit:



Hole	MA	MAL	MAM	MAU	WK1	WK2	WK3	PF
AVC030C	2.69	.	.
AVC031C	.	.	.	1.40	.	3.38	1.26	.
AVC032	.	0.74	.	1.29	0.67	2.95	1.19	.
AVC033	1.20	.	.	.	1.20	3.40	.	1.50
AVC034	.	0.72	0.81	0.31	.	2.16	1.11	.
AVC035	.	9.00	.	3.00	1.30	7.00	2.00	9.00
AVC036C	0.77	3.59	.	.
AVC037R	0.79	3.27	1.08	.
AVC038	2.51	.	.	.	0.33	3.39	1.12	.
AVC039	0.63	3.22	1.56	.

9.2.8.3 Strat and Ply Audits

The Strat audit shows the thickness of each strat in each hole, and the Ply audit shows the thickness of each ply in each hole. These audits can identify where a strat or ply is missing from a hole and they can also identify where they are atypically thicker or thinner than other instances. From the Audit menu, select the Strat or Ply menu item.

9.2.9 LAS Files Audit

The LAS file audit reads the headers of all the project's LAS files and lists for each file, the hole (WELL), from and to depths (STRT and STOP), reading interval (STEP), logging company (SRVC), logging date (DATE) and variables in the file.

An example of a LAS header as shown in Notepad++:

```

1 ~Version Information
2 VERS. 2.00: CWLS log ASCII Standard -VERSION 2.00
3 WRAP. NO: One line per depth step
4 #
5 #
6 ~Well Information Block
7 #MNEM.UNIT Data Type Description
8 #-----
9 STRT.M 304.000 :START DEPTH
10 STOP.M .010 :STOP DEPTH
11 STEP.M -.010 :STEP
12 NULL. -999.250 :NULL VALUE
13 COMP. COALLOG :COMPANY
14 WELL. AVC030C :WELL
15 FLD. AVOCA :FIELD
16 LOC. AVC030C :LOCATION
17 PROV. QUEENSLAND :PROVINCE
18 SRVC. Weatherford :SERVICE COMPANY
19 DATE. 28-FEB-2004 :LOG DATE
20 UWI. AVC030C :UNIQUE WELL ID
21 LIC. :LICENCE NUMBER
22 #
23 #

```

Often, there will often be a multitude of LAS files; even numerous files for a single hole, as there may be separate LAS files for different reading intervals, geophysical tools and/or parts of the hole. It is often difficult for the logger to incorporate the hole name, reading interval, tool and section of the hole all into the file name.

When *LogCheck* requires the LAS data for a specified hole, depth and variable, it determines the required file(s) from the LAS Audit table. In order to successfully do this though, the Well line in the LAS file should contain the hole name as it is used in *LogCheck*.

To create a Las Files Audit, select Files > Open > Audit > Las Files from the *LogCheck* menu, then select the required holes from the standard hole selection popup window.

An example of a Las Files Audit:

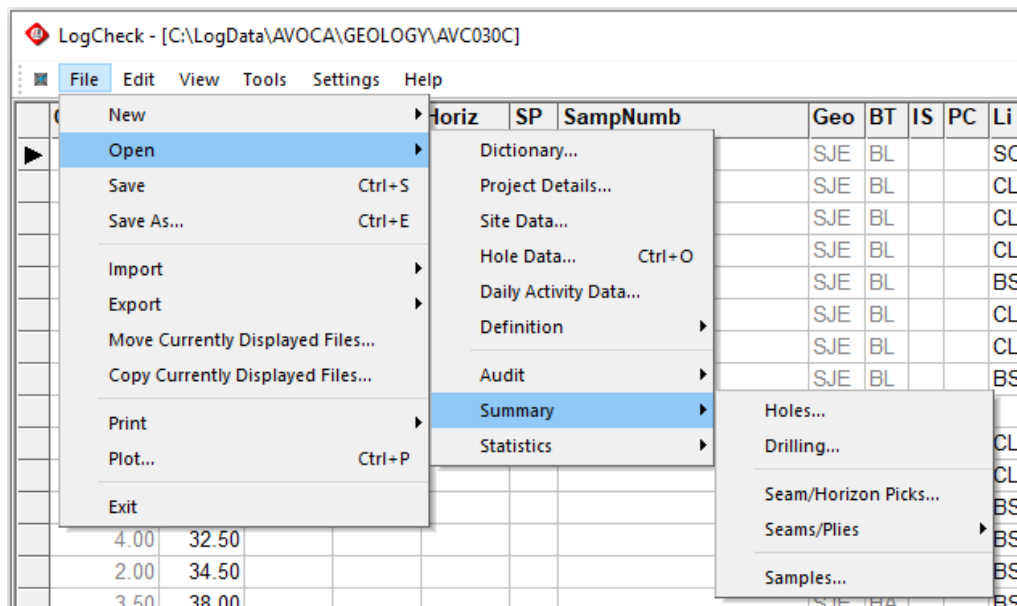
LogCheck - [C:\LogData\AVOCA\LASAUDIT\ALL_HOLES (ReadOnly)]

File Edit View Tools Settings Help

FileName	Hole	From	To	Step	Srvc	Date	ADEN	AXLE	AXLN	AZID	BBRG	BRAD
▶ AVC030C_GN.LAS	AVC030C	0.0100	304.0000	0.0100	WEATHERFORD	28/02/2004	X					
AVC030C_VT.LAS	AVC030C	2.0000	304.0000	0.0000	WEATHERFORD	28/02/2004		X	X	X	X	X
AVC030GV_C.LAS	AVC030C	2.1000	318.0000	0.1000	WEATHERFORD	07/03/2003				X		
AVC031C_GN.LAS	AVC031C	2.0100	269.0000	0.0100	WEATHERFORD	15/08/2003	X					
AVC031C_GV.LAS	AVC031C	1.1000	269.0000	0.1000	WEATHERFORD	08/03/2003				X		
AVC031C_VT.las	AVC031C	2.0000	268.9000	0.0000	WEATHERFORD	08/03/2003		X	X	X	X	X
AVC032GN.las	AVC032	0.0100	278.0000	0.0100	WEATHERFORD	17/12/2002	X					
AVC032GV.las	AVC032	1.1000	277.0000	0.1000	WEATHERFORD	17/12/2002				X		
AVC032VT.las	AVC032	2.0000	276.3000	0.0000	WEATHERFORD	17/12/2002		X	X	X	X	X
AVC033GN.las	AVC033	0.0100	254.0000	0.0100	WEATHERFORD	20/12/2002	X					
AVC033GV.las	AVC033	1.1000	254.0000	0.1000	REEVES	19/12/2002				X		
AVC033VT.las	AVC033	2.0000	253.0000	0.0000	WEATHERFORD	19/12/2002		X	X	X	X	X
AVC034GN.las	AVC034	0.0100	277.0000	0.0100	REEVES	20/12/2002	X					
AVC034GV.las	AVC034	1.1000	276.0000	0.1000	REEVES	19/12/2002				X		
AVC034VT.las	AVC034	2.0000	275.0000	0.0000	WEATHERFORD	19/12/2002		X	X	X	X	X

9.3 The Summary Menu

To open a summary select File > Open > Summary from the *LogCheck* menu:



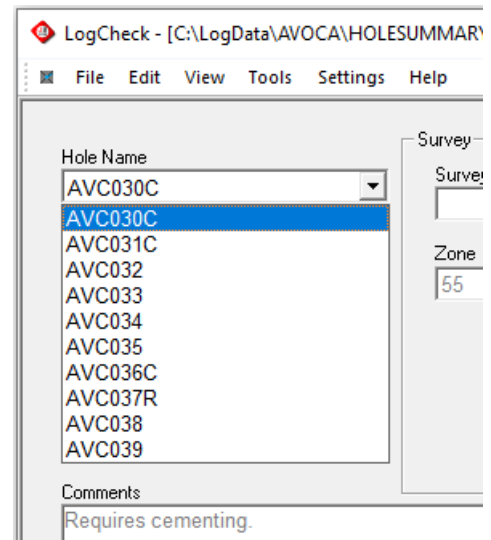
9.3.1 Hole Summary

The hole summary examines all the data stored within *LogCheck* for the selected hole(s), summarizes it and displays the summary. It includes items such as Hole Type, Hole Purposes, Survey, Drilling, Geology, Geophysics and Environmental:

This is not only useful for seeing all aspects of a hole but is useful to check that all the expected data for the hole has been entered.

To create a Holes Summary, select Files > Open > Summary > Holes from the *LogCheck* menu, then select the required holes to be included from the standard hole selection popup window.

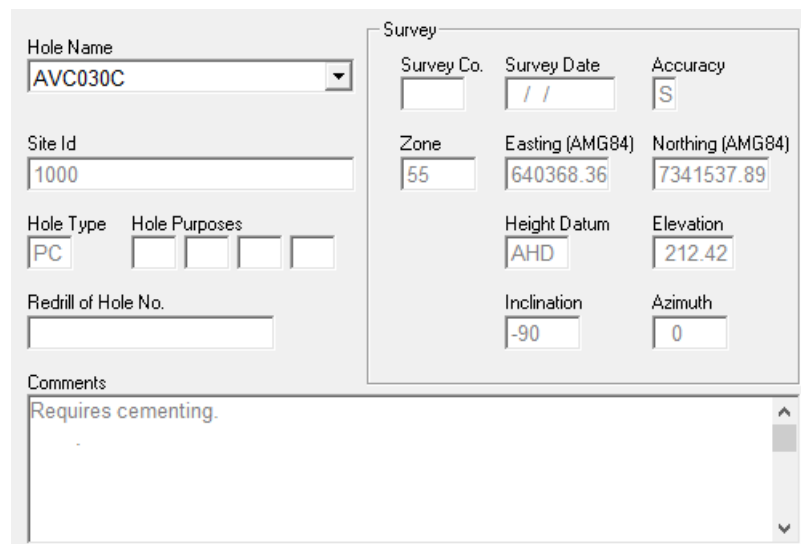
At any time, the summary displays just the results for a single hole. However, if multiple holes are selected then each can be displayed by selecting it from the drop down box in the summary for Hole Name:



9.3.1.1 Header Data

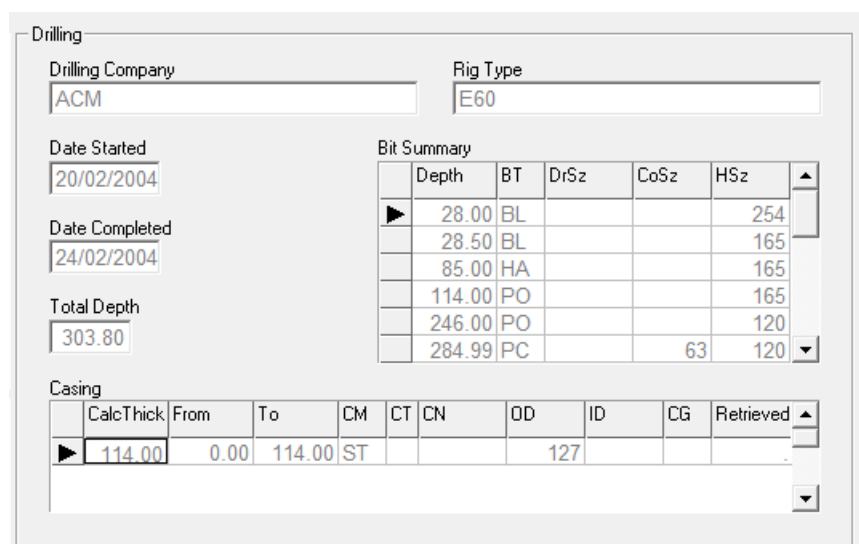
An example of the Hole Summary's Header data summary:

These items are all obtained directly from the Header data.



9.3.1.2 Drilling Data

An example of the Hole Summary's Drilling data summary:



This includes the fields:

- **Drilling Company** a list of codes for all the drilling companies that drilled parts of the hole
- **RigType** a list of codes for all the rig types that were used drilling the hole
- **Date Started** the first drilling date in the drilling data for the hole
- **Date Completed** the last drilling date in the drilling data for the hole
- **Total Depth** the total depth according to the driller
- **Bit Summary** table showing Bit Type, Drill Size, Core Size and Hole Size. A new row is shown each time one of these changes
- **Casing** table showing all the Casing data for the hole

9.3.1.3 Geology Data

An example of the Hole Summary's Geology data summary:

Geology

Geological Organiz. Geotech. Log Core Photos

RES

Logging Geologist

S JOHN EDWARDS, JOHN C IRVINE

Horizon, Strat, Seam Summary

	Unit	From	To	Thick
▶	BUTE	.	113.50	.
	BHWL	.	113.50	.
	BHWE	.	148.00	.
	WK2	294.73	297.42	2.69

This includes the fields:

- **Geological Organization** the code for the Geological Organization that logged the hole
- **Geotechnical Log** a flag indicating the hole has a geotechnical log
- **Core Photos** a flag indicating that there are core photos for the hole
- **Logging Geologists** list of the names of the Geologists who logged the hole
- **Horizon, Strat, Seam Summary** a table showing the Name, From Depth, To Depth and Thickness of any Horizons, Strats or Seams logged in the hole

9.3.1.4 Geophysics Data

An example of the Hole Summary's Geophysics data summary:

Geophysics

Logging Co. Logger's Name

WEA

Logs Run

C D G S V

Las File Summary

	FileName	From	To	Step	Date	Traces
▶	AVC030C GN.LAS	0.01	304.00	0.01	28/02/2004	GRDE, CODE, LSDU, BRDU, CADE, DENL, DENB,
	AVC030C VT.LAS	2.00	304.00	0.00	28/02/2004	TDEP, TILD, AZID, AXLN, AXLE, BBRG, BRAD, BRG1,
	AVC030GV C.LAS	2.10	318.00	0.10	07/03/2003	TILD, AZID

This includes the fields:

- **Logging Company** the code for the geophysical logging company that logged the hole
- **Logger's Name** the name of the person who geophysically logged the hole
- **Logs Run** list of logs run on the hole according to what is recorded in the hole's header
- **Las File Summary** a table showing the From Depth, To Depth, Step, Date Logged and the Curves for each of the hole's Las files

By comparing the Logs Run as recorded by the geologist in the hole's header with the Las File Summary, this summary can be used to double check that the logging company has provided all the Las files for all the hole's logs.

9.3.1.5 Environmental Data

An example of the Hole Summary's Environmental data summary:

Environmental

SWL:

SWL Date:

Rehab. Date:

Hole Status: ☐ ☐

CalcThick	From	To	Date	CM	Volume
150.0	200.00	350.00	01/02/2014		12.000
100.0	100.00	200.00	02/02/2014		15.000

Date	Action
01/02/2013	pumped out drilling sump
02/02/2013	filled in drilling sump
01/01/2014	planted saplings

This includes the fields:

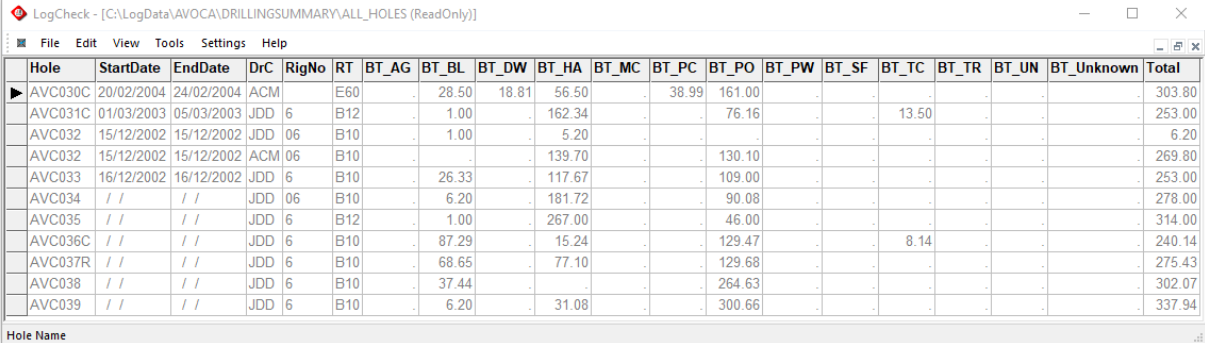
- **Standing Water Level** Standing Water Level
- **Standing Water Level Date** date Standing Water Level was measured
- **Rehabilitation Date** date of completion of hole's rehabilitation
- **Cementing** table showing all the Cementing data for the hole
- **Rehabilitation** a table showing all the Rehabilitation data for the hole

9.3.2 Drilling Summary

The Drilling Summary displays the number of metres of each type of drilling performed by each drilling company for each hole. This is useful for reconciling drilling company invoices with the actual drilling data.

To create a Drilling Summary, select **Files > Open > Summary > Drilling** from the *LogCheck* menu, then select the required holes to be included from the standard hole selection popup window.

An example of a Drilling Summary:



The screenshot shows the LogCheck application window with the title bar 'LogCheck - [C:\LogData\AVOCA\DRILLINGSUMMARY\ALL_HOLES (ReadOnly)]'. The menu bar includes File, Edit, View, Tools, Settings, and Help. The main area displays a table with the following columns: Hole, StartDate, EndDate, DrC, RNo, RT, BT_AG, BT_BL, BT_DW, BT_HA, BT_MC, BT_PC, BT_PO, BT_PW, BT_SF, BT_TC, BT_TR, BT_UN, BT_Unknown, and Total. The table contains 15 rows of data for different holes, including AVC030C, AVC031C, AVC032, AVC033, AVC034, AVC035, AVC036C, AVC037R, AVC038, and AVC039. Each row shows the drilling dates, company (DrC), rig number (RNo), and the number of metres drilled for various bit types (BT_x), along with a total depth (Total).

Hole	StartDate	EndDate	DrC	RNo	RT	BT_AG	BT_BL	BT_DW	BT_HA	BT_MC	BT_PC	BT_PO	BT_PW	BT_SF	BT_TC	BT_TR	BT_UN	BT_Unknown	Total
▶ AVC030C	20/02/2004	24/02/2004	ACM		E60		28.50	18.81	56.50		38.99	161.00							303.80
AVC031C	01/03/2003	05/03/2003	JDD	6	B12		1.00		162.34			76.16			13.50				253.00
AVC032	15/12/2002	15/12/2002	JDD	06	B10		1.00		5.20										6.20
AVC032	15/12/2002	15/12/2002	ACM	06	B10				139.70			130.10							269.80
AVC033	16/12/2002	16/12/2002	JDD	6	B10		26.33		117.67			109.00							253.00
AVC034	/ /	/ /	JDD	06	B10		6.20		181.72			90.08							278.00
AVC035	/ /	/ /	JDD	6	B12		1.00		267.00			46.00							314.00
AVC036C	/ /	/ /	JDD	6	B10		87.29		15.24			129.47			8.14				240.14
AVC037R	/ /	/ /	JDD	6	B10		68.65		77.10			129.68							275.43
AVC038	/ /	/ /	JDD	6	B10		37.44					264.63							302.07
AVC039	/ /	/ /	JDD	6	B10		6.20		31.08			300.66							337.94

The summary includes the fields:

- **Hole** Hole name
- **StartDate** Start date of drilling
- **EndDate** End date of drilling
- **DrC** Drilling company
- **RNo** Rig number
- **BT_x** Metres of drilling in the code for bit type *x*, where *x* is the bit type found in the Drilling Dictionary, for example, A – roller bit or D – diamond bit drilling,
- **Total** Total depth of drilling

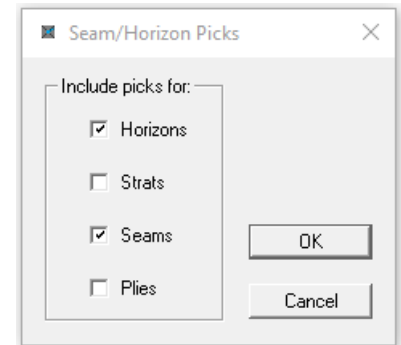
Note: where a hole has had more than one drilling company or rig operating on the hole a separate line is shown for each drilling company/rig combination. To calculate total meterage for different bit types over a set of holes, open a drilling summary for these holes, export it to Microsoft® Excel as a comma delimited file (.csv) and then sum the columns in Excel.

9.3.3 Seam/Horizon Picks

The Seam/Horizon Picks summary generates a “picks” file that has tops, bottoms and thicknesses for export to a modelling package. Note that when exporting this data, *LogCheck* provides the option of augmenting the data with its 3-D coordinates.

To create a Seam/Horizon Picks, select **Files > Open > Summary > Seam/Horizon Picks** from the *LogCheck* menu, then select items to include in the Picks:

Note that the Plies option only appears if you have a Ply column in your data format.



Then select the required holes and intervals from the standard Hole Selection dialog.

An example of a Seam/Horizon Picks summary:

Hole	Unit	From	To	Thick
AVC030C	BUTE	113.50	113.50	0.00
AVC030C	BHWL	113.50	113.50	0.00
AVC030C	BHWE	148.00	148.00	0.00
AVC030C	WK2	294.73	297.42	2.69
AVC031C	BHWL	7.00	7.00	0.00
AVC031C	BUTE	147.00	147.00	0.00
AVC031C	BHWE	151.00	151.00	0.00
AVC031C	WK2	234.95	238.33	3.38
AVC031C	WK3	246.66	247.92	1.26
AVC031C	MAU	259.24	260.64	1.40
AVC032	BHWL	12.00	12.00	0.00
AVC032	BUTE	139.00	139.00	0.00
AVC032	BHWE	142.00	142.00	0.00
AVC032	WK1	207.53	208.20	0.67
AVC032	WK2	220.47	223.42	2.95
AVC032	WK3	232.92	234.11	1.19
AVC032	MAU	246.95	247.54	0.59

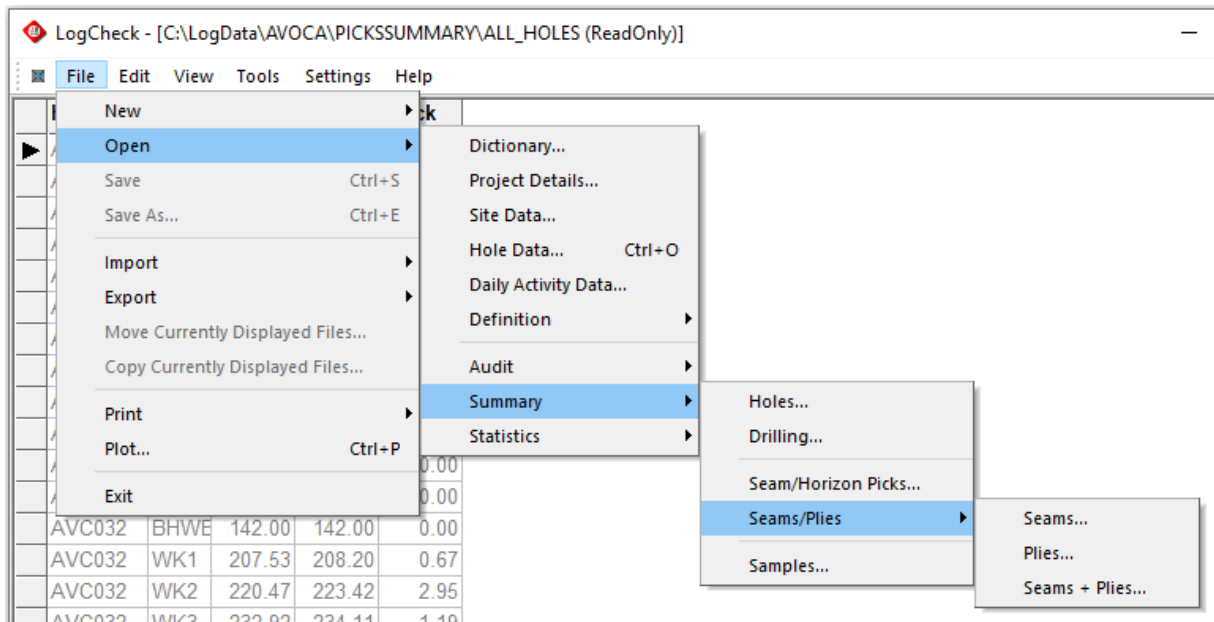
The summary includes the fields:

- **Hole** Hole name
- **Unit** The Horizon/Strat/Seam/Ply name
- **From** From depth of unit
- **To** To depth of unit
- **Thick** Thickness of the unit

9.3.4 Seam/Plies Summary

The Seam/Plies Summary displays a summary of the seams or plies occurring in each hole. For each intersection it includes: thickness, recovery, thicknesses of coal and partings and stripping ratios. The strip ratios may be useful during exploration to give ballpark figures for the economics of opencut mining. Be mindful though that when modelling strip ratios, these strip ratios should not be used for modelling, rather strip ratio models must be generated from thickness and coal density models.

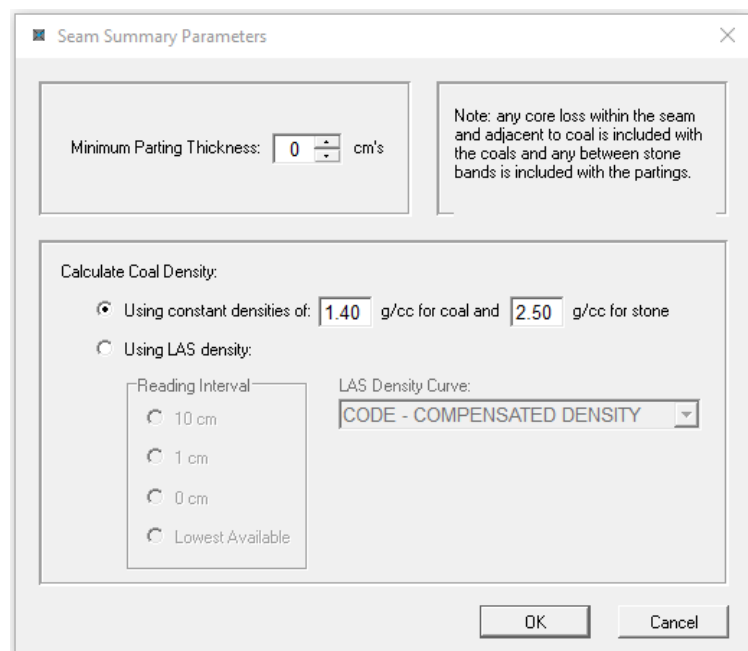
To create a Seam/Horizon Summary, select **Files > Open > Summary > Seams/Plies** from the *LogCheck* menu, then select type of summary required:



If Plies is chosen, it works on the Ply column, not the Seam column; if Seams + Plies is chosen, it works on the seam code concatenated with the Ply code.

Next select the required holes and intervals from the standard Hole Selection popup window.

Then select the required Seam Summary Parameters:

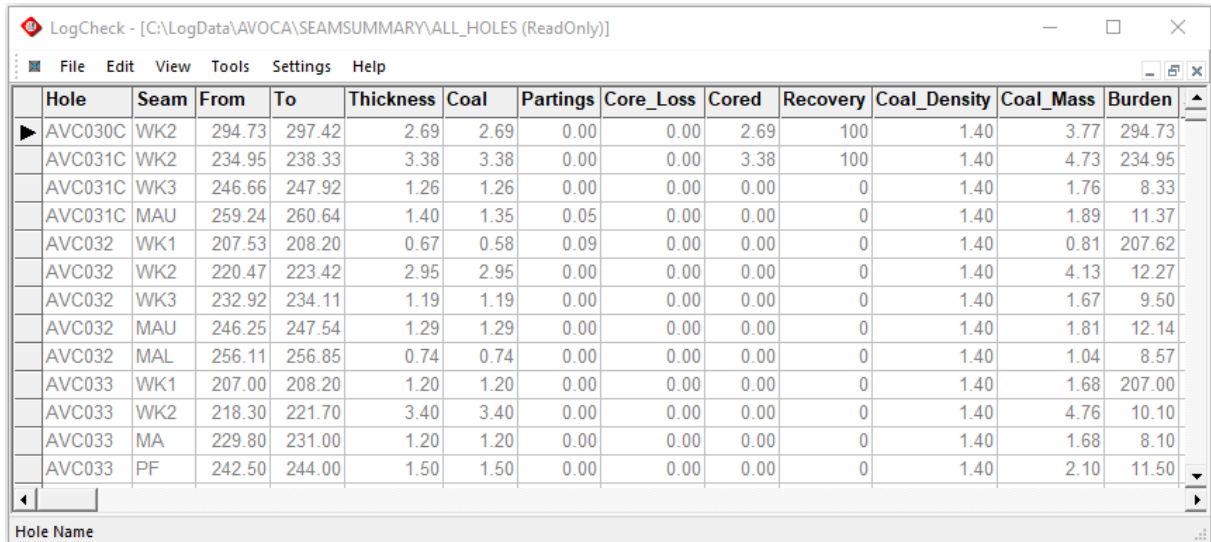


When deciding whether a unit is coal or partings, you can specify a minimum parting thickness in this window. This may be necessary, as anything less than this thickness that is not coal, may not be able to be separated during mining from the actual coal, and therefore needs to be included with the coal.

The coal density is required, in order to calculate the stripping ratio, though this is irrelevant for underground mining. There are two ways to specify the density:

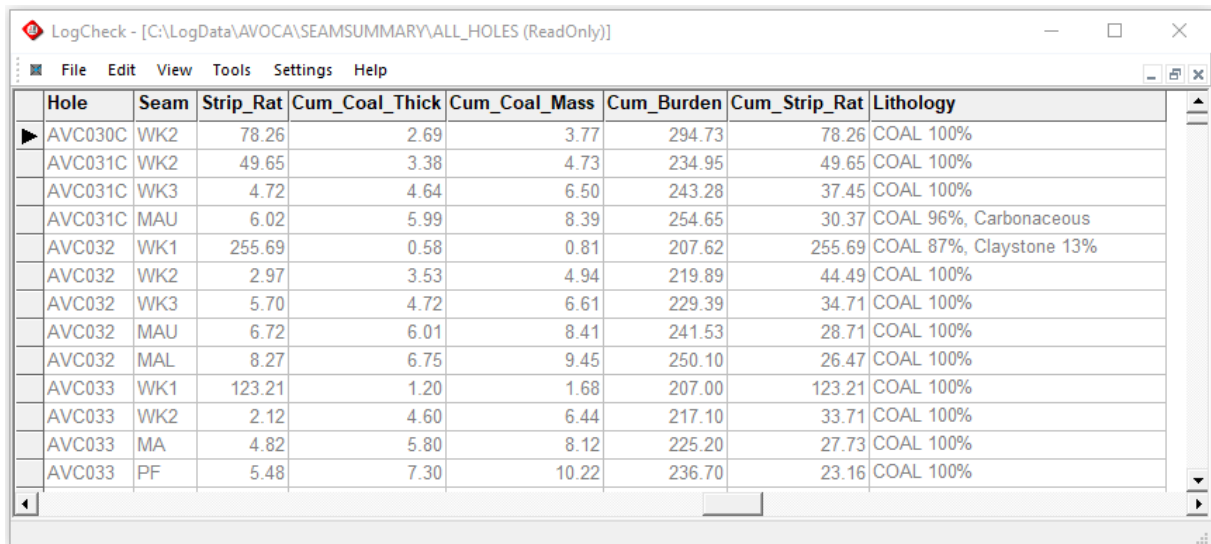
- Using two estimated densities – one for all coal and one for all stone.
- Using LAS density.

An example of a Seam Summary (left-hand columns):



Hole	Seam	From	To	Thickness	Coal	Partings	Core_Loss	Cored	Recovery	Coal_Density	Coal_Mass	Burden
AVC030C	WK2	294.73	297.42	2.69	2.69	0.00	0.00	2.69	100	1.40	3.77	294.73
AVC031C	WK2	234.95	238.33	3.38	3.38	0.00	0.00	3.38	100	1.40	4.73	234.95
AVC031C	WK3	246.66	247.92	1.26	1.26	0.00	0.00	0.00	0	1.40	1.76	8.33
AVC031C	MAU	259.24	260.64	1.40	1.35	0.05	0.00	0.00	0	1.40	1.89	11.37
AVC032	WK1	207.53	208.20	0.67	0.58	0.09	0.00	0.00	0	1.40	0.81	207.62
AVC032	WK2	220.47	223.42	2.95	2.95	0.00	0.00	0.00	0	1.40	4.13	12.27
AVC032	WK3	232.92	234.11	1.19	1.19	0.00	0.00	0.00	0	1.40	1.67	9.50
AVC032	MAU	246.25	247.54	1.29	1.29	0.00	0.00	0.00	0	1.40	1.81	12.14
AVC032	MAL	256.11	256.85	0.74	0.74	0.00	0.00	0.00	0	1.40	1.04	8.57
AVC033	WK1	207.00	208.20	1.20	1.20	0.00	0.00	0.00	0	1.40	1.68	207.00
AVC033	WK2	218.30	221.70	3.40	3.40	0.00	0.00	0.00	0	1.40	4.76	10.10
AVC033	MA	229.80	231.00	1.20	1.20	0.00	0.00	0.00	0	1.40	1.68	8.10
AVC033	PF	242.50	244.00	1.50	1.50	0.00	0.00	0.00	0	1.40	2.10	11.50

An example of a Seam Summary (right-hand columns):



Hole	Seam	Strip_Rat	Cum_Coal_Thick	Cum_Coal_Mass	Cum_Burden	Cum_Strip_Rat	Lithology
AVC030C	WK2	78.26	2.69	3.77	294.73	78.26	COAL 100%
AVC031C	WK2	49.65	3.38	4.73	234.95	49.65	COAL 100%
AVC031C	WK3	4.72	4.64	6.50	243.28	37.45	COAL 100%
AVC031C	MAU	6.02	5.99	8.39	254.65	30.37	COAL 96%, Carbonaceous
AVC032	WK1	255.69	0.58	0.81	207.62	255.69	COAL 87%, Claystone 13%
AVC032	WK2	2.97	3.53	4.94	219.89	44.49	COAL 100%
AVC032	WK3	5.70	4.72	6.61	229.39	34.71	COAL 100%
AVC032	MAU	6.72	6.01	8.41	241.53	28.71	COAL 100%
AVC032	MAL	8.27	6.75	9.45	250.10	26.47	COAL 100%
AVC033	WK1	123.21	1.20	1.68	207.00	123.21	COAL 100%
AVC033	WK2	2.12	4.60	6.44	217.10	33.71	COAL 100%
AVC033	MA	4.82	5.80	8.12	225.20	27.73	COAL 100%
AVC033	PF	5.48	7.30	10.22	236.70	23.16	COAL 100%

The summary includes the fields:

- **Hole** Hole name
- **Seam** Seam name
- **From** From depth of seam
- **To** To depth of seam
- **Thickness** The seam thickness – the difference between the From and To Depths. This thickness includes partings and core loss.

- **Coal** Thickness of coal in the seam. Whether a lithology is coal or not is determined by whether the lithology has a value of COAL or not in its Group column in the current Geology Dictionary, may include core loss – see following section.
- **Partings** Thickness of all lithologies in the seam that are not coal, may include core loss – see following section.
- **Core Loss** Thickness of all lithologies in the seam that have CORELOSS or CORE LOSS in the Group column of its lithotype's entry in the current Geology Dictionary
- **Cored** Thickness of the seam whose Bit Type in the corresponding drilling data has CORED in the Group column in the current Drilling Dictionary
- **Recovery** The linear recovery – the percentage of the seam length that is cored and not recorded as Core Loss in the geology.
- **Coal_Density** Coal density, for use in strip ratio calculations,
- **Coal_Mass** Coal mass per square metre,
- **Burden** Thickness of over/interburden,
- **Strip_Rat** Burden thickness/coal mass (strip ratio), in bank cubic metres per tonne of coal.
- **Cum_Coal_Mass** Cumulative coal mass per square metre,
- **Cum_Burden** Cumulative thickness of over/interburden,
- **Cum_Strip_Rat** Cumulative strip ratio (cumulative burden / cumulative coal mass),
- **Lithology** List of lithotypes and their percentages for the seam

The cumulative values include the combination of all the overlying values

9.3.4.1 Determining Whether a Core Loss is Coal or Non-Coal

For the purposes of dividing the seam into coal and partings, any core loss is allocated to one or the other. If the core loss is adjacent to coal, it is considered coal, otherwise it is considered parting. When deciding whether a core loss is to be regarded as coal or non-coal, four situations can be distinguished, based on whether the core loss is overlain/underlain by coal/non coal. The core loss is considered coal for the first three and non-coal for the last.

Coal
Core Loss
Coal

1. Core loss is regarded as coal

Non-coal
Core Loss
Coal

2. Core loss is regarded as coal

Coal
Core Loss
Non-coal

3. Core loss is regarded as coal

Non-coal
Core Loss
Non-coal

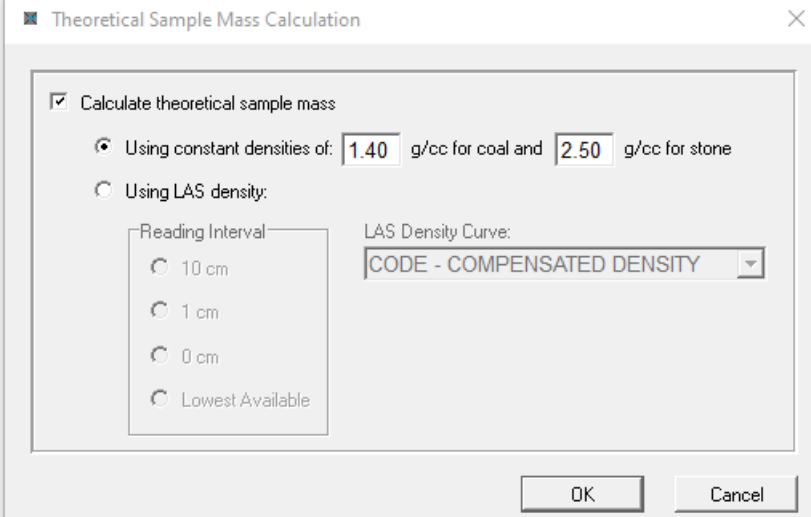
4. Core loss is regarded as parting

9.3.5 Samples Summary

The Samples Summary displays a summary of the samples taken for each hole. This is useful for tracking samples and producing sample tags.

To create a Samples Summary, select **Files > Open > Summary > Samples** from the *LogCheck* menu, then select the required holes to be included from the standard hole selection popup window.

The Theoretical Sample Mass Calculation popup window is then displayed:



Theoretical Sample Mass Calculation

☒ Calculate theoretical sample mass

☒ Using constant densities of: g/cc for coal and g/cc for stone

☐ Using LAS density:

Reading Interval:

- ☐ 10 cm
- ☐ 1 cm
- ☐ 0 cm
- ☐ Lowest Available

LAS Density Curve:

OK Cancel

If the “Calculate theoretical sample mass” box is checked, a theoretical sample mass is calculated for each sample by multiplying the sample length by drill hole cross-sectional area (derived from the core size in the drilling data) by a density which can either be derived by using a specified density for each of coal and stone or from a density from the LAS data. The sample mass as measured either in the field or by the laboratory can be compared to this to determine the volume recovery for the sample. The theoretical sample mass can also be used as a check that samples have not been confused, as the laboratory recorded sample mass cannot be greater than the theoretical sample mass.

An example of a Sample Summary (left-hand columns):

LogCheck - [C:\LogData\AVOCA\SAMPLESUMMARY\ALL_HOLES (ReadOnly)]

FileEditViewToolsSettingsHelp

	Hole	SP	SampNum	From	To	Thick	Coal	Core_Loss	Cored	LinearRecov	FromSeam	FromPly	ToSeam	ToPly
▶	AVC030C		003130	294.43	294.73	0.30	0.00	0.00	0.30	100	WK2_RF		WK2_RF	
	AVC030C		003131	294.73	294.89	0.16	0.16	0.00	0.16	100	WK2		WK2	
	AVC030C		003126	294.89	295.68	0.79	0.79	0.00	0.79	100	WK2		WK2	
	AVC030C		003127	295.68	296.45	0.77	0.77	0.00	0.77	100	WK2		WK2	
	AVC030C		003128	296.45	297.23	0.78	0.78	0.00	0.78	100	WK2		WK2	
	AVC030C		003129	297.23	297.58	0.35	0.19	0.00	0.35	100	WK2		WK2	
	AVC030C		003132	297.58	297.88	0.30	0.00	0.00	0.30	100				
	AVC031C		000501	234.06	234.95	0.89	0.00	0.00	0.89	100	WK2_RF		WK2_RF	
	AVC031C		000502	234.95	235.04	0.09	0.09	0.00	0.09	100	WK2		WK2	
	AVC031C		000503	235.04	235.09	0.05	0.05	0.00	0.05	100	WK2		WK2	
	AVC031C		000504	235.09	235.28	0.19	0.19	0.00	0.19	100	WK2		WK2	
	AVC031C		000505	235.28	235.75	0.47	0.47	0.00	0.47	100	WK2		WK2	
	AVC031C		000506	235.75	235.99	0.24	0.24	0.00	0.24	100	WK2		WK2	
	AVC031C		000507	235.99	236.24	0.25	0.25	0.00	0.25	100	WK2		WK2	
	AVC031C		000508	236.24	236.41	0.17	0.17	0.00	0.17	100	WK2		WK2	

Hole Name

An example of a Sample Summary (right-hand columns):

Hole	SP	SampNumb	DrillDate	CoSz	Density	TheoryMass	DispatchMass	VolRecov	Lithology
AVC030C		003130	24/02/2004	63	2.50	2.34	2.10	89.7	Sandstone 100%
AVC030C		003131	24/02/2004	63	1.40	0.70	0.45	64.3	COAL 100%
AVC030C		003126	24/02/2004	63	1.40	3.45	3.15	91.3	COAL 100%
AVC030C		003127	24/02/2004	63	1.40	3.36	3.25	96.7	COAL 100%
AVC030C		003128	24/02/2004	63	1.40	3.40	3.35	98.5	COAL 100%
AVC030C		003129	24/02/2004	63	1.90	2.08	2.00	96.2	COAL 54%, Sandstone 46%
AVC030C		003132	24/02/2004	63	2.50	2.34	2.35	100.4	Sandstone 100%
AVC031C		000501	05/03/2003	64	2.50	7.16	.	.	Mudstone 25%, Sandstone 1%,
AVC031C		000502	05/03/2003	64	1.40	0.41	.	.	COAL 100%
AVC031C		000503	05/03/2003	64	1.40	0.23	.	.	COAL 100%
AVC031C		000504	05/03/2003	64	1.40	0.86	.	.	COAL 100%
AVC031C		000505	05/03/2003	64	1.40	2.12	.	.	COAL 100%
AVC031C		000506	05/03/2003	64	1.40	1.08	.	.	COAL 100%
AVC031C		000507	05/03/2003	64	1.40	1.13	.	.	COAL 100%
AVC031C		000508	05/03/2003	64	1.40	0.77	.	.	COAL 100%

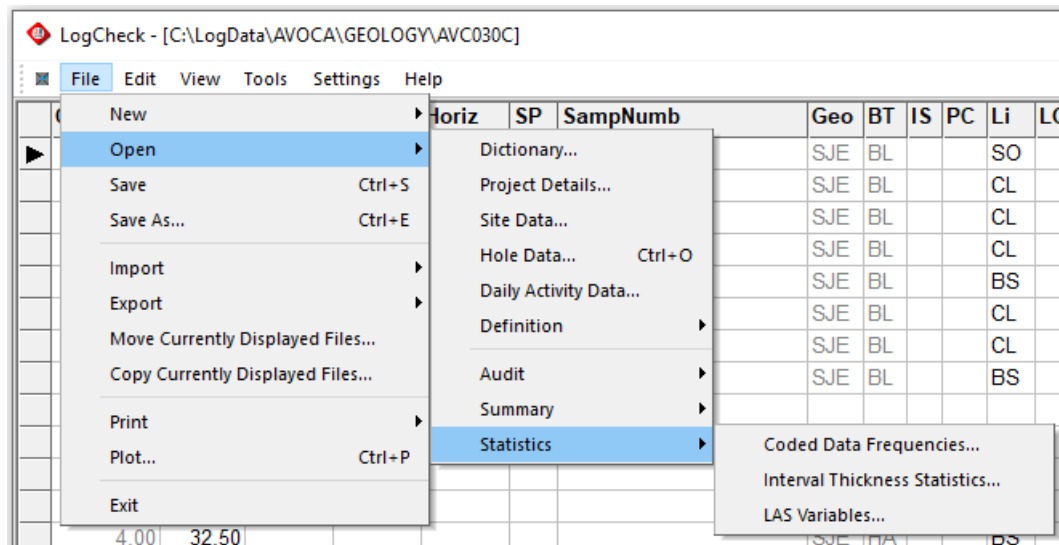
The summary includes the fields:

- **Hole** Hole name
- **SP** Sample purpose
- **SampNumb** Sample number
- **From** From depth of sample
- **To** To depth of sample
- **Thick** Difference between the From and To depths
- **Coal** Thickness of the coal in the sample. Whether a lithology is coal or not is determined by whether the lithology has a value of COAL or not in its Group column in the current Geology Dictionary.
- **Core Loss** Thickness of all lithologies in the seam that have CORELOSS or CORE LOSS in the Group column of its lithotype's entry in the current Geology Dictionary
- **Cored** Thickness of the seam whose Bit Type in the corresponding drilling data has CORED in the Group column in the current Drilling Dictionary
- **LinearRecov** The linear recovery – the percentage of the seam length that is cored and not recorded as Core Loss in the geology.
- **FromSeam** Top seam in the sample. If the top of the sample is in the roof of a seam, then this field will display the seam name followed by the letters RF.
- **FromPly** Top ply in the sample
- **ToSeam** Bottom seam in the sample. If the bottom of the sample is in the floor of a seam, then this field will display the seam name followed by the letters FL.
- **ToPly** Bottom ply in the sample
- **DrillDate** Date of drilling, as derived from drilling data,
- **CoSz** Core size, as derived from drilling data,
- **Density** The estimated density of the sample, calculated either by applying the user specified densities for coal and stone or from the geophysics.
- **TheoryMass** Theoretical sample mass – assuming 100% core recovery.
- **DispatchMass** Mass of the sample in kilograms measured before it is dispatched
- **VolRecov** The ratio of the DisptachMass to TheoryMass as a percentage
- **Lithology** Summary of the sample's lithology.

To produce sample tags from the summary select File > Export > Sample Tags from the *LogCheck* menu.

9.4 Statistics

To open a statistical analysis, select File > Open > Statistics from the *LogCheck* menu:



9.4.1 Coded Data Frequencies Statistics

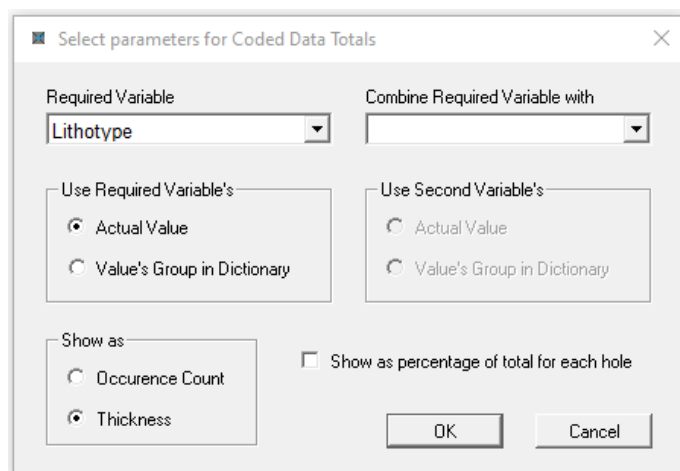
The Coded Data Frequencies displays the frequency of occurrence of each required variable in the selected hole(s) and intervals, either a direct count of the number of occurrences or weighted by thickness. Each selected variable can be analysed by its actual value, or by the value's group in its dictionary. A second variable can optionally also be selected to be combined with the first.

To create a Coded Data Frequencies Statistics, select Files > Open > Statistics > Coded Data Frequencies Statistics from the *LogCheck* menu, then select the required holes and intervals to be included from the standard hole selection popup window.

9.4.1.1 Example 1: Sum of Coded Value Thicknesses

This example sums the thicknesses of the LithoTypes in the 5m of roof of the WK2 seam. It uses an interval definition called WK2_Roof_5m to select these intervals (see Section 6.6 – Creating/Editing Interval Definitions). The results may then be used to see how the roof of the seam varies over the deposit.

The required parameters for this are:



The generated statistics are:

Hole	From	To	CO	MS	SD	SS	ST	XH	XM	XT	Blank	Total
AVC030C	289.73	294.73	0.00	0.00	0.05	4.88	0.07	0.00	0.00	0.00	0.00	5.00
AVC031C	229.95	234.95	0.00	0.22	0.03	1.66	0.46	1.48	0.22	0.93	0.00	5.00
AVC032	215.47	220.47	0.00	0.00	0.00	1.47	3.53	0.00	0.00	0.00	0.00	5.00
AVC033	213.30	218.30	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	5.00
AVC034	220.49	225.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	5.00
AVC035	258.00	263.00	1.00	0.00	0.00	0.00	4.00	0.00	0.00	0.00	0.00	5.00
AVC036C	229.27	234.27	0.00	0.00	0.00	3.12	1.33	0.00	0.55	0.00	0.00	5.00
AVC037R	223.85	228.85	0.00	0.00	0.00	2.15	2.85	0.00	0.00	0.00	0.00	5.00
AVC038	252.17	257.17	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	5.00
AVC039	298.86	303.86	0.00	0.00	0.00	1.14	3.86	0.00	0.00	0.00	0.00	5.00

If the Show as Percentage of Total for Each Hole box is ticked in the parameters window, the results are shown as a percentage of the 5 metres of roof, rather than the actual thickness:

Hole	From	To	CO	MS	SD	SS	ST	XH	XM	XT	Blank	Total
AVC030C	289.73	294.73	0.0	0.0	1.0	97.6	1.4	0.0	0.0	0.0	0.0	100.0
AVC031C	229.95	234.95	0.0	4.4	0.6	33.2	9.2	29.6	4.4	18.6	0.0	100.0
AVC032	215.47	220.47	0.0	0.0	0.0	29.4	70.6	0.0	0.0	0.0	0.0	100.0
AVC033	213.30	218.30	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	100.0
AVC034	220.49	225.49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	100.0
AVC035	258.00	263.00	20.0	0.0	0.0	0.0	80.0	0.0	0.0	0.0	0.0	100.0
AVC036C	229.27	234.27	0.0	0.0	0.0	62.4	26.6	0.0	11.0	0.0	0.0	100.0
AVC037R	223.85	228.85	0.0	0.0	0.0	43.0	57.0	0.0	0.0	0.0	0.0	100.0
AVC038	252.17	257.17	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	100.0
AVC039	298.86	303.86	0.0	0.0	0.0	22.8	77.2	0.0	0.0	0.0	0.0	100.0

9.4.1.2 Example 2: Sum of Coded Value's Dictionary Group Thicknesses

This example again sums the thicknesses of the LithoTypes in the 5m of roof of the WK2 seam using the interval definition called WK2_Roof_5m. However, the user has first set the Group in the LithoType category of the current Geology Dictionary to COAL for all coals and CARB_SED for all carbonaceous LithoTypes.

The required parameters for this are:

Select parameters for Coded Data Totals

Required Variable: **Lithotype**

Combine Required Variable with:

Use Required Variable's:

- ☐ Actual Value
- ☒ Value's Group in Dictionary

Use Second Variable's:

- ☐ Actual Value
- ☐ Value's Group in Dictionary

Show as:

- ☐ Occurrence Count
- ☒ Thickness

☒ Show as percentage of total for each hole

OK Cancel

The generated statistics are:

Hole	From	To	COAL	CARB_SED	Blank	Total
AVC030C	289.73	294.73	0.00	0.00	5.00	5.00
AVC031C	229.95	234.95	0.00	2.63	2.37	5.00
AVC032	215.47	220.47	0.00	0.00	5.00	5.00
AVC033	213.30	218.30	0.00	0.00	5.00	5.00
AVC034	220.49	225.49	0.00	5.00	0.00	5.00
AVC035	258.00	263.00	1.00	0.00	4.00	5.00
AVC036C	229.27	234.27	0.00	0.55	4.45	5.00
AVC037R	223.85	228.85	0.00	0.00	5.00	5.00
AVC038	252.17	257.17	0.00	0.00	5.00	5.00
AVC039	298.86	303.86	0.00	0.00	5.00	5.00

Hole Name

9.4.1.3 Example 3: Occurrence Count of Combined Variables

This example counts the number of occurrences of each combination of Surface Shape and Roughness in a set of Defect. When selecting the data, Defects was selected for Data Type in the standard Hole Selection popup window.

The required parameters for this are:

Select parameters for Coded Data Totals

Required Variable: **Surface Shape**

Combine Required Variable with: **Surface Roughness**

Use Required Variable's:

- ☒ Actual Value
- ☐ Value's Group in Dictionary

Use Second Variable's:

- ☒ Actual Value
- ☐ Value's Group in Dictionary

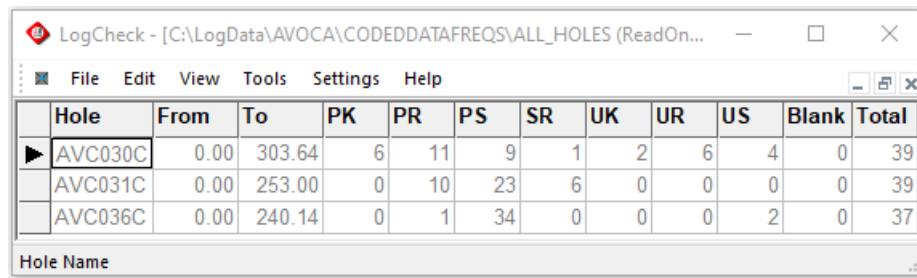
Show as:

- ☒ Occurrence Count
- ☐ Thickness

☐ Show as percentage of total for each hole

OK Cancel

The generated statistics are:

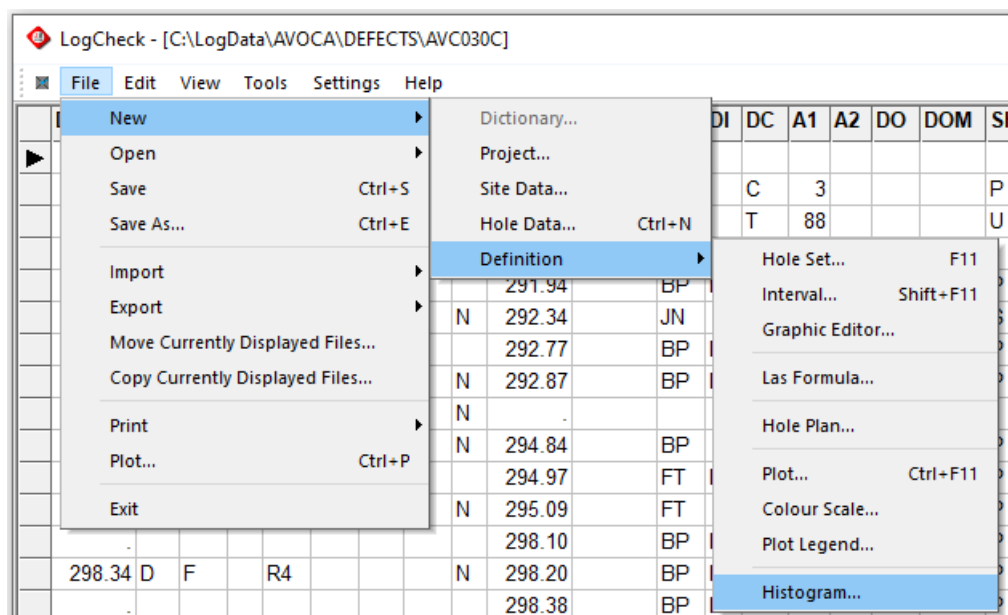


Hole	From	To	PK	PR	PS	SR	UK	UR	US	Blank	Total
AVC030C	0.00	303.64	6	11	9	1	2	6	4	0	39
AVC031C	0.00	253.00	0	10	23	6	0	0	0	0	39
AVC036C	0.00	240.14	0	1	34	0	0	0	2	0	37

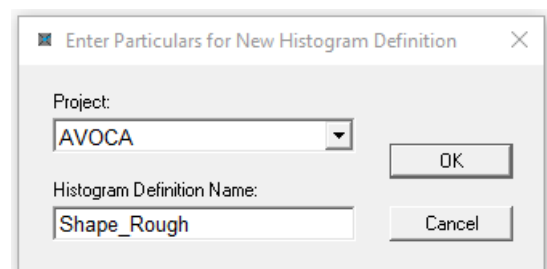
These results may be a useful to assess how the likelihood of slipping across defects changes over the deposit.

When using combinations of two variables, it is only viable for categories with a small number of entries, such as Defect Shape and Roughness as *LogCheck* creates a temporary category for every combination of the two variables. For example, if your data format is CoalLog, and you select Lithology and Estimated Strength, there are 97 lithologies and 18 estimated strengths. *LogCheck* attempts to categorise data into 97 x 18 groups, that is 1746 categories. This number exceeds the maximum allowable of 1020 combinations.

LogCheck can produce a histogram from the generated statistics. However, one must first create an appropriate Histogram Definition by selecting:



A popup window then requests a project and name for the new definition:



Next select the required option:

In this example, the histogram will group data together by hole, and display all categories.

By entering a list of specified categories, the user can control the order that the categories appear on the histogram.

Histogram Definition: Shape_Rough_Holes

Group together data for each:

☒ Hole

☐ Category

Display:

☒ All Categories

☐ Specified Categories:

After the histogram definition is created, display the required statistics in *LogCheck*, then select File > Plot from the *LogCheck* menu and select the required definition:

Select Histogram Definition to open

Project:

AVOCA

OK

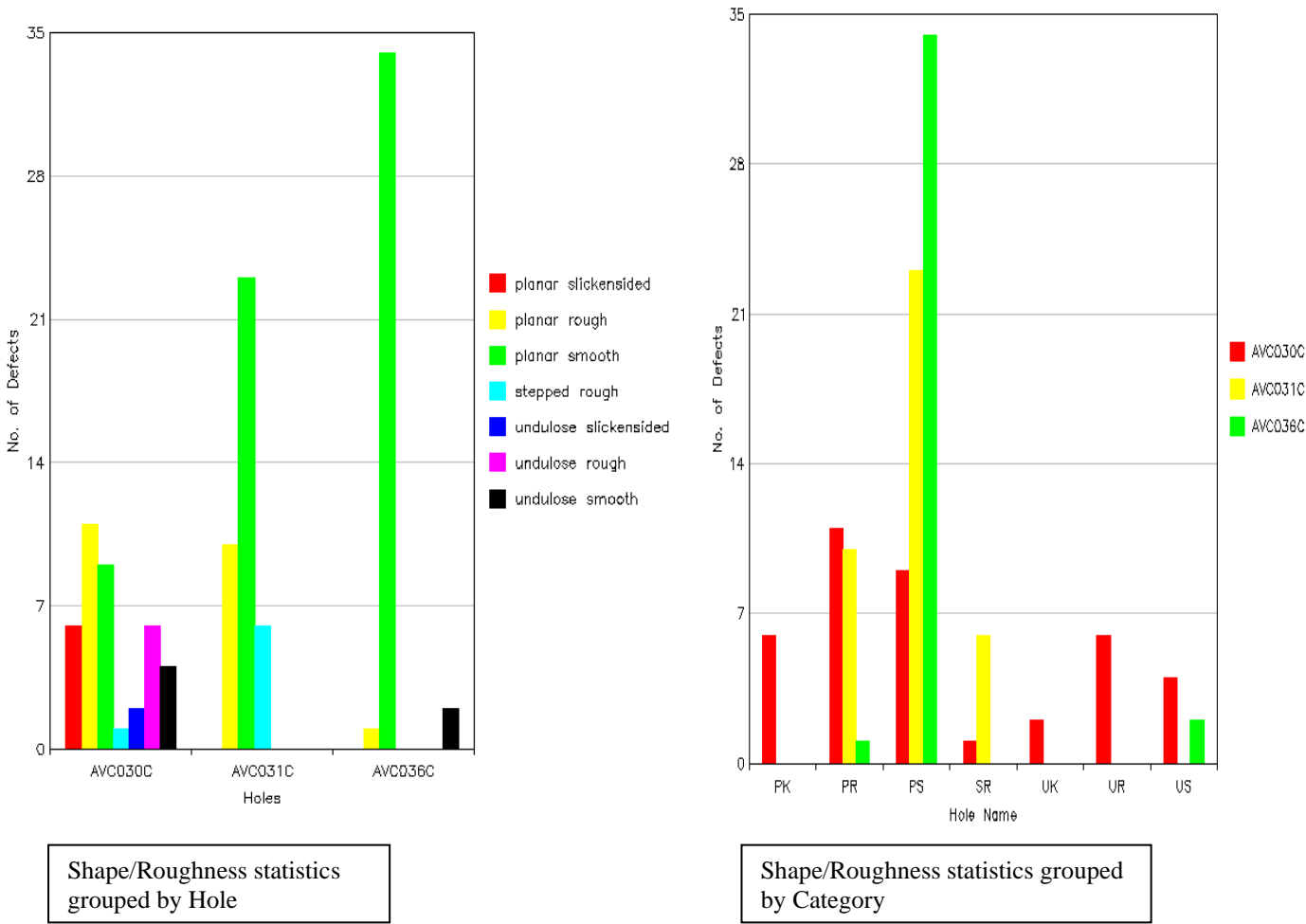
Histogram Definition Name:

Shape Rough Holes

Cancel

Finally, the user is prompted for the folder and filename for the plot to be generated.

The resulting plots for the above generated statistics:



9.4.2 LAS Variables Statistics

Las Variables Statistics generates statistics such as minimum, maximum, mean, standard deviation etc for the user selected LAS variables for specified holes and intervals within the holes.

To create a Coded Data Frequencies Statistics, select Files > Open > Statistics > Coded Data Frequencies Statistics from the *LogCheck* menu, then select the required holes and intervals to be included from the standard hole selection popup window.

Next select the required LAS variables:

Select Variables to Open	
<input type="checkbox"/> ADEN	<input type="checkbox"/> DEPD
<input type="checkbox"/> AXLE	<input type="checkbox"/> GRDE
<input type="checkbox"/> AXLN	<input type="checkbox"/> LSDU
<input type="checkbox"/> AZID	<input type="checkbox"/> MC2A
<input type="checkbox"/> BBRG	<input checked="" type="checkbox"/> MC2F
<input type="checkbox"/> BRAD	<input type="checkbox"/> MC2U
<input type="checkbox"/> BRDU	<input type="checkbox"/> MC4F
<input type="checkbox"/> BRG1	<input type="checkbox"/> MC6F
<input type="checkbox"/> BRG2	<input type="checkbox"/> RAD1
<input type="checkbox"/> BRG3	<input type="checkbox"/> RAD2
<input type="checkbox"/> BRG4	<input type="checkbox"/> RAD3
<input type="checkbox"/> CADE	<input type="checkbox"/> RAD4
<input type="checkbox"/> CODE	<input type="checkbox"/> SPOR
<input type="checkbox"/> DECR	<input type="checkbox"/> TDEP
<input type="checkbox"/> DENB	<input type="checkbox"/> TILD
<input type="checkbox"/> DENL	

Tick All Tick None OK Cancel

Next select the step interval data to include in the statistics:

Select Las Parameters

Reading Interval: ☐ 10 cm ☒ 1 cm ☐ Lowest Available

Depth Adjustment: Add: metres to each depth

Variables to be Calculated:

☒ **UCSCALC** — UCS from Sonic using Project Details' Formula
Sonic Curve:

☐ **UCSCALC** — Calculated from a LAS Formula
LAS Formula:

☐ **RSI** — Roof Strength Index using:
Density Curve:
UCS:

Replace missing densities with: ☒ Average rock density for hole
☐ g/cc

OK Cancel

Generated LAS Variables Statistics for MC2F:

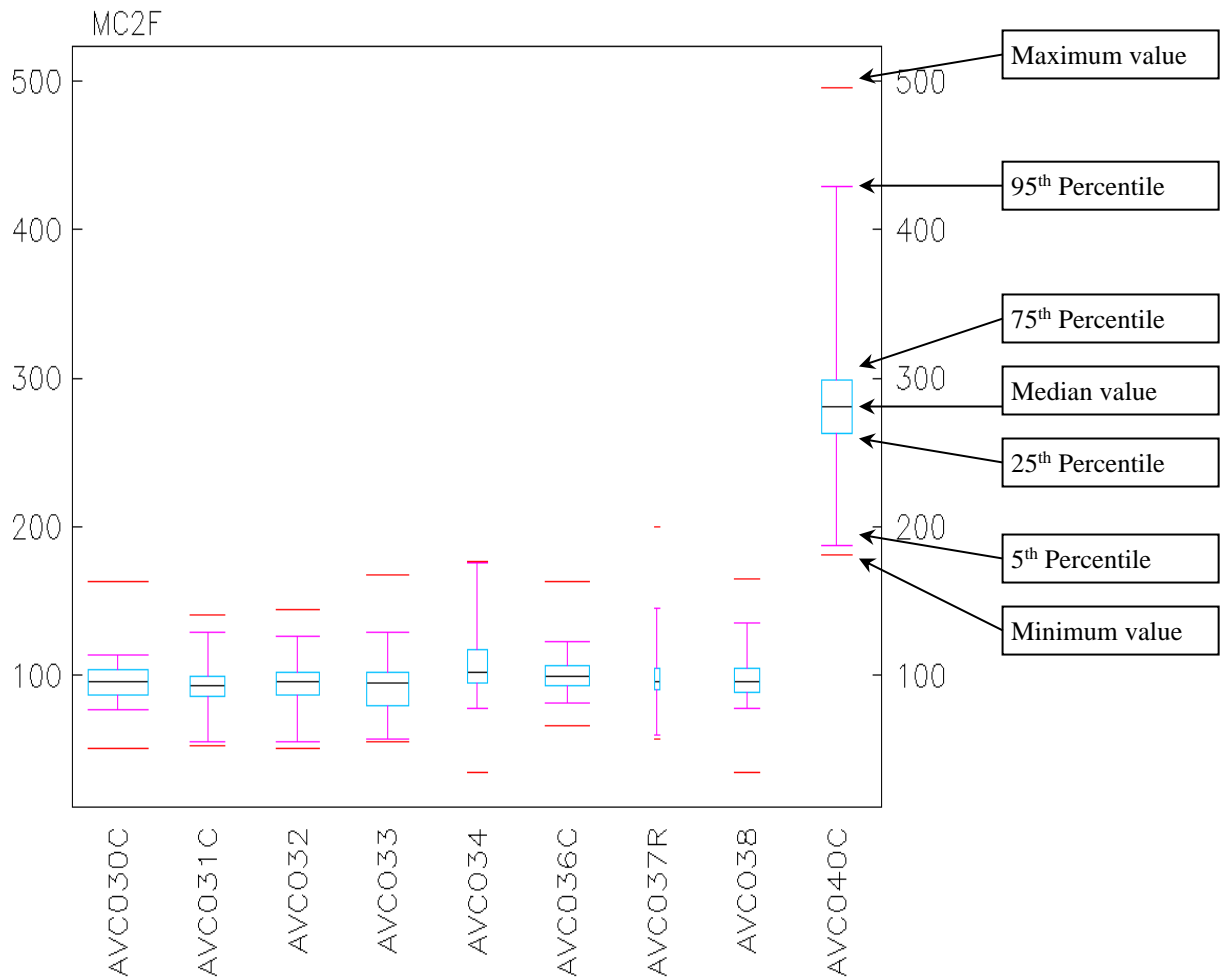
FileName	Hole	Variable	Units	No	NoMissing	Minimum	Maximum	Mean	StdDev	Percentile_05	Percentile_25	Median	Percentile_75	Percentile_95
AVC030C_GN	AVC030C	MC2F	US/F	19160	0	51.000	163.500	95.182	12.639	76.500	87.000	96.000	103.500	114.000
AVC031C_GN	AVC031C	MC2F	US/F	10991	0	52.500	141.000	92.821	16.605	55.500	85.500	93.000	99.000	129.000
AVC032GN	AVC032	MC2F	US/F	13681	0	51.000	144.000	94.352	16.736	55.500	87.000	96.000	102.000	126.150
AVC033GN	AVC033	MC2F	US/F	13390	0	55.500	168.000	90.579	21.077	57.000	79.500	94.500	102.000	129.000
AVC034GN	AVC034	MC2F	US/F	6504	0	34.500	177.000	109.107	27.022	78.000	94.500	102.000	117.000	175.500
AVC036C_GN	AVC036C	MC2F	US/F	13945	0	66.000	163.500	100.662	12.569	81.000	93.000	99.000	106.500	123.000
AVC038GN	AVC038	MC2F	US/F	7894	0	34.500	165.000	98.362	16.015	78.000	88.500	96.000	105.000	135.000

The includes the fields:

- **Filename** Name of LAS file
- **Hole** Name of Hole in the file
- **Variable** Geophysical variable code
- **Units** Unit of measurement
- **No** Number of non-missing values
- **NoMissing** Number of missing values
- **Minimum** Minimum value encountered in each file
- **Maximum** Maximum value encountered in each file
- **Mean** Sum of all values divided by the number of non-missing values
- **StDev** Standard deviation, which is a measure of the variation from the average
- **Percentile_05** 5th percentile, that is the value below which 5% of the values occur
- **Percentile_25** 25th percentile, that is the value below which 25% of the values occur
- **Median** Value below which 50 % of the values occur, that is, the middle value in the sorted list of all values
- **Percentile_75** 75th percentile, that is the value below which 75% of the values occur
- **Percentile_95** 95th percentile, that is the value below which 95% of the values occur

These can then be displayed as a Box & Whisker plot. This can be useful for checking the calibration between holes and for selecting a scale to display the LAS variables. To produce a Box & Whisker plot, after the LAS statistics are displayed in *LogCheck*, select File > Plot from the *LogCheck* menu. Then select the folder and filename for the plot.

The plot for the above results:



Box and Whisker plots are a useful graphical summary of the spread or variation in a set of data values. In the above plot, each of the horizontal bars represents the minimum, 5th quartile, median, 95th quartile and maximum values for each hole. The box itself represents where half the number of values lie. The bottom bar of the box represents the 25th percentile and the top bar of the box represents the 75th percentile. The width of the box is proportional to the number of values in the list of values.

Chapter 10

Printing and Exporting

By the end of this chapter you will be able to:

- Print dictionaries and data as tables.
- Print dictionaries, data and summaries as reports.
- Print sample tags for sample bags.
- Export data to other file formats.
- Move or Copy multiple *LogCheck* files between projects or computers.

10.1 Introduction

LogCheck can print dictionaries and hole data as both tables and reports. It can also print reports for hole summaries and generate Sample Tags for sample bags.

LogCheck can export all dictionaries, data, audits, summaries and statistics in a variety of formats including CSV and TXT files.

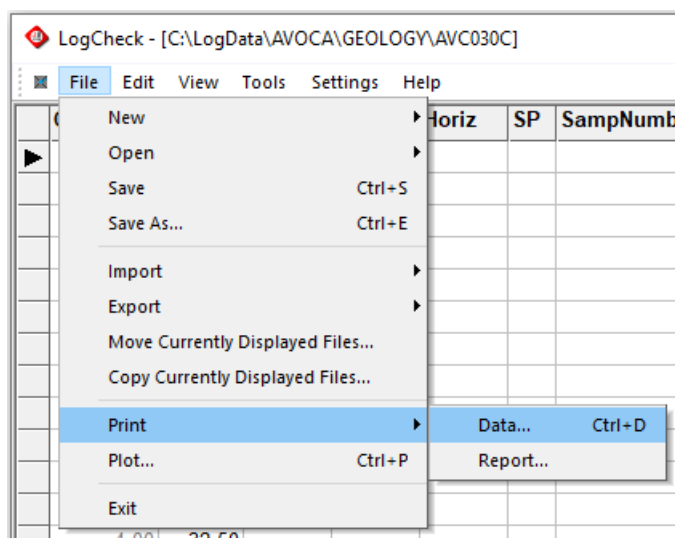
It also has a facility for Moving or Copying as *LogCheck* files, all the data for specific holes between projects or computers.

All example print-outs in this chapter for both tables and reports, display the GeoCheck logo in the top left-hand corner but the user can supply their own logo by entering the name of the file that contains their logo in the Project Company Logo box in the Project Details for their project (see Section 4.4.4 Company Project Logo).

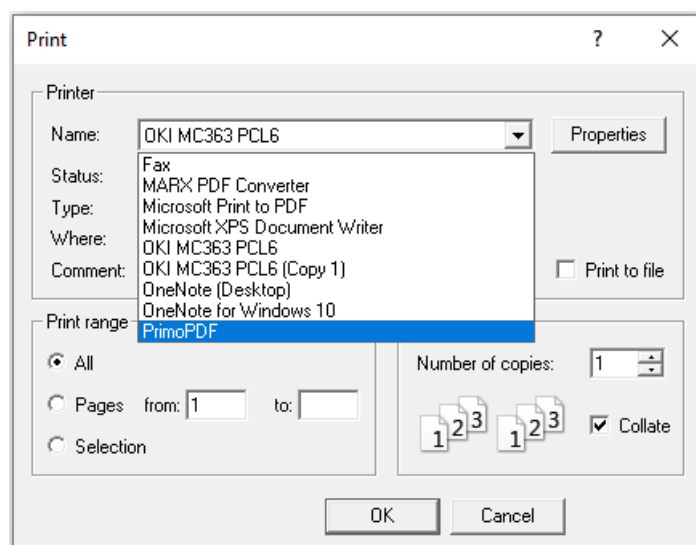
10.2 Printing Data

LogCheck can print all its dictionaries and data as tables. The dictionary tables look similar to how they appear on the screen and the data tables look similar to hand written coding sheets of the data.

To print the currently open dictionary or data select:



Next select the required printer:



To create a PDF file of the output select a PDF writer as the printer. If you do not have one installed, the producers of *LogCheck* recommend the freeware PrimoPDF available from:

<https://www.gonitro.com/primopdf>

If logging boreholes directly into *LogCheck* in the field, it is highly recommended that one regularly creates PDF's of the coded data and save these to flash disk so that if anything happens to the tablet then the data can be later re-entered from the PDF's.

10.2.1 Printing Dictionary Categories

An example of printing the LithoType category of the Geology Dictionary:

geoCheck GEOLOGICAL DATA SPECIALISTS		ACTIVITY Geology Dictionary - Lithotype										Page 1 of 4	
Code	Description for Code	Order entry to be	Lithotype Group	Comma Before	Primary Pattern for	Secondary Pattern for	Colour for Plotting	Fill for Plotting	Fill Colour for Plotting	Background Colour for Plotting	User Comments		
AI	Acid/Felsic Intrusive				IN3		241			241			
AL	Alluvium				AL3		51			51			
AN	Andesite				VR3		140			140			
AV	Acid/Felsic Volcanic				VR2		140			140			
BC	Brown Coal							BC					
BI	Basic/Mafic Intrusive				IN5		241			241			
BO	Boulders				BO1		40			40			
BR	Breccia				BR3		40			40			
BS	Basalt				VR4		140			140			
BU	Basement Undifferentiated				BU1	MM1	6			6			
BV	Basic/Mafic Volcanic				VR4		140			140			
BW	Burnt Wood / Charcoal				FW1			COCI					
CA	Calcite				CA1		131			131			
CB	Carbonate				LS3		131			131			
CC	Calcrete				CR1	C1	131			131			
CG	Conglomerate				CGPP		40			40			
CH	Chert				CH1		32			32			
CK	Chalk				CK1		131			131			
CL	Clay				CL1		254			254			
CO	Coal		COAL					CO	4				
CS	Claystone				CS1		254			254			
CV	Colluvium				CV		40			40			
CW	Weathered Coal							CI					
DE	Diatomaceous Earth				AL1	DI	92			92			
DI	Diamictite				TI1		92			92			
DM	Dolomite				DM1		131			131			
DO	Dolerite				DO1		140			140			
FB	Fault Breccia				FB1		40			40			
FC	Fireclay				FR	CL6	254			254			

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LogCheck Software System

10.2.2 Printing Actual Data

An example of printing Geology Data:

geoCheck GEOLOGICAL DATA SPECIALISTS		Avoca Lithology Log										Hole AVC030C Page 1 of 8																	
Calculated Thickness	Interval Base Depth	Seam Name	Ply Name	Horizon Name	Sample Purpose	Field Sample Number	Sample Number	Geologist's Initials from Geology File	Interval Status	Lithology Descriptor										Geotechnical				Mechanical		Sedimentology		Minerals	
										Lithotype	Lithology Qualifier	Stratigraphic Unit	Colour	Adjective #1	Adjective #2	Adjective #3	Adjective #4	Interrelationships	Weathering	Estimated Strength	Bedding Spacing	Defect Type	Defect Inset	Defect Spacing	Defect Dip Angle	Core State	Mechanical State	Texture	Bed Contact
1.000	1.000									SO	D	DR	CL	MX	FE			W	C4										
2.000	3.000									CL	E	B	G	SA	FE			W	C5										
5.500	8.500									CL	L	C	B	MN	XX	ND		W	C5										
4.200	12.700									CL	L	B	C	FE				W	C5										
1.500	14.200									BS	E	B	G	RA	XX			W	R4			VU							
1.800	16.000									CL	L	C	B	AL	BS			W	C2										
3.000	19.000									CL	L	E	C	LI	RA	XX	ND		D	C2									
5.000	24.000									BS	E	B	G	AB	CL	BN	FE		D	R4									
													LI																
1.000	25.000									CL	L	F	C	AL	BS	LI			D	C2									
1.000	26.000									CL	L	C	B	RA	XX	ND			D	C2									
2.500	28.500									BS	D	B	G	FE	RA	XX			S	R5		VN							
4.000	32.500									BS	D	E	G	RA	XX				S	R5		VN							
2.000	34.500									BS	E	B	G	CL	FE				D	R4			XL						
3.500	38.000									BS	D	E	G	RA	FE	BN			S	R5				XL					
3.500	41.500									BS	E	B	G	FE	LI	CL			D	R4									
5.500	47.000									BS	D	E	G	RA	XX				F	R5		VN							
5.400	52.400									BS	M	E	G	CL	AB				D	R3									
3.100	55.500									CL	L	E	G	CL	AL	BS			E	R2									
2.000	57.500									BS	M	E	G	CL	AB				S	R3									
3.500	61.000									BS	D	E	G	CL	RA	XX			S	R5		VN							
12.000	73.000									BS	D	E	G	AB	CL	BN			S	R5				XL					
7.000	80.000									BS	D	E	G	AB	CL	BN	FE		S	R4									
5.000	85.000									CL	M	E	G	CL	FE	AL	BS		S	C4									
28.500	113.500			BUTE						CL	M	B	G	CL	FE	AL	BS		S	C4									
				BHWL																									
1.000	114.500									SS	FF	E	G	CL					S	R3									
5.500	120.000									CS	E	G	E	RA	SA	BN			S	R4									

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LogCheck Software System

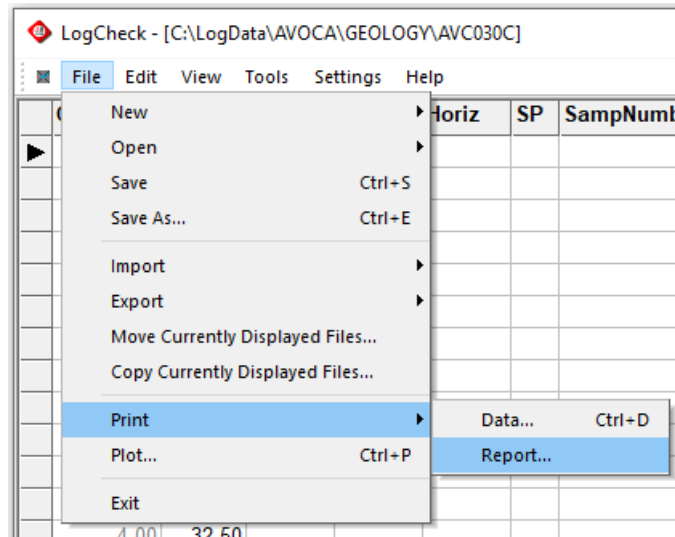
4-Oct-2022 16:33:55

LogCheck Software System

10.3 Printing Reports

LogCheck can print reports for its dictionaries, some of its data types and some of its audits and summaries.

To print the currently open dictionary, data, audit or summary as a report select:



10.3.1 Dictionary Report

An example of the Dictionary Report for a Geology Dictionary:


geoCheck GEOLOGICAL DATA SPECIALISTS		Avoca Geology Dictionary				Page 1 of 4
SAMPLE PURPOSE	CC Calcrete	OB Cobbles	DD dull (<1%)	SHADE		
QP Coal Quality, raw ply (coal, roof, floor or parting)	CG Conglomerate	OS Oil Shale	M1 mid-lustrous to bright	L light		
QB Coal Quality, bulk sample	CH Chert	OW Old Workings	M2 mid-lustrous	A light to medium		
QU Coal Quality, channel sample (underground)	CK Chalk	PC Pellet Claystone	M3 mid-lustrous to dull	C light to dark		
LP Loxline, raw ply (coal, roof, floor or parting)	CL Clay	PE Peat	CU undifferentiated	E medium		
SP Spon. Comb., raw ply (coal, roof, floor or parting)	CO Coal	PH Phyllite	HA heat affected	B medium to dark		
SB Spontaneous Combustion, bulk sample	CS Claystone	PY Pyrite	KC coked	D dark		
SU Spontaneous Combustion, channel sample	CV Colluvium	QT Quartzite	CI cindered	N banded		
GT Geotechnical Sample, laboratory tested	CW Weathered Coal	QZ Quartz	FU fusainous	M mottled		
GF Geotechnical Sample, field tested	DE Diatomaceous Earth	RH Rhyolite	AN anthracite	S speckled		
ME Gas Sample, exploration (virgin)	DI Diamictite	SA Sand	CT cannel (torbanite, bog)	V variegated		
MD Gas Sample, compliance (drained)	DM Dolomite	SC Silcrete	DC dull conchoidal	HUE		
ES Environmental Sample, soil	DO Dolerite	SD Siderite	IF inferior	B brownish		
EO Environmental Sample, overburden characterisation	FB Fault Breccia	SH Shale	SP sapropelic	C creamy		
ER Environmental Sample, reactive ground	FC Fireclay	SI Silt	SY stony	E greenish		
WT Water Quality, laboratory tested	FI Fill / Spoil	SL Slate	CL clayey	F buff		
WF Water Quality, field tested	FK Ferricrete	SO Soil	SI silty	G greyish		
AD Age Dating	FW Fossil Wood	SS Sandstone	SA sandy	K blackish		
PN Petrology	GB Gabbro	ST Siltstone	GV gravelly	L bluish		
PE Petrology	GD Granodiorite	SU Sedimentary Rock, undifferentiated	VV very fine	M multi-coloured		
INTERVAL STATUS	GN Gneiss	SY Syenite	VF very fine to fine	O orange		
A adjusted to geophysics	GR Granite	SZ Schist	VM very fine to medium	P pinkish		
I interpreted from geophysics	GV Gravel	TA Talc	VC very fine to coarse	R reddish		
R raw/uncorrected	GY Gypsum	TF Tuff	VX very fine to extremely coarse	U purplish		
U unknown	IG Igneous Rock, undifferentiated	TI Tillite	FF fine	W whitish		
LITHOTYPE	II Intermediate Intrusive	TN Tonstein	FM fine to medium	X off-whitish		
AI Acid/Felsic Intrusive	IN Intrusive Rock, undifferentiated	TR Trachyte	FC fine to coarse	Y yellowish		
AL Alluvium	IS Ironstone	TS Tar Sand	FX fine to extremely coarse	COLOUR		
AN Andesite	IV Intermediate Volcanic	TT Tuffite	MM medium	B brown		
AV Acid/Felsic Volcanic	KA Kaolinite	VB Volcanic Breccia	MC medium to coarse	C cream		
BC Brown Coal	KK Cone in Cone Carbonate	VD Void	MX medium to extremely coarse	E green		
BI Basic/Mafic Intrusive	KL Core Loss	VR Volcanic Rock, undifferentiated	CC coarse	F buff		
BO Boulders	LA Laterite	KC Carbonaceous Claystone	CK coarse to extremely coarse	G grey		
BR Breccia	LC Lost Coal (from geophysics)	XH Carbonaceous Shale	XX extremely coarse	K black		
BS Basalt	LG Lignite	XM Carbonaceous Mudstone	GG granular	L blue		
BU Basement Undifferentiated	LI Limonite	XS Carbonaceous Sandstone	GP granular to pebbly	M multi-coloured		
BV Basic/Mafic Volcanic	LO Loam	XT Carbonaceous Siltstone	GO granular to cobbly	O orange		
BW Burnt Wood / Charcoal	LS Limestone	ZC Coaly Claystone	GU granular to bouldery	P pink		
CA Calcite	M1 Conglomerate, >65% matrix	ZH Coaly Shale	PP pebbly	R red		
CB Carbonate	M2 Conglomerate, 35-65% matrix	ZM Coaly Mudstone	PO pebbly to cobbly	U purple		
	M3 Conglomerate, <35% matrix	ZS Coaly Sandstone	PU pebbly to bouldery	W white		
	MD Mud	ZT Coaly Siltstone	OJ cobbly	X off-white		
	MM Metamorphic Rock, undifferentiated	LITHOLOGY QUALIFIER	OU cobbly to bouldery	Y yellow		
	MR Missing Record	BR bright (>90% bright coal)	UU bouldery	LITHOLOGY ADJECTIVES		
	MS Mudstone	BB bright with dull bands (60-90%)	CS clay sized	AB abundant (30-60%)		
	MY Mylonite	BD interbanded dull and bright (40-60%)	MS mud sized	AC acidic		
	MZ Monzonite	DB mainly dull with frequent bright bands (10-40%)	TS silt sized	AK arkosic		
	NC Non Coal	DM dull with minor bright bands (1-10%)	SS sand sized			
	NL Not Logged					
	NR No Recovery					

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LogCheck Software System

10.3.2 Activities Report

An example of the Report for a day's Activities:



DAILY EXPLORATION SUMMARY

REPORT DATE: Thursday, 29th August 2019
PROJECT NAME: ACTIVITY

LOCATION	BHID	RIG & NUMBER	GEOLOGIST	PROPERTY	CASING	BASE OF WEATHERING (m)	DRILLED IN DAY					
							OPEN (m)	CORE (m)	DRILLED TO (m)	COMPLETED	SEAMS	WATER FLOWS
190486	AV095_O	Wizard 7	CASSIDY LEWIS		PVC to 10.7m	8.00	97.30	0.00	108.00	Yes	18-19m	
											89-90m	
190439	AV096_O	Wizard 2	Stephen Fullerton		PVC to 2.8m	20.00	122.50	0.00	122.50	Yes	26-29m	
											31-37m	
											42-43m	
											79-82m	
											85-87m	

SITES REHABILITATED:

SAFETY COMMENTS:
 All safe and really well
 Safety theme "Pos Coms"


GENERAL COMMENTS:
 Really good day all round on the north, both Wizard rigs topped 200m. Rig 2 completed AVC082_O (190479) to 158.5m and drilled AVC085_O (190508) to 92.4m. Rig 7 completed AVC081_O (190444) to 120m, completed AVC084_O (190452) to 132m and drilled AVC086_O (190456) to 12m. The marauders from the south arrived today and parked up near their next site 190470. Good day for earthworks as well with another 11 sites cleared. Darren will return on Wednesday to clear more.

PLANNED OPERATIONS (NEXT 24hrs):
 ECD to commence drilling on site 190470 AVC083_O.
 Rig 2 to complete AVC085_O and move to 190413.
 Rig 7 to complete AVC086_O and move to 190467.

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10.3.3 Headers Report


An example of the Report for a hole's Header data:

		<i>Avoca</i> <i>Hole Header</i>		<i>Hole AVC030C</i>
<div> <div> IDENTIFICATION </div> <div> LOCATION </div> </div>				
<i>Basin:</i>	Sydney (Hunter Coalfield)	<i>Height Datum:</i>	Australian Height Datum	
<i>Lease Number:</i>		<i>Location Acc.:</i>	Surveyed	
<i>Site Id:</i>	1000	<i>UTM Zone:</i>	55	
<i>Hole Type:</i>	Partly cored	<i>Easting:</i>	640368.36m	
<i>Data Status:</i>	Final	<i>Northing:</i>	7341537.89m	
<i>Hole Purposes:</i>		<i>Elevation:</i>	212.42m	
		<i>Survey Co.:</i>		
		<i>Survey Date:</i>		
<div> <div> DRILLING </div> <div> ENVIRONMENTAL </div> </div>				
<i>Inclination:</i>	-90°	<i>Standing Water Level:</i>		
<i>Azimuth:</i>	0°	<i>SWL Date:</i>		
<i>Date Started:</i>	20/02/2004	<i>Date Rehabilitated:</i>		
<i>Date Completed:</i>	24/02/2004	<i>Hole Status:</i>		
<i>Total Depth:</i>	303.800m			
<i>Redrill of Hole No.:</i>				
<div> LOGGING </div>				
<i>Geological Organiz.:</i>	Resolve Geological			
<i>Geotech. Log:</i>	No			
<i>Core Photos:</i>	No			
<i>Geophysical Co.:</i>	Weatherford Logging Service			
<i>Geophysical Logger's Name:</i>				
<i>Logs Run:</i>	Caliper, Density, Natural Gamma, Sonic, Verticality			
<div> COMMENTS </div>				
Requires cementing.				

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10.3.4 Casing Report

An example of the Report for a hole's Casing data:

 GEOLOGICAL DATA SPECIALISTS		Avoca Casing Log								Hole AVC030C
										Page 1 of 1
From Depth	To Depth	Calculated Thickness	Casing Material	Casing Type	Casing Name	Outside Diameter (mm)	Inside Diameter (mm)	Casing Grout	Casing Retrieved (m)	Comments
0.00	114.00	114.00	steel			127				
Total Depth: 114.00										

10.3.5 Cementing Report

An example of the Report for a hole's Cementing data:

 geoCheck GEOLOGICAL DATA SPECIALISTS		Avoca Cementing Log			Hole AVC030C
					Page 1 of 1
Length	From Depth	To Depth	Date	Actual Volume (m**3)	Comments
150.00	200.00	350.00	01/02/2014	12.00	
100.00	100.00	200.00	02/02/2014	15.00	
————— Total Depth: 200.00 —————					

10.3.6 Drilling Report

An example of the Report for a hole's Drilling data:

geoCheck GEOLOGICAL DATA SPECIALISTS		Avoca Drilling Log										Hole AVC030C	
												Page 1 of 1	
From Depth	To Depth	Calc. Thick	Rec. Thick	Rec. %	Run No.	Date	Bit. Type	Drill. Fluid	Core Size	Hole Size	Comments		
Contractor: A.C.M. Exploration , Rig type: E60 , Driller: MARK HILL-WEBER													
0.00	28.00	28.00				20/02/2004	blades / drag blades	air		254	DARR DRILLING		
28.00	28.50	0.50				20/02/2004	blades / drag blades	air		165	DARR DRILLING		
28.50	85.00	56.50				20/02/2004	hammer	water injectio		165	DARR DRILLING		
85.00	114.00	29.00				20/02/2004	pcd open	water injectio		165	DARR DRILLING		
114.00	246.00	132.00				21/02/2004	pcd open	water injectio		120	DARR DRILLING		
246.00	284.99	38.99				22/02/2004	pcd core (conventional)	water injectio	63	120	DARR DRILLING		
284.99	287.99	3.00	2.43	81	1	24/02/2004	diamond	water injectio	63	70	DARR DRILLING		
287.99	290.49	2.50	2.34	94	2	24/02/2004	diamond	water injectio	63	70	DARR DRILLING		
290.49	291.29	0.80	1.53	191	3	24/02/2004	diamond	water injectio	63	70	DARR DRILLING		
291.29	294.29	3.00	2.44	81	4	24/02/2004	diamond	water injectio	63	70	DARR DRILLING		
294.29	295.11	0.82	1.38	168	5	24/02/2004	diamond	water injectio	63	70	DARR DRILLING		
295.11	297.80	2.69	2.69	100	6	24/02/2004	diamond	water injectio	63	70	DARR DRILLING		
297.80	300.80	3.00	3.00	100	7	24/02/2004	diamond	water injectio	63	70	DARR DRILLING		
300.80	303.80	3.00	2.85	95	8	24/02/2004	diamond	water injectio	63	70	DARR DRILLING		
Total Depth: 303.80													

10.3.7 Geology Report

An example of the Report for a hole's Geology data:

geoCheck GEOLOGICAL DATA SPECIALISTS		Avoca Lithology Log		Hole AVC030C
				Page 8 of 10
Depth	Thickness	Sample Number	Lithology	
			abundant (30-60%) carbonaceous blebs, fresh, high strength rock, solid core, POINT LOAD.	
			————— Top of Warkworth 2 Seam —————	
294.750	0.020	003131	COAL, stony: fresh, very low strength rock, very broken core.	
294.890	0.140	003131	COAL, stony: fresh, low strength rock, broken core.	
295.680	0.790	003126	COAL: fresh, low strength rock, broken core, GM119, GAS SAMPLE.	
296.450	0.770	003127	COAL: fresh, low strength rock, solid core, GM173, GAS SAMPLE.	
297.230	0.780	003128	COAL: fresh, low strength rock, solid core, GM275, GAS SAMPLE.	
297.420	0.190	003129	COAL: fresh, low strength rock, broken core, GM336, GAS SAMPLE.	
			————— Base of Warkworth 2 Seam —————	
			————— Geological Thickness: 2.690 metres —————	
297.580	0.160	003129	SANDSTONE, fine: medium grey, abundant (30-60%) silty bands, fresh, medium strength rock, solid core, FLOOR, IN ABOVE CANISTER.	
297.720	0.140	003132	SANDSTONE, fine: light grey, abundant (30-60%) carbonaceous, silty laminae (2-20mm), feldspathic, quartzose, fresh, medium strength rock, solid core, POINT LOAD.	
297.880	0.160	003132	SANDSTONE, fine: light grey, abundant (30-60%) carbonaceous, silty laminae (2-20mm), feldspathic, quartzose, fresh, medium strength rock, solid core, POINT LOAD.	

For the Geology report the user has a number of options that they can set by selecting Settings > Options and then selecting the Exporting & Printing tab:

Printed Reports

Geology

Orientation

☒ Portrait

☐ Landscape

☐ Display Seam & Ply columns


☒ Display Seam Top & Base lines

These include:

- Orientation Portrait or Landscape
- Seams & Ply Columns if ticked then as well as columns for Depth, Thickness, Sample Number and Lithology as shown in the above example, columns are included to display the Seam and Ply codes
- Seam Top & Base Lines if ticked then lines are displayed across the report for the top and base of Seams as shown in the example above


10.3.8 Water Flows Report

An example of the Report for a hole's Water Flows data:

		Avoca Water Flows Log							Hole AVC030C	
									Page 1 of 1	
Test Depth	Sample Type	Sample No	Test Type	Flow Ht. (mm's)	Flow Rate (l/s)	pH	Dissolved Solids	Elect. Cond. (uS/cm)	Temp. (deg C)	Comments
61.00			V-Notch		0.60					
Total Depth: 61.00										

10.3.9 Basic Coal Quality Report

An example of the Report for a hole's Basic Coal Quality data:

		Demonstration Coal Quality Project Coal Quality Log											Hole DEMO002	
													Page 1 of 1	
Density & Moisture		Proximate Analysis					Energy			Trace Elements				Comments
Sample Number	Relative Density	Total Moisture	Inherent Moisture	Ash	Volatile Matter	Fixed Carbon	Specific Energy	Calorific Value	Crucib. Swell No	Gieseler Maximum	Total Sulphur	Phosphorus	Chlorine	
G1974/97	1.34		4.10	8.00						3.50				
G1974/98	1.31		4.20	6.00						3.00				
G1974/98	1.53		3.60	31.80						1.00				
G1974/98	1.27		5.30	2.50						4.00				
G1974/10	1.33		4.20	9.20	39.40	47.20	0.00	0		2.50	0.25			
G1974/10	1.28		4.70	4.30	41.40	49.60	31.55	7534		3.00	0.29			
G1974/10	1.36		5.00	10.90	35.80	48.30	28.90	6901		2.00	0.54			
G1974/12	1.38		6.30	16.40						2.00				
G1974/12	1.37		6.80	12.10						1.00				
G1974/12	1.30		5.30	5.50						3.50				
G1974/12	1.32		4.00	5.70						1.00				
G1974/12	1.28		3.90	3.30						3.50				
G1974/12	2.17		4.20	75.20						0.00				
G1974/12	1.30		4.10	4.70						3.50				
G1974/12	1.32		4.30	4.70						1.50				
G1974/12	1.32		5.10	2.30						1.00				
G1974/12	1.50		4.20	26.40						2.50				
G1974/12	1.35		4.10	10.80						4.50				
G1974/12	1.32		4.00	7.10						3.50				
G1974/12	1.51		4.40	29.40						1.00				
G1974/14	1.31		3.50	6.40						4.00				
G1974/14	1.33		4.90	2.50						1.00				
G1974/14	1.30		4.10	1.40						3.50				
G1974/14	1.39		3.40	12.10										
G1974/14	1.28		3.10	2.30										
G1974/15	1.31		6.70	3.60	33.10	56.60	31.05	7415	1.50		0.25			
G1974/15	1.29		5.10	3.90	36.50	54.50	30.65	7319	4.00		0.35			
G1974/16	1.32		5.70	6.00	33.00	55.30	31.50	7522	1.50		0.31			

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10.3.10 Defects Report

An example of the Report for a hole's Defect data:


geoCheck GEOLOGICAL DATA SPECIALISTS		Avoca Defects Log							Hole AVC030C	
									Page 1	
Base Defect	Width (mm)	Defect Type	Dip Orient.	Min. Angle	Max. Angle	Defect Intact	Defect Cont.	Infill Description	Shape	Roughness
<u>0.00 - 285.18, RMU type: open, fresh, medium strength rock, non plastic</u>										
285.18		Joint		3			Continuous across core width	Open	Planar	Rough
<u>285.18 - 289.76, RMU type: core with defects, fresh, high strength rock, non plastic</u>										
287.48		Joint		88			Truncated within core width	Open	Undulose	Rough
<u>289.76 - 291.29, RMU type: unbroken core, fresh, high strength rock, non plastic</u>										
<u>291.29 - 292.70, RMU type: core with defects, fresh, high strength rock, non plastic</u>										
291.94		Bedding plane		12	I		Continuous across core width	Open	Planar	Rough
292.34		Joint		34			Continuous across core width	Open	Stepped	Rough
<u>292.70 - 292.90, RMU type: core with defects, fresh, medium strength rock, non plastic</u>										
292.77		Bedding plane		3	I		Continuous across core width	Open	Planar	Smooth
292.87		Bedding plane		4	I		Continuous across core width	Open	Planar	Smooth
<u>292.90 - 293.73, RMU type: unbroken core, fresh, high strength rock, non plastic</u>										
<u>293.73 - 294.95, RMU type: core with defects, fresh, high strength rock, non plastic</u>										
294.84		Bedding plane		6			Continuous across core width	Trace, calcite, non plastic	Planar	Smooth
<u>294.95 - 295.11, RMU type: core with defects, fresh, low strength rock, non plastic</u>										
294.97		Fault		35	I		Continuous across core width	Healed (cemented), calcite, non plastic	Planar	Slickensided
295.09		Fault		35			Continuous across	Trace, calcite, non plastic	Planar	Slickensided

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10.3.11 Point Loads Report

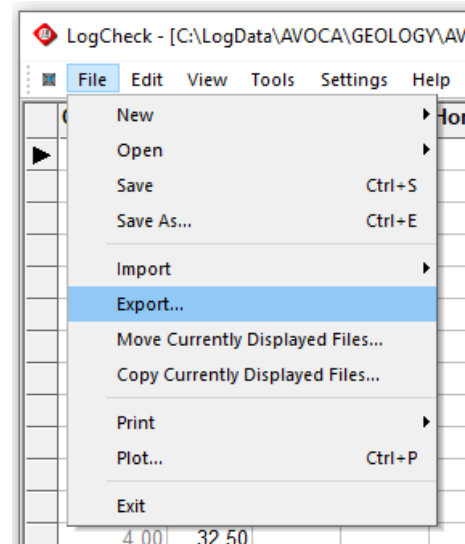
An example of the Report for a hole's Point Load data:

 GEOLOGICAL DATA SPECIALISTS			Avoca Point Loads Log									Hole AVC030C
												Page 1
Sample Base Depth	Sample Thick.	Sample State	Sample Type	Sample No.	Test Id	Test Type	Platen Sep.	Width	Fail. Load (kN's)	Valid	Index	Comments
285.30	0.12	Dry			1	Diametral	64	120	10.74	Valid		
					2	Diametral	64	62	6.71	Valid		
					3	Diametral	64	58	10.30	Valid		
					4	Axial	31	64	6.06	Valid		
					5	Axial	34	64	6.16	Valid		
					6	Axial	24	64	3.67	Valid		
286.35	0.13	Dry			7	Diametral	64	130	9.98	Valid		
					8	Diametral	64	76	10.01	Valid		
					9	Diametral	64	68	6.71	Valid		
					10	Axial	30	64	4.25	Valid		
					11	Axial	46	64	5.48	Valid		
					12	Axial	37	64	6.72	Valid		
					13	Axial	31	64	7.10	Valid		
287.27	0.14	Dry			14	Diametral	64	140	7.87	Invalid		Took large v shaped chunk out of top
					15	Diametral	64	68	10.67	Valid		Failed at ~40 degrees
					16	Diametral	64	72	8.98	Valid	2.91	

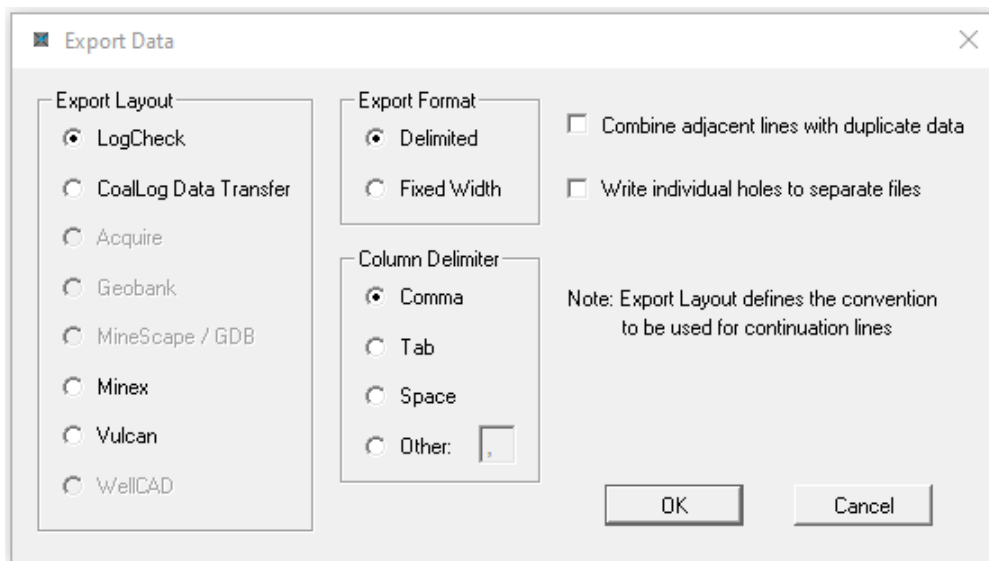
10.4 Exporting Data

All Dictionaries, Site Data, Hole Data, Audits, Summaries (except Hole Summaries) and Statistics can be exported from *LogCheck* in a number of different formats. These can then be imported by other copies of *LogCheck* or other software such as Excel or modelling programs.

To export any of these, open them and then select:



Next the user is prompted for the export file layout and format:



The options on this popup window include:

- **Export Layout** Which options are available for this depend on the type of data being exported. The *LogCheck* option is available for all data types. This option exports the data just as shown on the screen. CoalLog Data Transfer is only available for CoalLog versions of *LogCheck* and then only for Hole Data. In general, the other layouts are only available for Header and Geology data and only in specific Header and Geology formats. Please contact the distributors of *LogCheck* for further assistance with the non *LogCheck* or CoalLog layouts.

- **Export Format** Delimited or Fixed Format. Delimited formats separate each column of data by a Column Delimiter such as a comma. Fixed Format lays the data out with a fixed number of characters for each column in the file. For example, Hole Name may be the first eight characters of the file and then Depth may be the next seven characters etc.
- **Column Delimiter** If Delimited Export Format is selected then this is the character to separate columns. This will generally be a comma but in some countries where they use commas for decimal points they may use another delimiter between columns.
- **Combine adjacent lines with duplicate data**

If multiple lines have the same data apart from depths, if this is ticked then the superfluous lines are removed. For example, if the user exports just the Calculated Depth, Depth and Sample Numbers from the Geology data, then if this is unticked then there will be a line in the export file for each row in the original Geology data:

	A	B	C	D	E
1	Hole	From_Depth	To_Depth	CalcThick	SampNumb
126	AVC030C	293.34	293.51	0.17	
127	AVC030C				
128	AVC030C				
129	AVC030C	293.51	294.43	0.92	
130	AVC030C				
131	AVC030C	294.43	294.58	0.15	3130
132	AVC030C				3130
133	AVC030C	294.58	294.73	0.15	3130
134	AVC030C				3130
135	AVC030C	294.73	294.75	0.02	3131
136	AVC030C	294.75	294.89	0.14	3131
137	AVC030C	294.89	295.68	0.79	3126
138	AVC030C	295.68	296.45	0.77	3127
139	AVC030C	296.45	297.23	0.78	3128
140	AVC030C	297.23	297.42	0.19	3129
141	AVC030C	297.42	297.58	0.16	3129
142	AVC030C	297.58	297.72	0.14	3132
143	AVC030C				3132
144	AVC030C	297.72	297.88	0.16	3132
145	AVC030C				3132
146	AVC030C	297.88	298.12	0.24	
147	AVC030C				
148	AVC030C	298.12	298.21	0.09	

Whereas if ticked, there is only one line for each sample number:

	A	B	C	D	E
1	Hole	From_Depth	To_Depth	CalcThick	SampNumb
2	AVC030C	0	294.43	294.43	
3	AVC030C	294.43	294.73	0.3	3130
4	AVC030C	294.73	294.89	0.16	3131
5	AVC030C	294.89	295.68	0.79	3126
6	AVC030C	295.68	296.45	0.77	3127
7	AVC030C	296.45	297.23	0.78	3128
8	AVC030C	297.23	297.58	0.35	3129
9	AVC030C	297.58	297.88	0.3	3132
10	AVC030C	297.88	303.42	5.54	

- Write individual holes to separate files

This option is only available if the current data includes more than one hole. If ticked then the exported data for each hole will be exported to a separate file.

When exporting data, the hole name, from depth and to depth is automatically included with each unit. However, the user is next asked if they want to add the coordinates for the top and bottom of each unit and how to determine these:

The coordinates are calculated based on the Easting, Northing and Collar Elevation in the header plus an offset determined from each unit's From and To Depth. These offsets can be calculated either by using the holes inclination and azimuth at the collar which is recorded in the hole's Header data or from a Las file containing the offsets that have been calculated from a Verticality log.

Clearly to add the coordinates, the hole's coordinates must exist in the Header data, and either inclination and azimuth of the hole must exist in the Header data or the user must have a LAS file containing the offsets.

For example, here is the export of a Seam Summary without coordinates added:

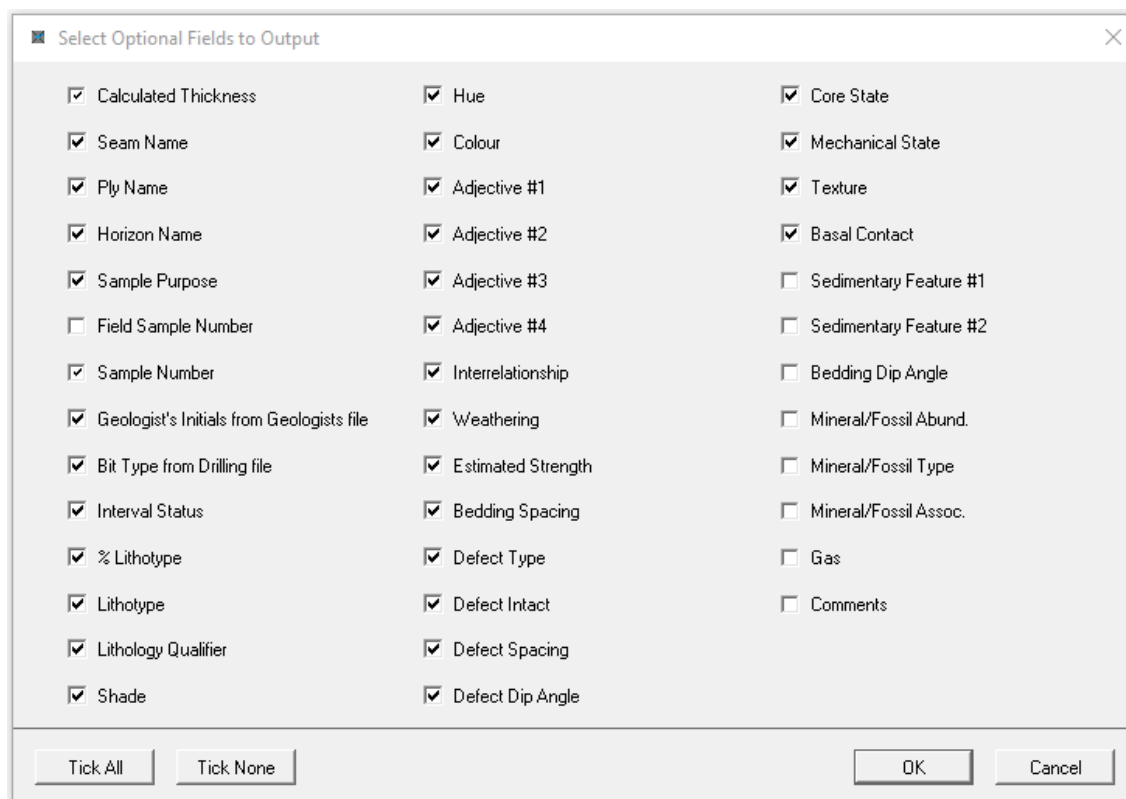
	A	B	C	D	E	F	G	H
1	Hole	Seam	From_Depth	To_Depth	Thickness	Coal	Partings	Core_Loss
2	AVC031C	WK2	234.95	238.33	3.38	3.38	0	0
3	AVC031C	WK3	246.66	247.92	1.26	1.26	0	0
4	AVC031C	MAU	259.24	260.64	1.4	1.35	0.05	0

And with coordinates added:

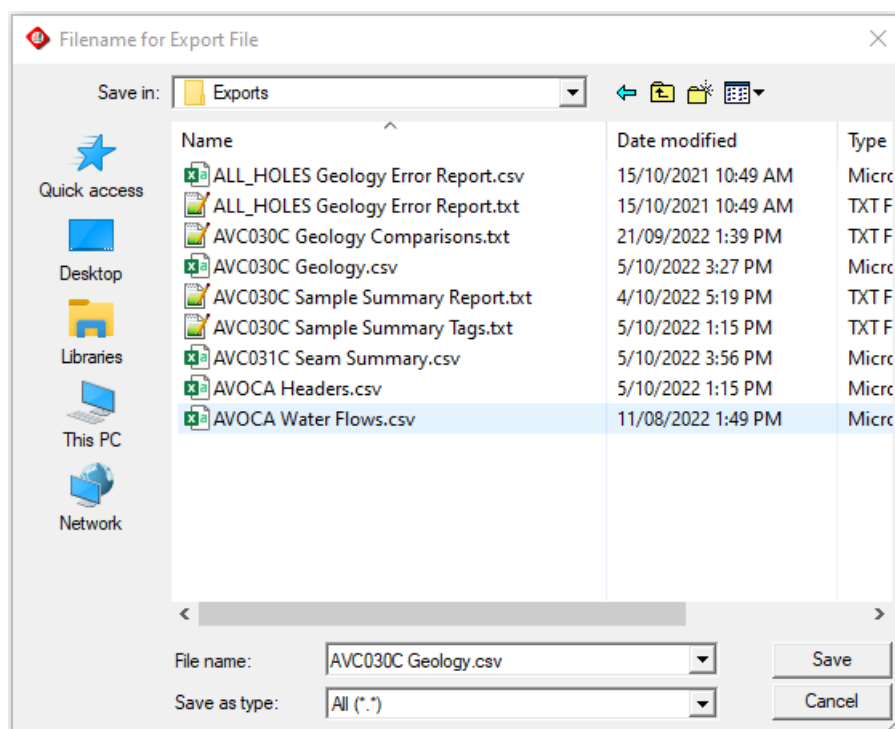
	A	B	C	D	E	F
1	Hole	Seam	GDatum	Easting_From_Depth	Northing_From_Depth	Elevation_From_Depth
2	AVC031C	WK2	AMG84	641696.78	7340981.21	-31.37
3	AVC031C	WK3	AMG84	641696.78	7340981.21	-43.08
4	AVC031C	MAU	AMG84	641696.78	7340981.21	-55.66

G	H	I	J	K	L	M	N	O
Easting_To_Depth	Northing_To_Depth	Elevation_To_Depth	From_Depth	To_Depth	Thickness	Coal	Partings	Core_Loss
641696.78	7340981.21	-34.75	234.95	238.33	3.38	3.38	0	0
641696.78	7340981.21	-44.34	246.66	247.92	1.26	1.26	0	0
641696.78	7340981.21	-57.06	259.24	260.64	1.4	1.35	0.05	0

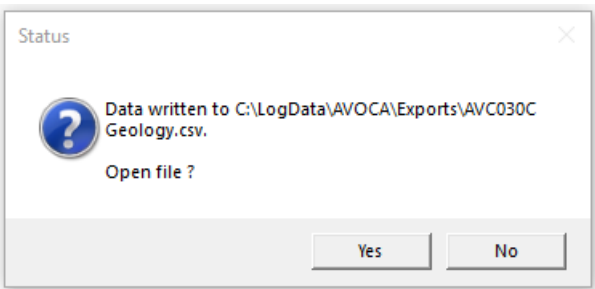
Next the user is prompted for what fields they wish to include as well as Hole Name, From and To Depths:



Lastly, they are prompted for the folder and file name for the generated file:



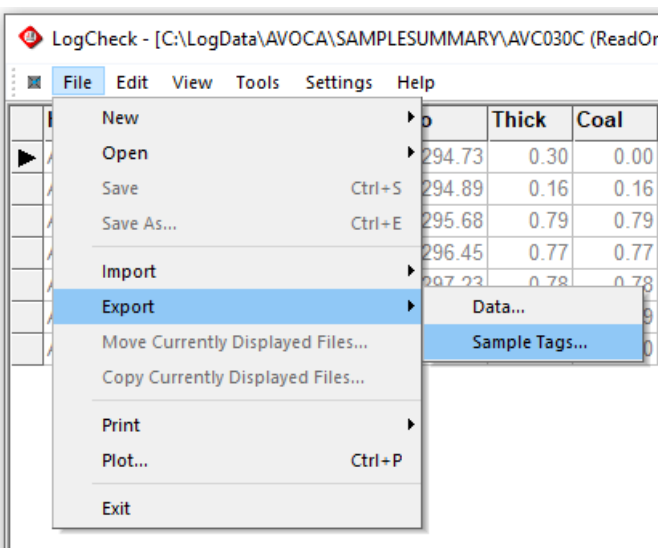
After the export file is generated the user is asked if they would like to open it:



10.4.1 Exporting Sample Tags

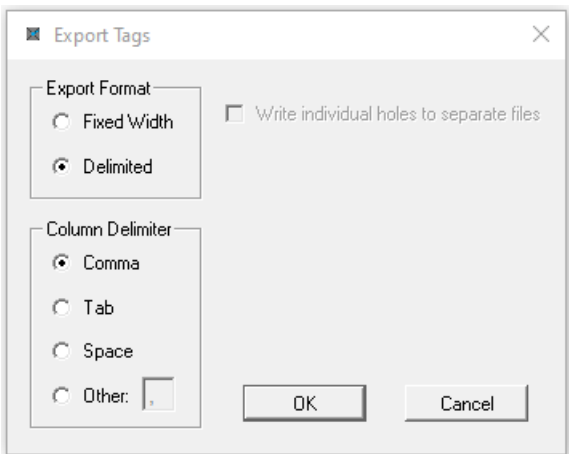
For Sample Dispatch Data and Sample Summaries, there is also an option to export sample tags for printing.

To export these, after opening the Sample Dispatch Data or Sample select:



required
Summary

Next the user is prompted for the required format:



They are then prompted for the name of the folder and file name for the tags and once generated asked if they would like to open it.

An example of the Sample Tag export:

AVC030C Sample Summary Tags.txt	
1	
2	AVOCA
3	
4	Hole No.: AVC030C
5	Sample No.: 003130
6	Depth From: 294.43m.
7	Depth To: 294.73m.
8	From Seam/Ply: WK2_RF/
9	To Seam/Ply: WK2_RF/
10	
11	
12	Bag: of
13	
14	
15	
16	
17	
18	
19	
20	AVOCA
21	
22	Hole No.: AVC030C
23	Sample No.: 003131
24	Depth From: 294.73m.
25	Depth To: 294.89m.
26	From Seam/Ply: WK2/
27	To Seam/Ply: WK2/
28	
29	
30	Bag: of
31	
32	
33	
34	
35	
36	
37	
38	AVOCA
39	
40	Hole No.: AVC030C
41	Sample No.: 003126
42	Depth From: 294.89m.
43	Depth To: 295.68m.
44	From Seam/Ply: WK2/
45	To Seam/Ply: WK2/
46	
47	
48	Bag: of
49	
50	

10.5 Moving and Copying *LogCheck* Data Files

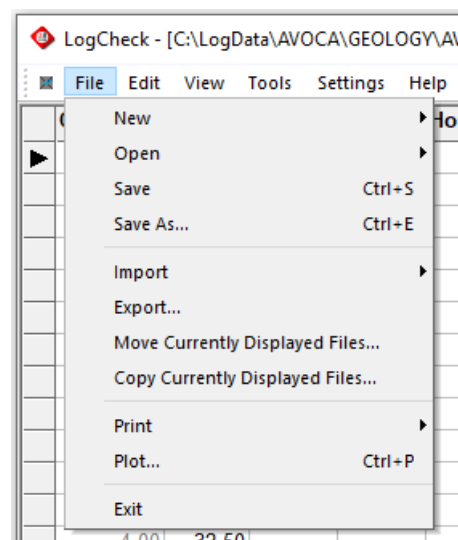
One can manually move or copy *LogCheck* data files between projects on a computer or between *LogCheck* installations on different computers using Windows Explorer (see Appendix A: *LogCheck* Folders and Files). However, *LogCheck* has the ability to Move or Copy multiple *LogCheck* data files at one time. This is useful for moving and copying all the data files for a specific set of holes.

When moving files, *LogCheck* moves them from where they currently sit on the user's computer to a specified folder, however, it also takes a copy of the moved files and places them in a folder named Archived in the user's project folder. Moving files can be useful when the filed geologist has finished editing them and wishes to move them to a server or the database manager's computer. They thus can easily determine which files have been moved and which have not by seeing which are in their original folders and which are in the Archived folder.

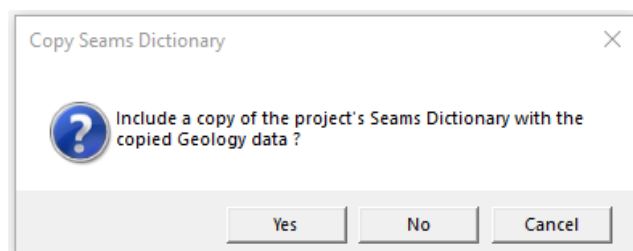
To Move or Copy files for a specific set of holes. First set up a Hole Set containing these holes (see Section 6.5 Creating/Editing a Hole Set Definition).

Next, if just wanting to Move or Copy one data type, open the Hole Data for the Hole Set, by selecting File > Open > Hole Data and then select the Data Type and Hole Set. If wanting to Move or Copy the data for all data types for the specific Hole Set, open the Hole Audit for the Hole Set, by selecting File > Open > Audit > Holes and then select the Hole Set.

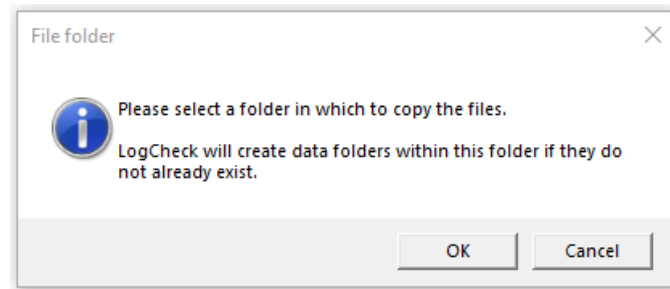
Next select either Move or Copy Currently Displayed Files from the *LogCheck*'s File menu:



Next, if the data to moved or copied includes Geology data with an accompanying Seams Dictionary, *LogCheck* asks:

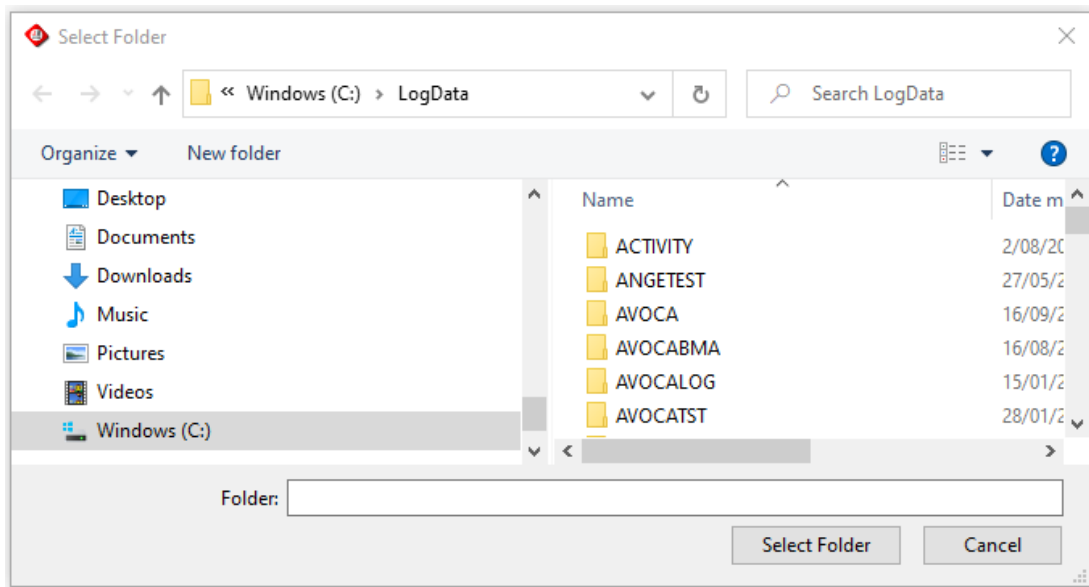


It then informs the user that:

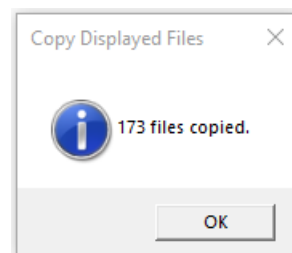


For example, if moving or copying Headers and Geology data for a set of holes, then once the user provides the name of a folder in which to Move or Copy the files then if there is no Headers and Geology folder in the desired folder, *LogCheck* will create these folders and put the appropriate files in each.

It then prompts for the name of the folder to move or copy to:



It then moves or copies the files and informs the user:



Chapter 11

Plotting Hole Plans

By the end of this chapter you will be able to:

- Create a Hole Plan Definition
- Plot a Hole Location Plan including Data for each Hole
- Plot a Seam Thickness Map

11.1 Introduction

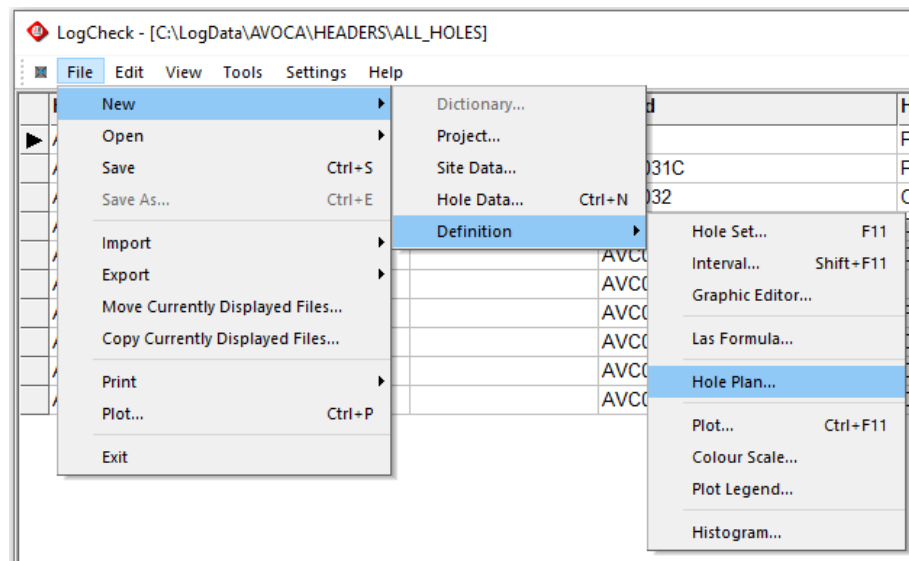
LogCheck can plot a hole plan displaying the location of selected holes plus additional information such as the date drilled or the thickness of a particular seam. Data from the following data types can be displayed on a Hole Plan:

- Hole Audit
- Drill Sites
- Headers
- Drilling Summary
- Horizon, Strat, Seam or Ply Audits
- Seam / Horizon Picks
- Seam or Ply Summaries

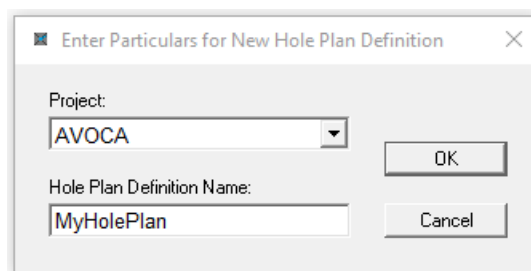
Before plotting a hole plan though the user needs to create a Hole Plan Definition that specifies items such as minimum and maximum Eastings and Northings and annotation heights for the plan.

11.2 Creating and Editing a Hole Plan Definition

To create a new Hole Plan Definition select:

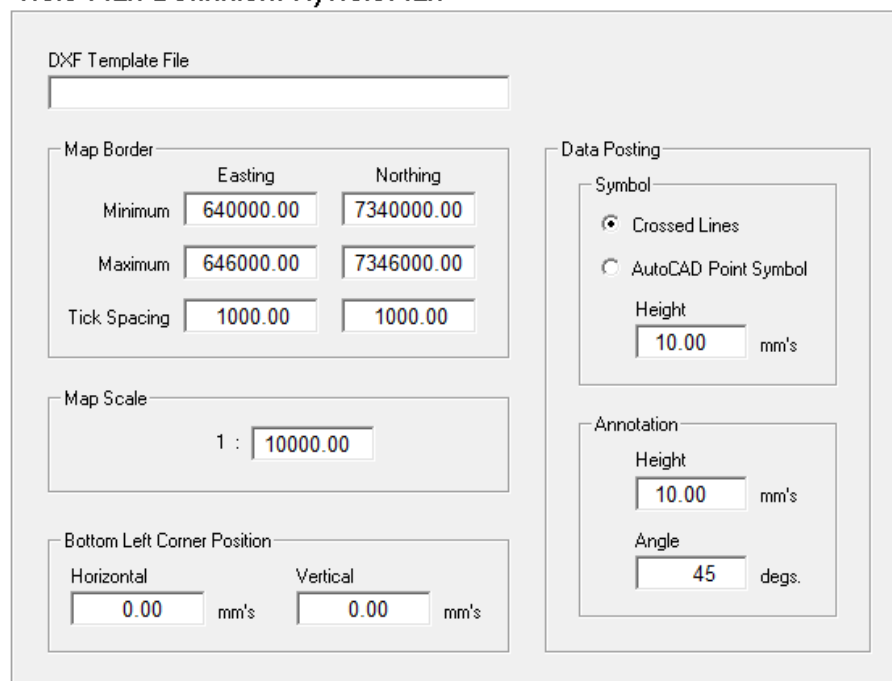


Next *LogCheck* prompts for the project and name for the new Hole Plan Definition:



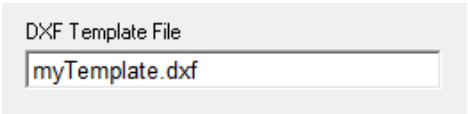
Next the Hole Plan Definition window displays:

Hole Plan Definition: MyHolePlan



11.2.1 DXF Template File

When *LogCheck* creates a DXF file, it builds on another DXF file – that is, the DXF Template File. If this field is left blank, *LogCheck* uses its own default empty template, called *LogCheck.dxf*. However, the user can specify the name of another DXF file in this field for *LogCheck* to build on.



DXF Template File
myTemplate.dxf

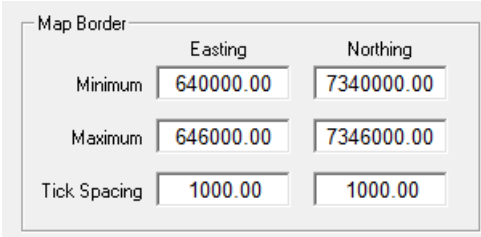
When *LogCheck* creates a new DXF file, it will look for the named DXF template file in the following folders in the following order:

1. PlotPara under the folder Definitions in the current project folder.
2. PlotPara under \LogData\Definitions.
3. PlotPara under \Program Files\LogCheck\Definitions – this is distributed with the software.

The user can set up their own DXF file template which be a standard company sheet or default legends, however, the DXF file must be in Release 12 format. Most CAD software offers DXF Release 12 as a file type in their Save As option.

11.2.2 Map Border

This enables the user to setup the minimum and maximum coordinates for the map and the tick spacing along the edge of the map:

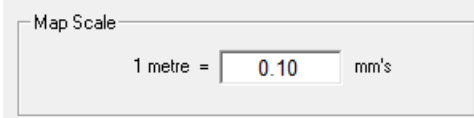


	Easting	Northing
Minimum	640000.00	7340000.00
Maximum	646000.00	7346000.00
Tick Spacing	1000.00	1000.00

When creating a Hole Plan Definition *LogCheck* initially sets the minimum and maximum coordinates. If minimum and maximum coordinates have been set in the Project Details for the project it uses these otherwise it determines the minimum and maximum coordinates from the Headers of all the and then uses rounded values of these.

11.2.3 Map Scale

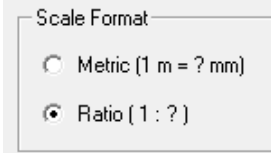
The map scale is the scale at which the plots are to be created.



Map Scale
1 metre = 0.10 mm's

All plots generated by *LogCheck* are produced in mm's and so when creating hardcopies of the plots using software such as AutoCAD TrueView then the hardcopy needs to be generated at a scale of 1 drawing unit = 1mm.

Scales can be specified in either Metric (1m on the ground = so many mm's on the plot) or Ratio format (1m on the plot = so many m's on the ground). Which of the two formats is used in the Plot Definition editor can be set in the Scale Format panel of the *LogCheck* plotting options (select Settings > Options, then select the Plotting page), as shown at right. A metric format of 1 metre on ground = 20mm on paper is equivalent to 1:50 in ratio format.



Scale Format
☐ Metric (1 m = ? mm)
☒ Ratio (1 : ?)

If the Scale Format is set to Metric, then the Map Scale panel appears as shown on the left; if the Scale Format is set to Ratio, then the Map Scale panel appears as shown below on the right:

Map Scale

1 metre = mm's

Map Scale

1 :

11.2.4 Bottom Left Corner Position

The plot is created in millimetres and the Bottom Left Corner Position is the position in the plot for the bottom left corner of the map. Generally this will be set by the user to 0,0:

Bottom Left Corner Position

Horizontal mm's Vertical mm's

However, if the Map Scale is set to 1 metre = 1 mm and the Bottom Left Corner Position is set to the map's minimum Easting and Northing then when viewing the map in AutoCAD TrueView then as the mouse is moved around the screen the true coordinates of the mouse's location will appear in the bottom right of the screen.

11.2.5 Data Posting

This enables the user to specify the type of symbol to be used for the drill hole location, the size of the symbol, the size of the annotation for each hole and the angle for plotting the annotation.

Data Posting

Symbol

☒ Crossed Lines

☐ AutoCAD Point Symbol

Height mm's

Annotation

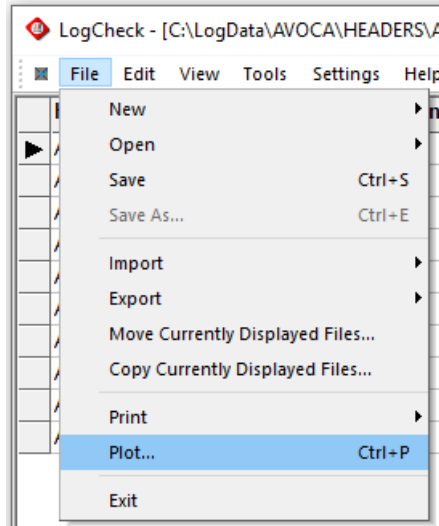
Height mm's

Angle degs.

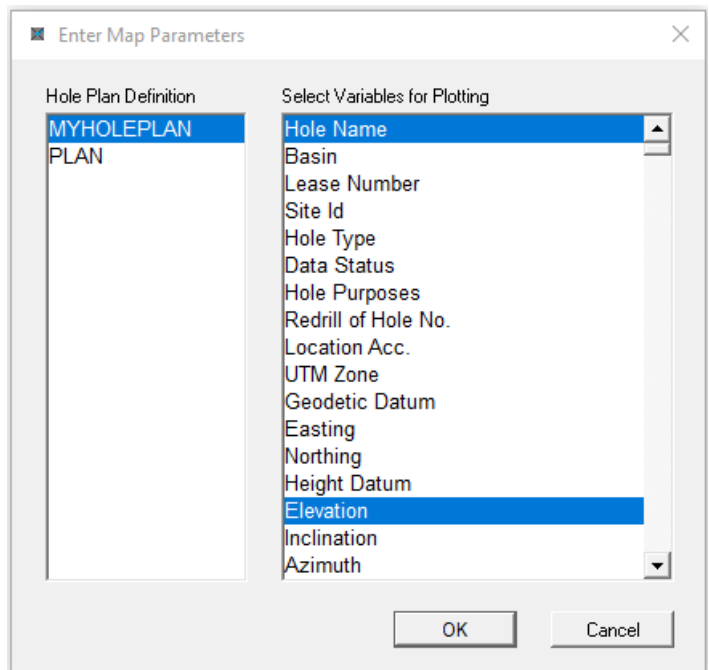
11.3 Generating a Hole Location Plan

To generate a Hole Plan for all the holes in a project showing each hole's name and elevation:

- Open the Header data for all holes in the project.
- Select File > Plot:

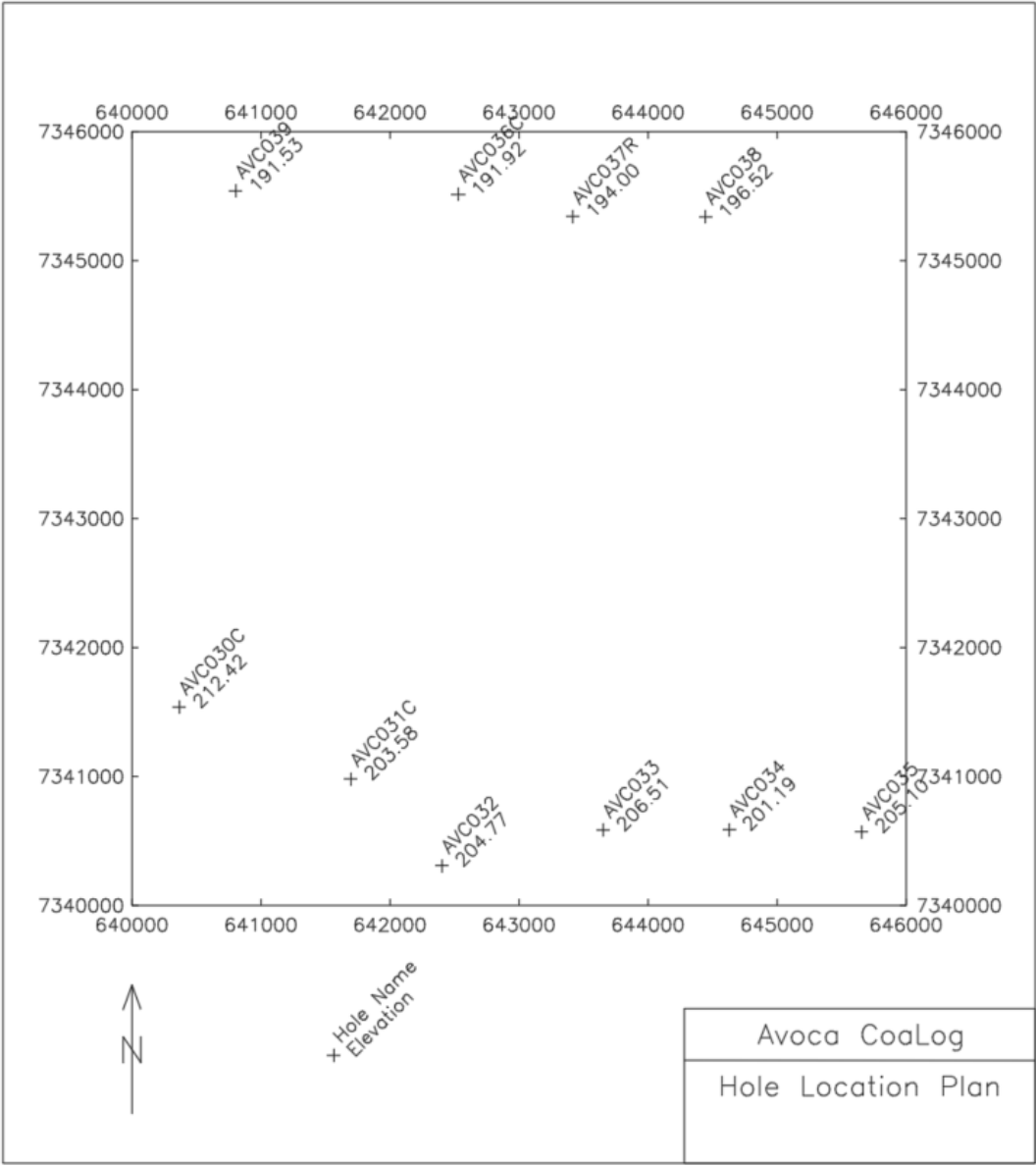


- Select the Hole Plan Definition to use and the Variables to be plotted. When selecting the Variables, the Shift and Ctrl keys can be used to select more than one Variable:



- Select the folder and file name for the resulting plot file.

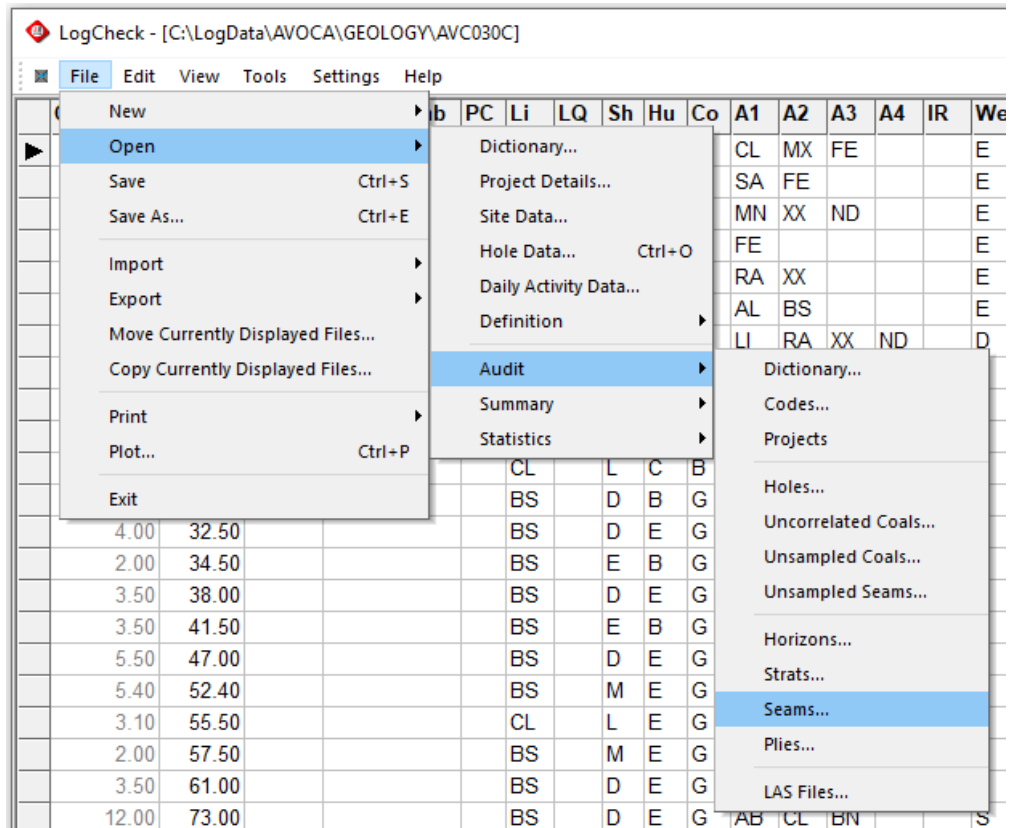
Using the MyHolePlan Definition shown above and the selected Variables shown above will generate the Hole Location Plan:



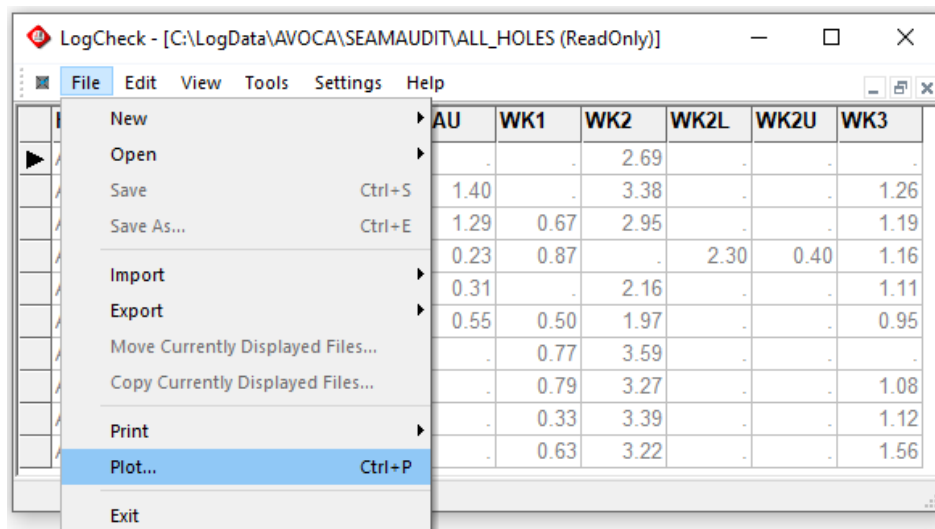
11.4 Posting Seam Thicknesses on a Hole Plan

To post Seam Thicknesses on a Hole Plan for a number of specified seams for all the holes in a project showing each hole's name and the seam thicknesses.

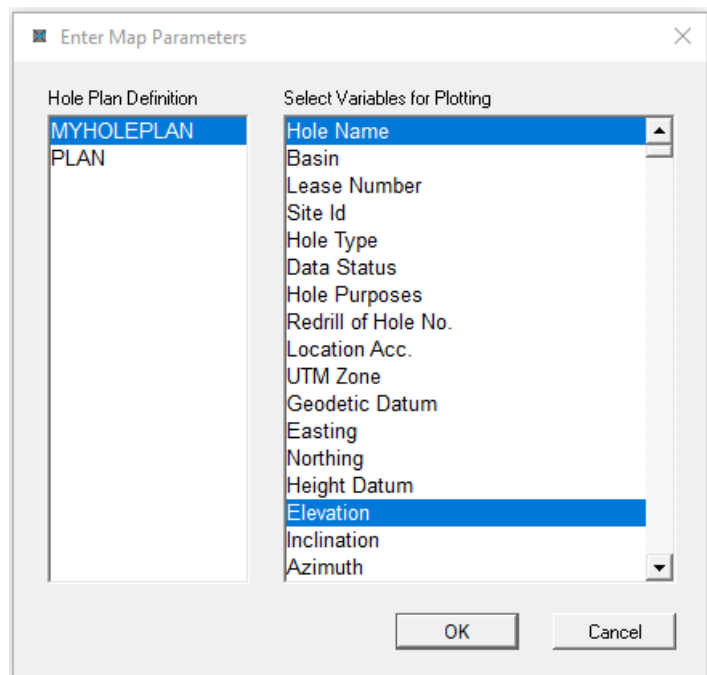
- Open the Seam Audit for all holes in the project.



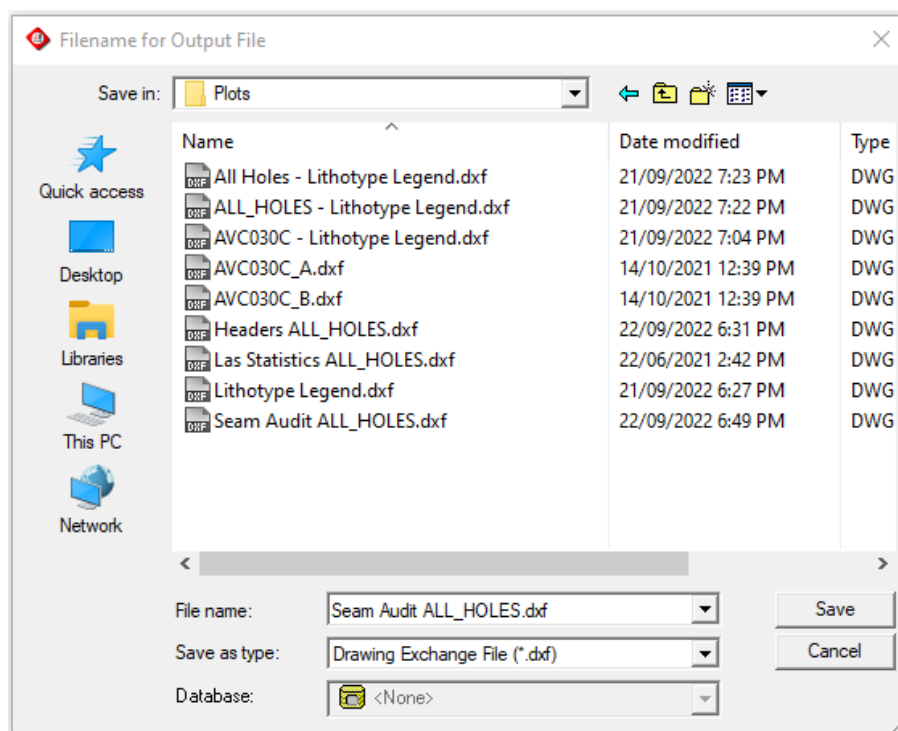
- Select File > Plot:



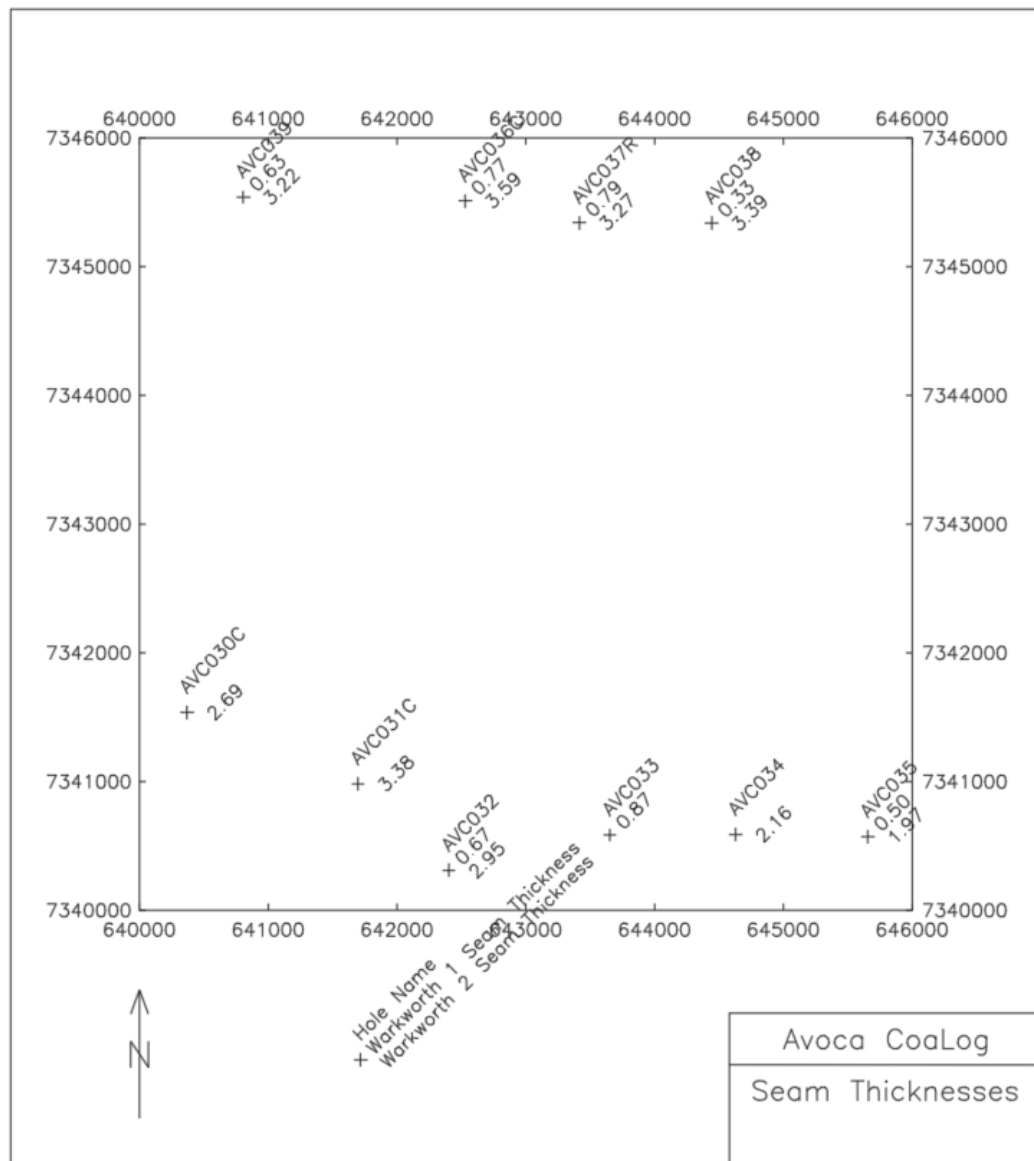
- Select the Hole Plan Definition to use and the seams whose thicknesses are to be plotted. When selecting the seams, the Shift and Ctrl keys can be used to select more than one seam:



- Select the folder and file name for the resulting plot file:



Using the MyHolePlan Definition shown above and the selected Variables shown above will generate the Hole Location Plan:



Chapter 12

Plotting Down Hole Data

By the end of this chapter you will be able to:

- Open, create and save a Plot Definition file.
- Set parameters for the layout of plot sheets.
- Add, edit, and delete tracks for a plot.
- Plot a hole or a section.
- Plot the LAS data by appending to an existing plot file.

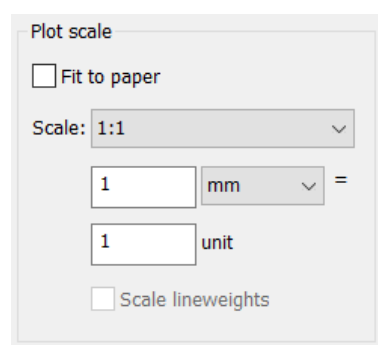
12.1 Introduction

LogCheck provides a wide variety of options for plotting downhole data. The many variations are controlled by parameters that are defined in what is referred to as a Plot Definition.

All plots are generated as AutoCad release 12 DXF files (note that Release 12 has no facilities for bitmaps or JPEG files). Many freeware packages and most CAD packages can display and plot these files. We recommend AutoCad's TrueView to display the plot file. This is available for free and can be downloaded from (at the time of printing):

<https://www.autodesk.com/viewers>

The size and position of all items recorded in the DXF file are in millimetres in the DXF file. This means that when generating a hard-copy plot from the DXF file then the Scale should be set to 1 mm = 1 unit:



A Plot Definition includes parameters such as the vertical scale, the width, location and contents of columns (known as tracks), the horizontal scale for sections, and items to be shown in the title block. A Plot Definition contains over 120 different parameters that can be modified by the user.

When the user plots their currently open data, they are prompted for the location and name of the Plot Definition to be used.

A Plot Definition consists of four files, for example, the Plot Definition named LC_SEAM consists of the four files:

```
LC_SEAM.mem
LC_SEAM_Bars.dbf
LC_SEAM_Titles.dbf
LC_SEAM_Tracks.dbf
```

Plot Definition files can be renamed, deleted or copied to another location. If renaming these files, they must all be given the same Plot Definition name and the .mem, _Bars.dbf, _Titles.dbf, and _Tracks.dbf components of the name must be preserved.

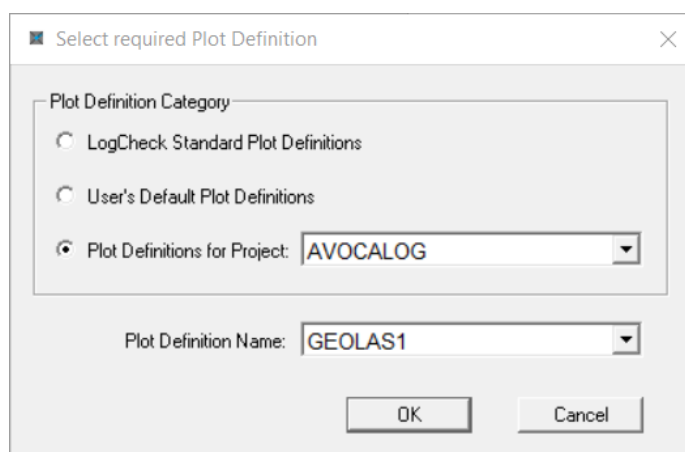
LogCheck comes with a standard set of Plot Definition files, which all have the prefix "LC_". These are described in Appendix B and include:

- A *seams only* plot at 1:20
- Entire hole with Geophysics (Density, Gamma and Calliper)
- 1:20 plot of individual holes in A4 and A3.
- 1:100 plot of individual holes in A4 and A3.
- 1:200 plot of individual holes in A4 and A3.
- A4 and A3 section plots without horizontal scale (ie sit 10 mm apart for a fence diagram) at 1:100 and 1:200.

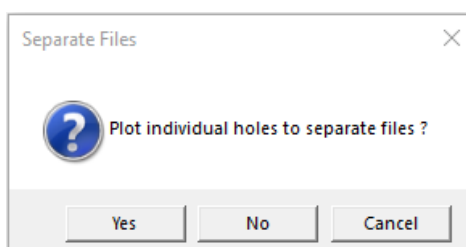
12.2 Plotting Single Holes

To plot the data for single holes:

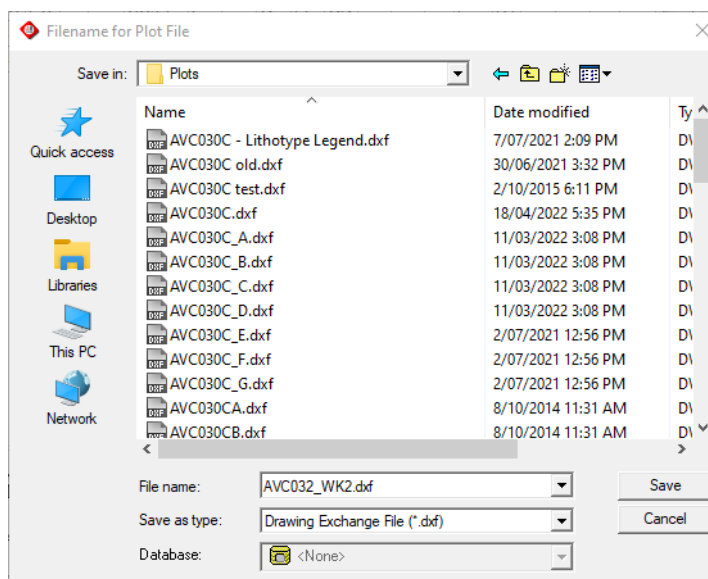
- Open the hole(s) and data type to be plotted by selecting File > Open > Hole Data. When selecting the data to be opened, the user can select all holes, a user specified Hole Set or a single hole. They can also select the entire hole, a depth interval or part of the hole as defined by a user specified Hole Interval Definition.
- Select File > Plot from the menu.
- Select the category and name of the Plot Definition to be used. The Categories are *LogCheck* standard plots (these all start with LC_ and are stored with the software), the user's default Plot Definitions (stored in C:\LogData\Definitions\PlotPara) or Plot Definitions that are specific to a project (stored in C:\LogData\projectName\ Definitions\PlotPara).



- If more than one hole has been opened (by selecting All Holes or a user defined Hole Set), the user will be asked if they would like to Plot individual holes to separate files? They should reply Yes otherwise the multiple holes will be plotted as a single section.

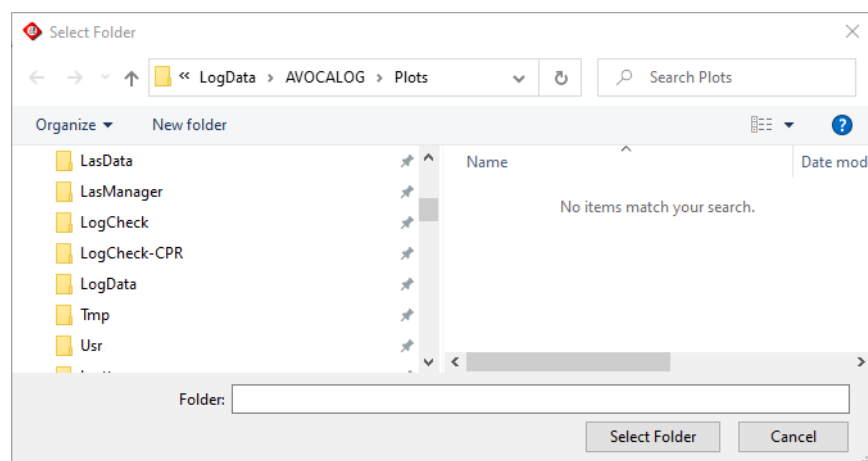


- Provide the location and name(s) for the generated plot file(s):
- If plotting a single hole, *LogCheck* prompts for a file name for saving the file:



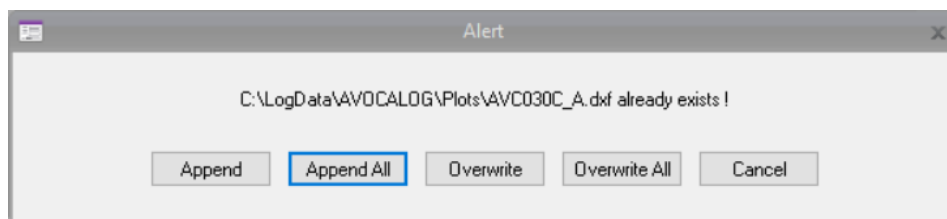
The suggested filename will consist of the hole name followed by the interval definition name (if used) and if a hole's plot consists of multiple pages a suffix. If the plot consists of 26 pages the suffix for the first page will be *_A*, the second *_B*, etc. If the plot consists of more than 26 pages, the suffix for the first page will be *_AA*, the second *_AB*, etc. The files have a file type of .dxf.

- If plotting multiple holes, *LogCheck* prompts for a folder name for saving the files:



It then automatically creates filenames for each plot which consist of the hole name followed by the interval definition name (if used) and if a hole's plot consists of multiple pages a suffix. If the plot consists of 26 pages the suffix for the first page will be *_A*, the second *_B*, etc. If the plot consists of more than 26 pages, the suffix for the first page will be *_AA*, the second *_AB*, etc. The files have a file type of .dxf.

- If a plot file name already exists, *LogCheck* asks whether to overwrite the file, or append the current hole to data that is already in the file, as shown below:



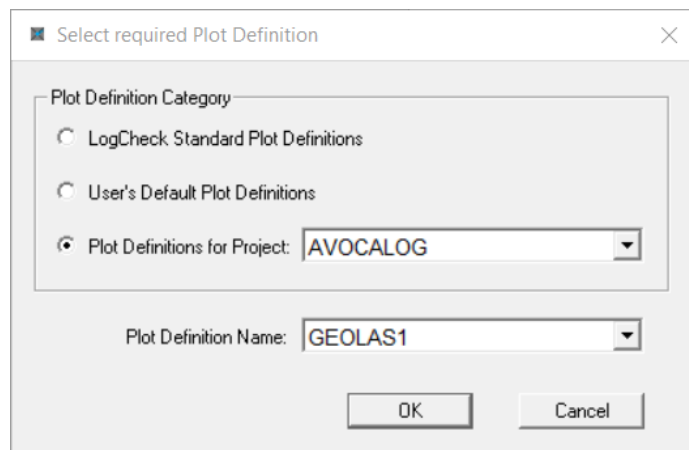
If one of the Append options is chosen, the data is added to the existing plot; if one of the Overwrite options is chosen, the original plot file is deleted and a new plot is created.

To plot Geology data and LAS data to the same file, first open the Geology data and plot it. Then open the LAS data and plot it to the same plot filename, selecting Append rather than Overwrite. If Overwrite is chosen, the plot will show only the LAS data, not the Geology data, as the Geology data plot will be overwritten.

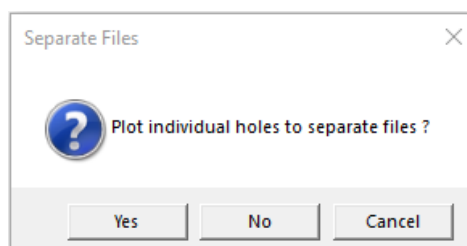
12.3 Plotting a Section

To plot a section:

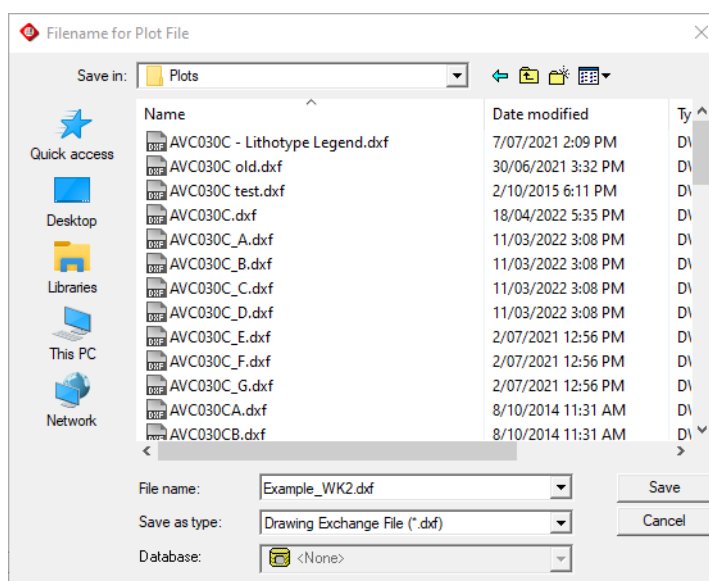
- Create a Hole Set Definition specifying the holes required for the section. The holes to be included in a particular Hole Set can be specified by creating a list, those within a specified corridor of a user defined section line and/or using a query. When doing a scaled section *LogCheck* projects the holes onto a section line. If a section line has been specified in the Hole Set Definition then this is the section line onto which the holes are projected otherwise *LogCheck* fits a best fit line through the collar coordinates of the selected holes and the holes are projected onto this line.
- Open the holes and data type to be plotted by selecting File > Open > Hole Data. When selecting the data to be opened, the user should specify the Hole Set they have defined as described above. They can also select the entire hole, a depth interval or part of the hole as defined by a user specified Hole Interval Definition.
- Select File > Plot from the menu.
- Select the category and name of the Plot Definition to be used. The Categories are *LogCheck* standard plots (these all start with LC_ and are stored with the software), the user's default Plot Definitions (stored in C:\LogData\Definitions\PlotPara) or Plot Definitions that are specific to a project (stored in C:\LogData\projectName\Definitions\PlotPara).



- The user will then be asked if they would like to Plot individual holes to separate files? They should reply No otherwise *LogCheck* will plot separate plots for each hole rather than a section of the holes.

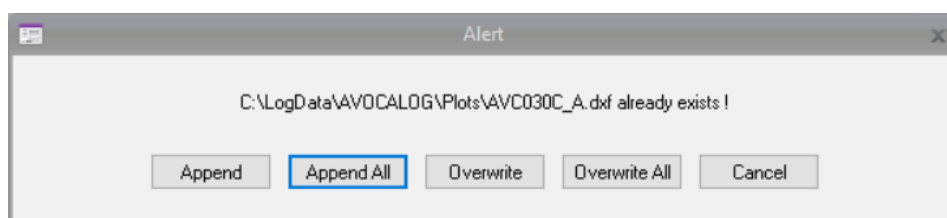


- Provide the location and name for the generated plot file:



The suggested filename will consist of the Hole Set Definition name followed by the Interval Definition name (if used). The file will have a file type of .dxf.

- If a plot file name already exists, *LogCheck* asks whether to overwrite the file, or append the current hole to data that is already in the file, as shown below:



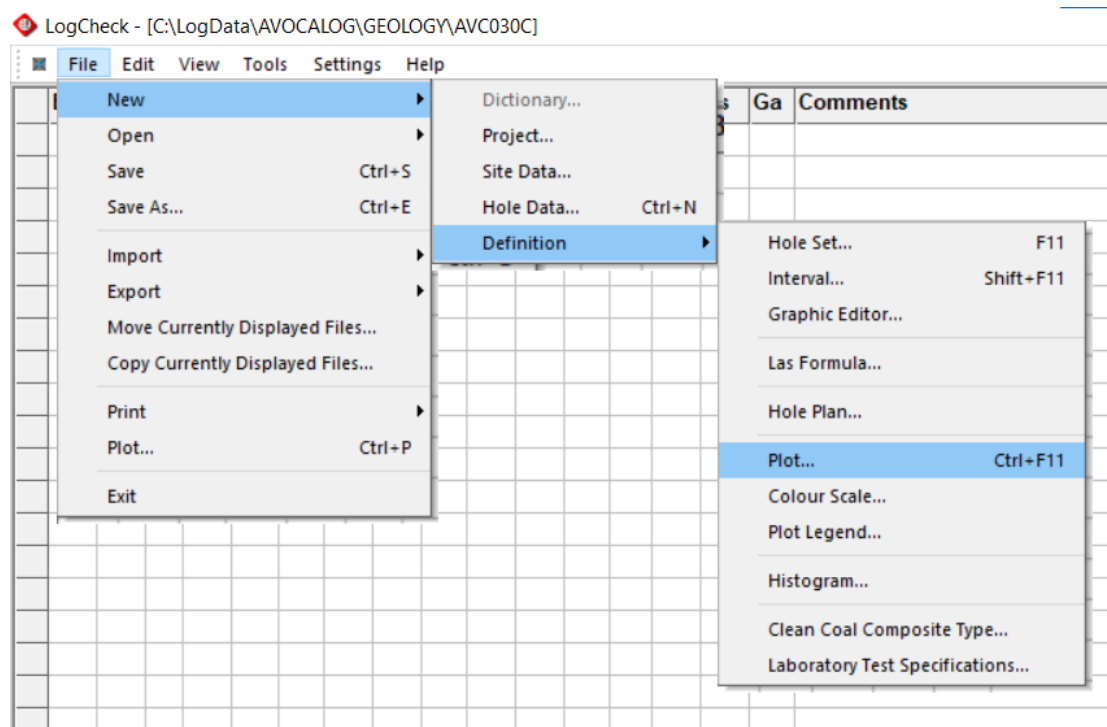
If one of the Append options is chosen, the data is added to the existing plot; if one of the Overwrite options is chosen, the original plot file is deleted and a new plot is created.

To plot Geology data and LAS data for a section to the same file, first open the Geology data and plot it. Then open the LAS data and plot it to the same plot filename, selecting Append rather than Overwrite. If Overwrite is chosen, the plot will show only the LAS data, not the Geology data, as the Geology data plot will be overwritten.

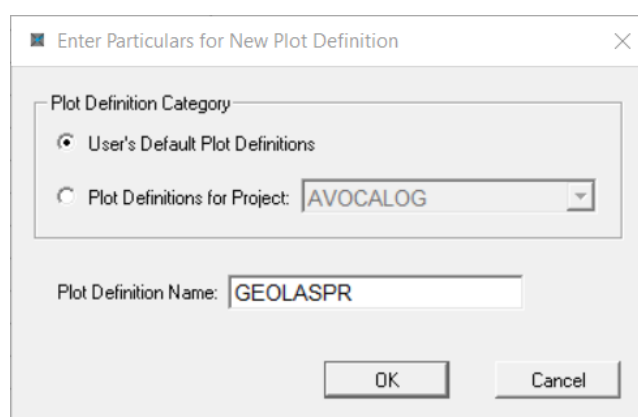
12.4 Plot Definition Files

12.4.1 Creating a Plot Definition File

A new Plot Definition can be created by going to File > New > Plot Definition (or pressing the Ctrl+F11 keys), as shown below:



The following form is then displayed:

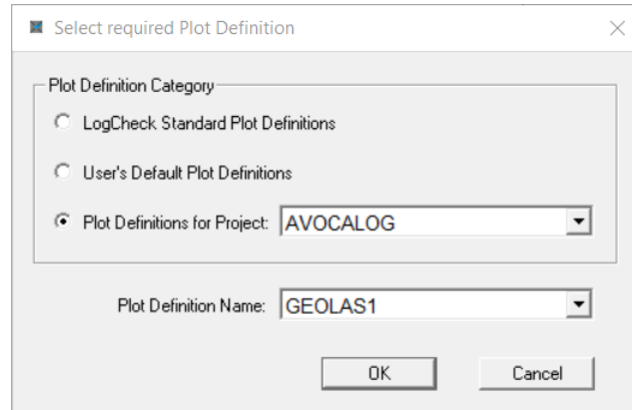


In this example, a new Plot Definition will be created in the user's default Plot Definitions (C:\LogData\Definitions\PlotPara), and its name will be GEOLASPR. Plot Definition file names can be of any length, contain upper and lower case characters, but cannot contain blanks. They also cannot begin with the characters LC_ as this prefix is reserved for *LogCheck* standard Plot Definitions.

12.4.2 Opening Plot Definition Files

A Plot Definition file can be opened for viewing and editing by going to File > Open > Plot Definition.

The following form is then displayed:

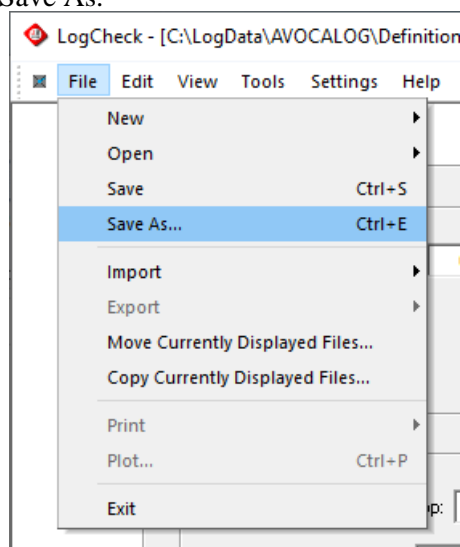


The Plot Definition Categories are *LogCheck* standard plots (these all start with LC_ and are stored with the software), the user's default Plot Definitions (stored in C:\LogData\Definitions\PlotPara) or Plot Definitions that are specific to a project (stored in C:\LogData\projectName\Definitions\PlotPara).

12.4.3 Copying a Plot Definition File

An existing plot file can be copied to another plot file – which presumably will then have some modification performed on it. To copy a Plot Definition file:

- Open an existing Plot Definition file.
- From the File menu, select Save As:



- Enter a new name for the plot (as shown on the right). Note that as names starting with LC_ are reserved for the *LogCheck* standard Plot Definitions, then the name cannot begin with LC_

12.4.4 Plot Definition Editor

An example of a Plot Definition in its editor is:

There are five tabs at the bottom of this form. On selection of each, a different set of parameters for defining the plot layout are displayed:

- **Sheet Layout:** Horizontal and vertical scales, how to split a hole into multiple columns across the page and vertical alignment of multiple holes on the same page.
- **Sheet Annotations:** Sheet border, text to be plotted on each page and depth bars that appear once per page.
- **Stratigraphy:** Stratigraphy to be plotted between holes on a section.
- **Hole Annotations:** Text to be plotted for each hole plotted on the page.
- **Tracks:** Set options for the location and content of the various tracks that are to be drawn on the plot.

12.5 Plot Definition - Sheet Layout Page

The parameters that can be set in the Sheet Layout page as displayed in the previous section include:

Horizontal aspects of the Layout:

- Horizontal Offset from the Top Left corner of the sheet to the First Hole on Left
- For Single Hole plots: Maximum Number of Repetitions across Sheet and Distance between Repetitions
- For Sections: whether the distance between holes is defined by a Scale or a Fixed Distance and what the Scale or Fixed Distance is

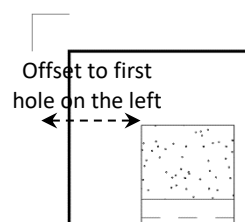
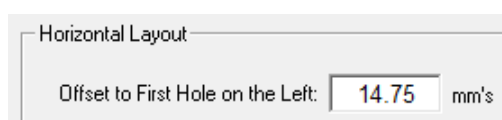
Vertical aspects of the Layout:

- Vertical Offset from the Top Left corner of the sheet to the top of the Hole or for sections the top of the Shallowest Hole
- Vertical Scale
- For Single Hole plots: Maximum Length of the Track before the Track is split into one or more further tracks displayed across the page
- For Sections: how to align the holes vertically, that is on Hole Elevation, Top or Bottom of Displayed Interval or a Level Chosen from the Data

Ability to plot all fixed length track boxes and their titles even if no data

12.5.1 Offset to First Hole on the Left

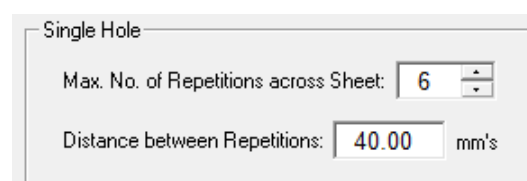
The distance in millimetres from the left-hand side of the page to the left-hand edge of the first hole on the left. Where a sheet border has been plotted this will be the horizontal distance from the tick mark in the top left-hand corner of the sheet.



12.5.2 Horizontal Layout for Single Hole plots

12.5.2.1 Maximum Number of Repetitions

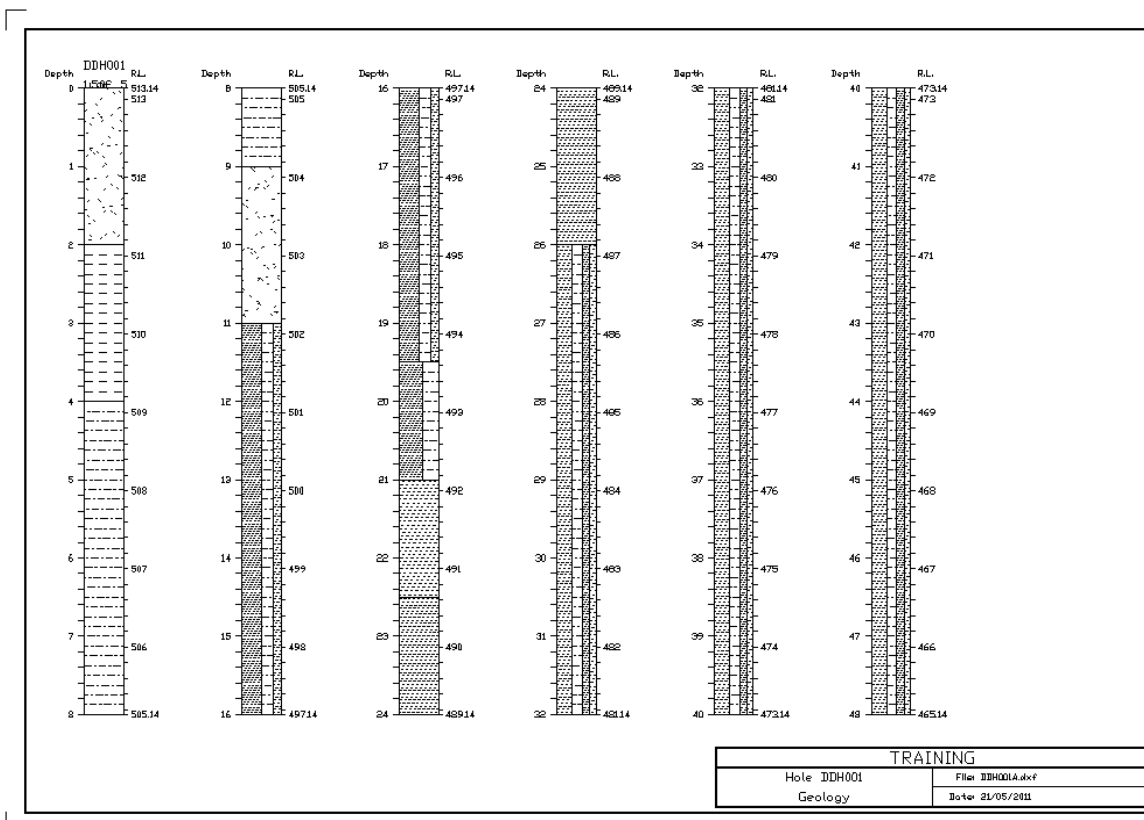
The maximum number of repetitions is the maximum number of times that tracks are repeated across the sheet.



12.5.2.2 Distance between Repetitions

Where there are repetitions of tracks across the sheet, this specifies the distance between them in millimetres.

The page layout example specified above would plot 6 tracks across the page separated by 40mm. The first track is from 0-8m, the second from 8-16, etc.:



12.5.3 Horizontal Layout for Sections

To plot holes on a section, the user must first create a Hole Set Definition to define the holes that are to be plotted and then select this Hole Set when opening the data to plot.

Holes plotted on a section can either be positioned at a specified horizontal scale or at a fixed interval of a specified distance in millimetres between holes. If Scaled is selected, only holes whose coordinates have been entered in their Headers can be plotted.

Section

☒ Scaled: 1 :

☐ Fixed interval: mm's

Scales can be specified in either Metric (1m on the ground = so many mm's on the plot) or Ratio format (1m on the plot = so many m's on the ground). Which of the two formats is used in the Plot Definition editor can be set in the Scale Format panel of the *LogCheck* plotting options (select Settings > Options, then select the Plotting page), as shown at right. A metric format of 1 metre on ground = 20mm on paper is equivalent to 1:50 in ratio format.

Scale Format

☐ Metric (1 m = ? mm)

☒ Ratio (1 : ?)

If the Scale Format is set to Metric, then the Section panel in the Plot Definition appears as shown on the left; if the Scale Format is set to Ratio, then the Section panel appears as shown below on the right:

Section

☒ Scaled: 1 metre = mm's

☐ Fixed interval: mm's

Section

☒ Scaled: 1 :

☐ Fixed interval: mm's

The position of holes on a section is also controlled by how the corresponding Hole Set has been defined. Hole Sets can be defined by creating a list of holes, specifying the coordinates of a section and a corridor tolerance from the section on which the holes lie and/or specifying a query:

Hole Set Definition: mysection

☒ Select by picking from list

All Holes	Selected Holes (<input type="checkbox"/> Sorted)
AVC030C	AVC037R
AVC031C	AVC034
AVC032	AVC032
AVC033	AVC038
AVC034	
AVC035	
AVC036C	
AVC037R	
AVC038	
AVC039	
TEST	

Add to Selection ► Remove from Selection ►

☒ Select by section

Section Type

☐ East-West Section with Northing:

☐ North-South Section with Easting:

☐ Oblique Section: Left End: Easting Northing
Right End: Easting Northing

☒ Section between holes:

Section Corridor Tolerance: ±

☐ Select using a query

Data Type Query, for example: date >= ctod("1/6/2003") and date <= ctod("30/6/2003")

For scaled section plots:

- if Select by section is ticked in the Hole Set Definition, the holes are plotted in their position as projected onto the Section defined in the Hole Set Definition.
- if Select by section is not ticked, then a best fit line is fitted through the coordinates of the selected holes and the holes are projected onto this section.

For fixed distance plots:

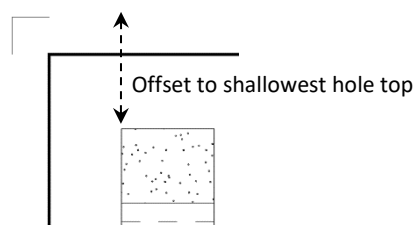
- if Select by section is ticked in the Hole Set Definition, the holes are plotted in the order they occur on the section.
- if Select by section is not ticked but Select by picking by list is, the holes are plotted in the order they appear in the Selected Holes list, that is the order is that in which they have been added to the list unless the Sorted box at the top of the list is ticked in which case they are in alphabetic order.
- if only Select using a query is ticked they are plotted in alphabetic order.

12.5.4 Offset to Shallowest Hole Top

The distance in millimetres from the top of the page to the shallowest hole top. Where a sheet border has been plotted this will be the vertical distance from the tick mark in the top left-hand corner of the sheet. A negative value for this offset indicates going down from the top of the page and a positive one going up.

Vertical Layout

Offset to Shallowest Hole Top: mm's



12.5.5 Vertical Scale

Vertical scale is that used to plot the log data.

Scales can be specified in either Metric (1m on the ground = so many mm's on the plot) or Ratio format (1m on the plot = so many m's on the ground).

Which of the two formats is used in the Plot Definition editor can be set in the Scale Format panel of the *LogCheck* plotting options (select Settings > Options, then select the Plotting page), as shown at right. A metric format of 1 metre on ground = 20mm on paper is equivalent to 1:50 in ratio format.

Scale Format

☐ Metric (1 m = ? mm)

☒ Ratio (1 : ?)

If the Scale Format is set to Metric, then the Vertical Scale in the Plot Definition appears as shown on the left; if the Scale Format is set to Ratio, then the Vertical Scale appears as shown below on the right:

Vertical Scale: 1 metre = mm's

Vertical Scale: 1 :

12.5.6 Vertical Layout for Single Hole plots

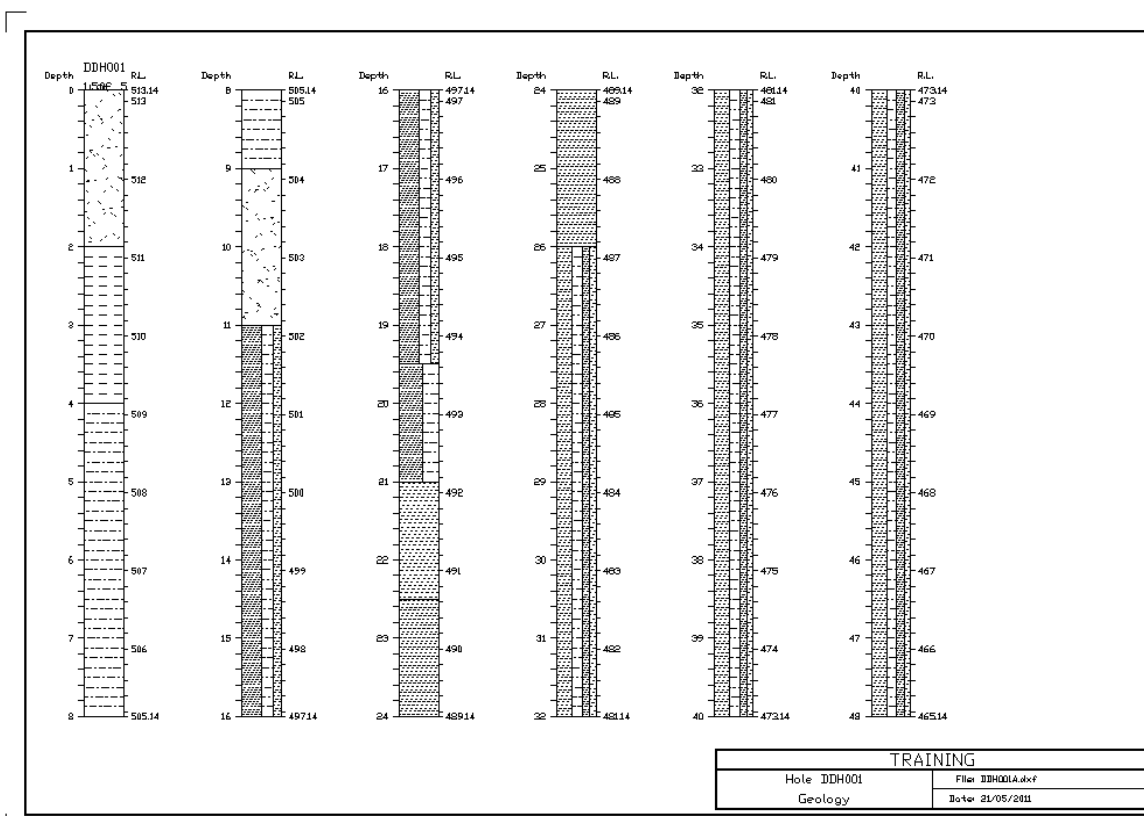
The maximum track length is the maximum length of hole that will be displayed going down the page before starting a new column across the page or starting a new page.

Single Hole

Maximum Track Length: metres

If the entire hole does fit onto a single sheet based on the maximum no. of repetitions across the page and maximum track length, *LogCheck* writes the remaining plot into separate DXF file(s), identified by the hole name and a letter. For example, if the maximum no. of repetitions across the sheet is 6 and maximum track length is 8 metres then if the plot contains more than 6 times 8metres, that is 48 metres of a hole, the plot will be automatically broken into multiple sheets.

The following plot uses a Maximum Track Length of 8 metres.



12.5.7 Vertical Layout for Sections

The Vertical Alignment panel allows the holes to be aligned by: Hole Elevation, Top of Displayed Interval, Bottom of Displayed Interval, or a Level Chosen from the Data:

Section - Vertical Alignment

☐ Hole Elevation
☐ Top of Displayed Interval
☐ Bottom of Displayed Interval
☒ Level Chosen from Data:

Data Type: Geology
☒ Top of
☐ Base of

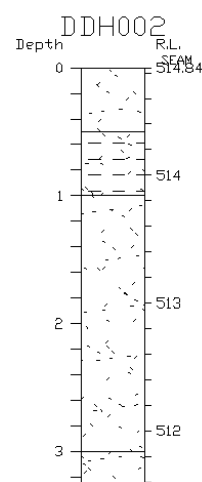
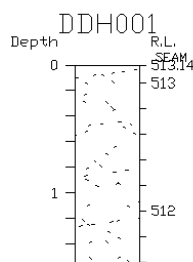
Selected Unit, for example. SEAM = "P"
 seam = "WRK1"

12.5.7.1 Alignment by Hole Elevation

The holes are vertically aligned such that any particular elevation lies in the same vertical position on the sheet for all the holes

An example of vertical alignment by hole elevation:

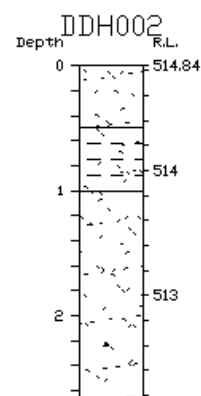
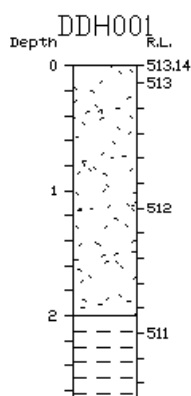
The collar of the hole on the left has an elevation of 513.14 and the one on the right is 514.84.



12.5.7.2 Alignment by Top of Displayed Interval

The holes are vertically aligned such that the top of the displayed interval for each hole lies in the same vertical position on the sheet for all holes.

An example of vertical alignment by Top of Displayed Interval:



12.5.7.3 Alignment by Bottom of Displayed Interval

The holes are vertically aligned such that the bottom of the displayed interval for each hole lies in the same vertical position on the sheet for all holes.

An example of vertical alignment by Bottom of Displayed Interval:



12.5.7.4 Alignment by Level Chosen From Data

The holes are vertically aligned such that a particular level derived from the data lies in the same vertical position on the sheet for all holes. The user specifies the level by providing both the Data Type to be searched and the DBL (DBase Language) expression (see Appendix A) for the search. For example, the following example would use the Geology data to determine the depth of the Top of the Seam named J.

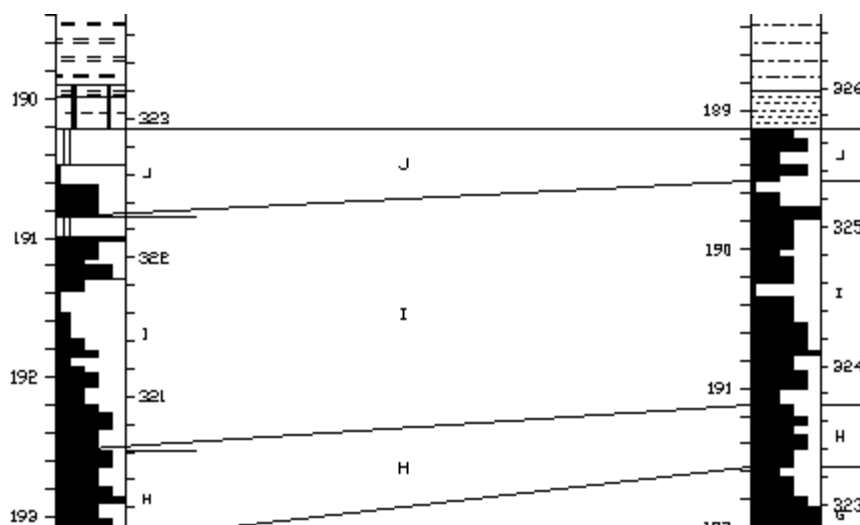
Section - Vertical Alignment

☐ Hole Elevation
☐ Top of Displayed Interval
☐ Bottom of Displayed Interval
☒ Level Chosen from Data:

Data Type: Geology

☒ Top of
☐ Base of

Selected Unit, for example. SEAM = "P"
seam = "J"



12.5.7.5 Plot all fixed length track boxes and their titles even if no data

☒ Plot all fixed length track boxes and their titles even if no data

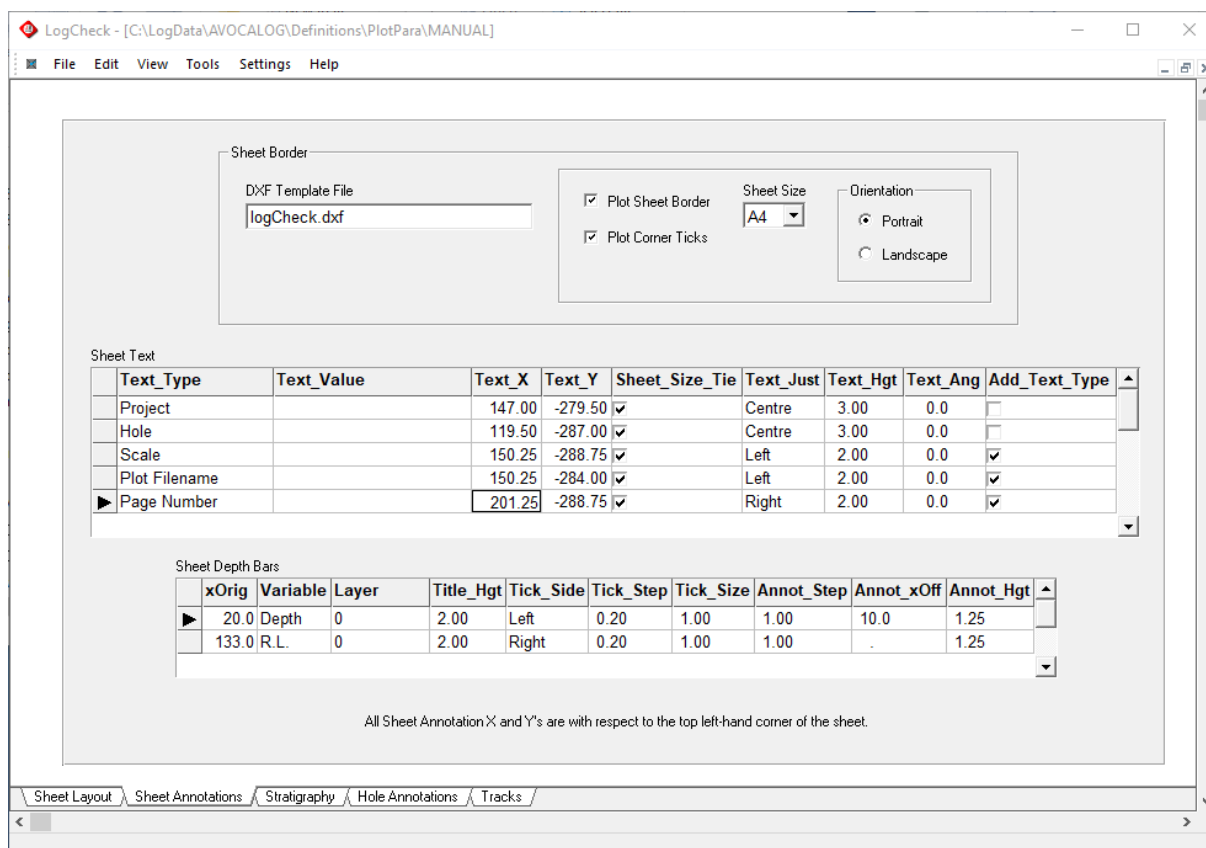
Ticking this option means that all fixed length track boxes and their titles are plotted when the plot is first created rather than when data is appended to the plot. For example, tick this if you would like the box for Las to appear on all the plots created with the definition even though there is no Las data for the particular hole or depths being plotted.

Note though that it will only plot these track boxes and titles for those tracks whose length is fixed to the size of the page rather than the length of available data. To fix box lengths to the page length for a particular track, go to the Tracks tab, select the track you require and then tick Fix Box Length to Page Length:

☒ Fix Box Length to Page Length

12.6 Plot Definition - Sheet Annotations Page

An example of the Sheet Annotations page:



LogCheck - [C:\LogData\AVOCALOG\Definitions\PlotPara\MANUAL]

File Edit View Tools Settings Help

Sheet Border

DXF Template File
logCheck.dxf

☒ Plot Sheet Border ☒ Plot Corner Ticks

Sheet Size
A4

Orientation
☒ Portrait ☐ Landscape

Sheet Text

Text_Type	Text_Value	Text_X	Text_Y	Sheet_Size_Tie	Text_Just	Text_Hgt	Text_Ang	Add_Text_Type
Project		147.00	-279.50	<input checked="" type="checkbox"/>	Centre	3.00	0.0	<input type="checkbox"/>
Hole		119.50	-287.00	<input checked="" type="checkbox"/>	Centre	3.00	0.0	<input type="checkbox"/>
Scale		150.25	-288.75	<input checked="" type="checkbox"/>	Left	2.00	0.0	<input checked="" type="checkbox"/>
Plot Filename		150.25	-284.00	<input checked="" type="checkbox"/>	Left	2.00	0.0	<input checked="" type="checkbox"/>
Page Number		201.25	-288.75	<input checked="" type="checkbox"/>	Right	2.00	0.0	<input checked="" type="checkbox"/>

Sheet Depth Bars

xOrig	Variable	Layer	Title_Hgt	Tick_Side	Tick_Step	Tick_Size	Annot_Step	Annot_xOff	Annot_Hgt
20.0	Depth	0	2.00	Left	0.20	1.00	1.00	10.0	1.25
133.0	R.L.	0	2.00	Right	0.20	1.00	1.00	.	1.25

All Sheet Annotation X and Y's are with respect to the top left-hand corner of the sheet.

Sheet Layout Sheet Annotations (selected) Stratigraphy Hole Annotations Tracks

The parameters that can be set in the Sheet Annotations page include those for:

- A sheet border
- Additional text to be plotted on the sheet including that shown in the sheet's title box
- Depth/R.L. bars that are only displayed once per sheet as opposed to once per hole. This may include say RL bars on the left and right hand sides of an entire section.

X and Y positions of items on the Sheet Annotations page are in millimetres and are with respect to the top left-hand corner of the plot. Negative Y values indicate going down from the top left-hand corner of the plot.

12.6.1 Sheet Border

12.6.1.1 DXF Template File

When *LogCheck* creates a DXF file, it builds on another DXF file – that is, the DXF Template File. If this field is left blank, *LogCheck* uses its own default empty template, called *LogCheck.dxf*. However, the user can specify the name of another DXF file in this field for *LogCheck* to build on.

DXF Template File

myTemplate.dxf

When *LogCheck* creates a new DXF file, it will look for the named DXF template file in the following folders in the following order:

4. PlotPara under the folder Definitions in the current project folder.
5. PlotPara under \LogData\Definitions.
6. PlotPara under \Program Files\LogCheck\Definitions – this is distributed with the software.

The user can set up their own DXF file template which be a standard company sheet or default legends, however, the DXF file must be in Release 12 format. Most CAD software offers DXF Release 12 as a file type in their Save As option.

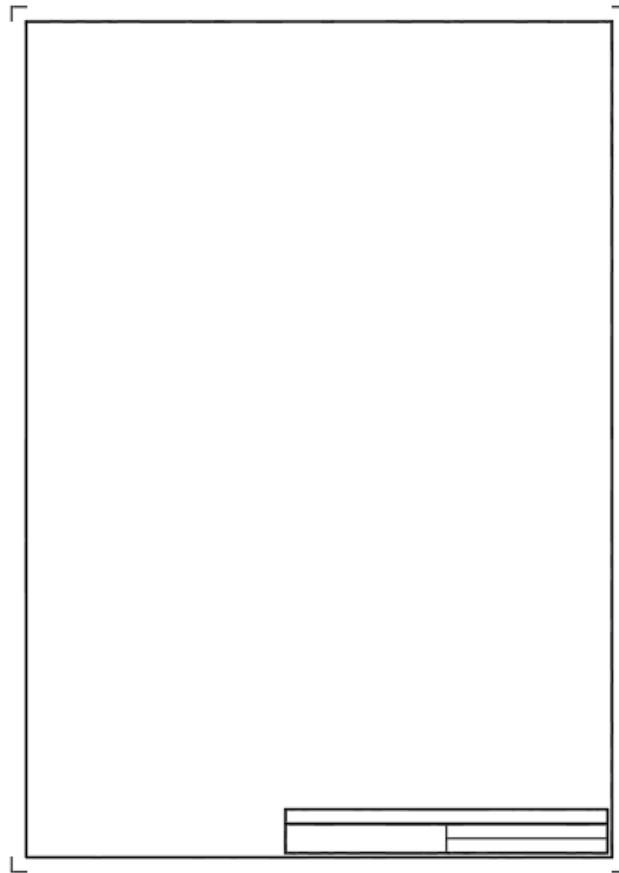
12.6.1.2 Plot Sheet Border

If Plot Sheet Border is ticked then when the plot is first created, *LogCheck* adds a sheet border and title box to the plot:



12.6.1.3 Plot Corner Ticks

If Plot Corner Ticks is ticked then when the plot is first created, *LogCheck* includes corner ticks defining the edge of the sheet:



12.6.1.4 Sheet Size

If plotting either a sheet border or corner ticks, *LogCheck* needs to know the sheet size to be used. This can be A0, A1, A2, A3, A4 or A5.

12.6.1.5 Orientation

If plotting either a sheet border or corner ticks, *LogCheck* needs to know the orientation of the sheet to be used. This can be Portrait or Landscape.

12.6.2 Sheet Text

Text can be added to the plot. This text will normally but not necessarily be located in the title block of the sheet. It can be text specified by the user or text derived from the data. The text to be plotted, its position, height, angle and whether a prefix describing the text is specified in the Sheet Text grid:

Sheet Text									
	Text_Type	Text_Value	Text_X	Text_Y	Sheet_Size_Tie	Text_Just	Text_Hgt	Text_Ang	Add_Text_Type
▶	Project		147.00	-279.50	✓	Centre	3.00	0.0	<input type="checkbox"/>
	Hole		119.50	-287.00	✓	Centre	2.75	0.0	<input type="checkbox"/>
	Scale		150.25	-288.75	✓	Left	2.00	0.0	✓
	Plot Filename		150.25	-284.00	✓	Left	2.00	0.0	✓
	Page Number		201.25	-288.75	✓	Right	2.00	0.0	✓

The above specifications would produce the following Title Block for hole AVC030C:

AvocaLog Example Project	
AVC030C	Filename: AVC030C_B.dxf
	Scale: 1:100 Page: 2 of 4

Further text entries can be added to the plot by adding rows to the above grid by going to the last row in the grid and then pressing the down arrow key. Rows can also be Appended, Inserted or Deleted and values can Blanked or Copied from Above using the Edit menu at the top of the screen.

Each row in the grid has the following values that the user can set:

- **Text_Type:** The text type of the entry. This column has a drop-down box with available *LogCheck* variables that can be displayed on the plot. For both single holes and sections the following options are available:
 - Specify the user can specify a text string in the row's **Text_Value** column
 - Project the name of the Project as specified on the Project Details page
 - Plot Filename the name of the .dxf file containing the plot
 - Scale the plot scale in a 1:nnnn format
 - Plot Date date the plot was created
 - Basin the holes' Sedimentary Basin as recorded in its Header data
 - Lease No the holes' Lease No as recorded in its Header data

For sections the following option is available:

- Hole Set Name the name of the Hole Set being plotted

For single holes the following options are available:

- Hole the name of the Hole being plotted
- Page Number for use where a plot has to be split over a number of sheets. This is in the format *nnn* of *nnn*
- Easting the hole's Easting as recorded in its Header data
- Northing the hole's Northing as recorded in its Header data
- Elevation the hole's Elevation as recorded in its Header data

- | | |
|------------------------|---|
| - Total Depth | the hole's Total Depth as recorded in its Header data |
| - Hole Inclination | the hole's Inclination as recorded in its Header data |
| - Hole Azimuth | the hole's Azimuth as recorded in its Header data |
| - Start Date | the hole's Start Date as recorded in its Header data |
| - Total Depth | the hole's Total Depth as recorded in its Header data |
| - Geolog. Company | the Geological Organization that logged the hole as recorded in its Header data |
| - Geophys. Total Depth | the hole's Geophysical Total Depth as recorded in its Header data |
| - Header Comment | the Header Comment as recorded in its Header data |
| - Geologist | the hole's Geologist(s) as recorded in its Geologists' data |
| - Driller | the hole's Driller as recorded in its Drilling data |
| - Rig Type | the hole's Rig Type as recorded in its Drilling data |
- **Text_Value:** When **Text_Type** is *Specify*, the user specified text to be plotted on the sheet.
 - **Text_X:** The X coordinate of the text in millimetres relative to the top left-hand corner of the plot. For **Text_Just:**
 - Left the X coordinate of the left-hand edge of the text.
 - Centre the X coordinate of the centre of the text
 - Right the X coordinate of the right-hand edge of the text

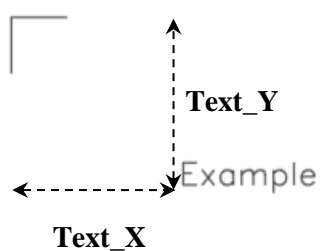
See examples below.
 - **Text_Y:** The Y coordinate of the text in millimetres relative to the top left-hand corner of the plot. Note that positive values are up and negative values down. For **Text_Just:**
 - Left the Y coordinate of the left-hand edge of the text.
 - Centre the Y coordinate of the centre of the text
 - Right the Y coordinate of the right-hand edge of the text

See examples below.
 - **Sheet_Size_Tie:** On ticking this, if **Text_X** and **Text_Y** are blank and Plot Sheet Border has been ticked, *LogCheck*, enters values in **Text_X** and **Text_Y** to place the text in an appropriate location in the title block. If **Sheet_Size_Tie** is ticked, then when the Sheet Size or Sheet Orientation is modified the **Text_X** and **Text_Y** are automatically modified so that they remain in the same position in the title block after the modification.
 - **Text_Just:** The text justification (Left, Right or Centre).
 - **Text_Hgt:** The height of the text in millimetres.
 - **Text_Ang:** The angular rotation of the text, 0 is horizontal, 90 vertical. See examples below.
 - **Add_Text_Type:** If ticked, a prefix is added to the text describing the text. For example, if a hole has an Easting of 603451.12 and **Add_Text_Type** is ticked the text that would be plotted would be Easting: 603451.12 instead of just 603451.12.

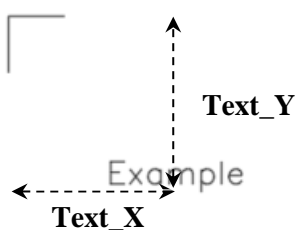
Examples of values for **Text_X**, **Text_Y**, **Text_Just** and **Text_Ang**:

Text_Ang = 0°

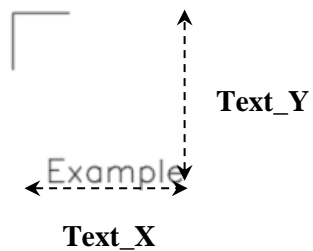
Text_Just = Left



Text_Just = Centre

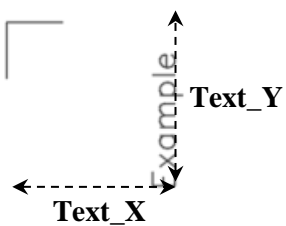


Text_Just = Right

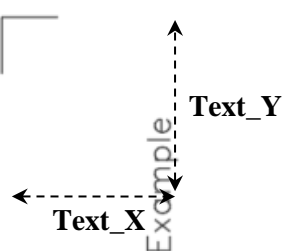


Text_Ang = 90°

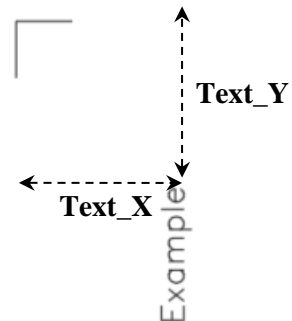
Text_Just = Left



Text_Just = Centre



Text_Just = Right



12.6.3 Sheet Depth Bars

Depth and RL (Reduced Level) Bars can be defined to be displayed on plots. These bars fall into two categories: those that are plotted once for each sheet, called Sheet Depth Bars and those that are plotted once for each hole, called Hole Depth Bars. Generally, Hole Depth Bars are used for displaying depth bars on plots but Sheet Depth Bars can be useful for including a single depth bar on a Section. For example, to create a single RL bar for the entire section where the holes are vertically aligned based on their elevation. The Sheet Depth Bars to be displayed on the plot are specified in the Sheet Depth Bars grid:

Sheet Depth Bars										
	xOrig	Variable	Layer	Title_Hgt	Tick_Side	Tick_Step	Tick_Size	Annot_Step	Annot_xOff	Annot_Hgt
▶	20.0	Depth	0	2.00	Left	0.20	1.00	1.00	10.0	1.25
	133.0	R.L.	0	2.00	Right	0.20	1.00	1.00	.	1.25

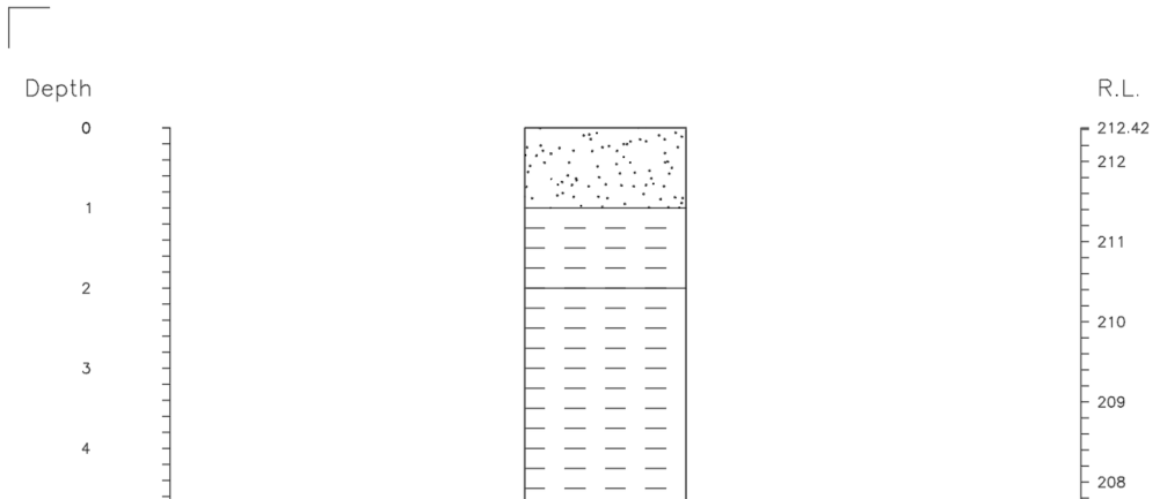
Depth Bars can be added to the plot by adding rows to the above grid by going to the last row and then pressing the down arrow key. Rows can also be Appended, Inserted or Deleted and values can be Blanked or Copied from Above using the Edit menu at the top of the screen.

The vertical position of the top of Sheet Depth Bars is that of the Vertical Offset to the Shallowest Hole as defined in the Vertical Layout panel on the Sheet Layout page.

Each row of the Sheet Depth Bars Grid has the following values that the user can set:

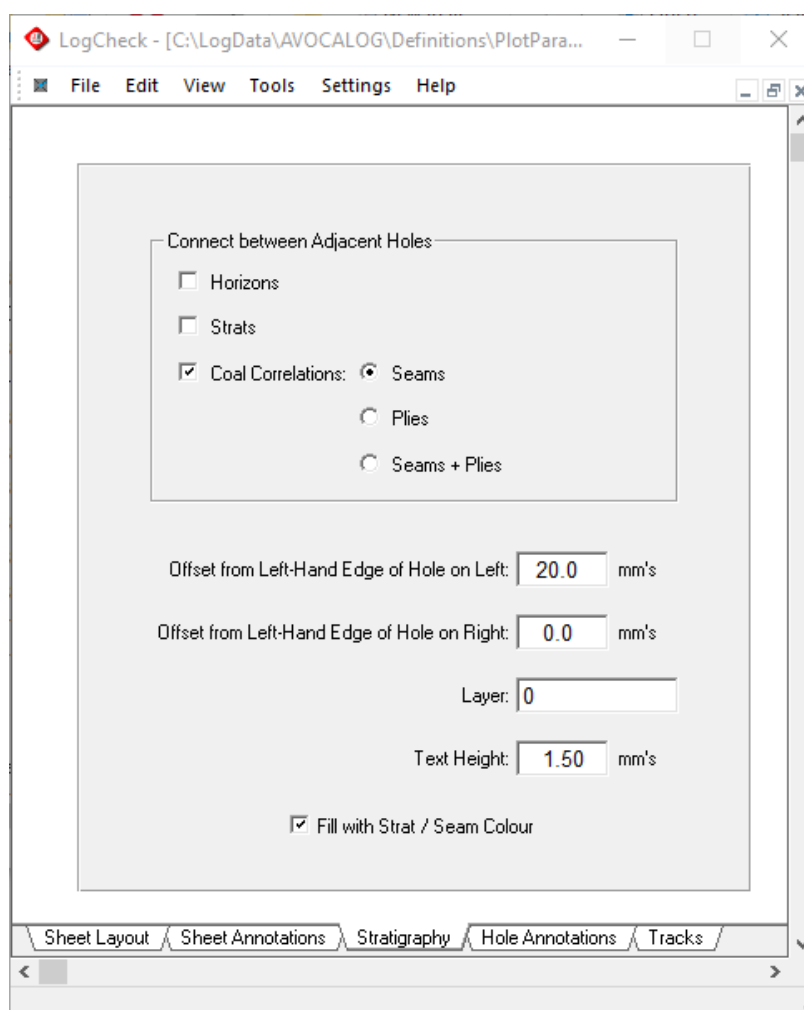
- **xOrig:** the position of the depth bar relative to the left-hand edge of the sheet.
- **Variable:** Depth or R.L.
- **Layer:** the layer on which to plot the bar. The default layer generally used in .dxf plots is called 0.
- **Title_Hgt:** the text height in millimetres of the title (either “Depth” or “RL”) that appear at the top of the bar. If set to blank or zero, no title appears on the bar.
- **Tick_Side:** Left or Right.
- **Tick_Step:** the depth interval between ticks. For example, a value of 0.2 means that a tick will be placed every 0.2 m down the hole.
- **Tick_Size:** the horizontal length of each tick in millimetres.
- **Annot_Step:** the depth interval between ticks that are annotated with their value – as generally a value is not required on every tick. **Annot_Step** has to be a multiple of the **Tick_Step**.
- **Annot_xOff:** the distance from the bar to the start of the annotation. Where the **Tick_Side** is Left then it is the distance to the right-hand edge of the annotation and where it is Right it is the distance to the left-hand edge of the annotation.
- **Annot_Hgt:** text height in millimetres of the depth bar values. If this is set to blank or zero no annotations are displayed.

For the Sheet Depth Bars table shown above, the resulting plot is shown below. Note the “Depth” on the left of the plot, and “R.L.” on the right side of the plot. The **Tick_Step** is 0.2, creating 5 ticks to the metre, and the **Annot_Step** is 1.0 metre.



12.7 Plot Definition - Stratigraphy Page

The Stratigraphy Page is only used for sections. An example of the Stratigraphy page:



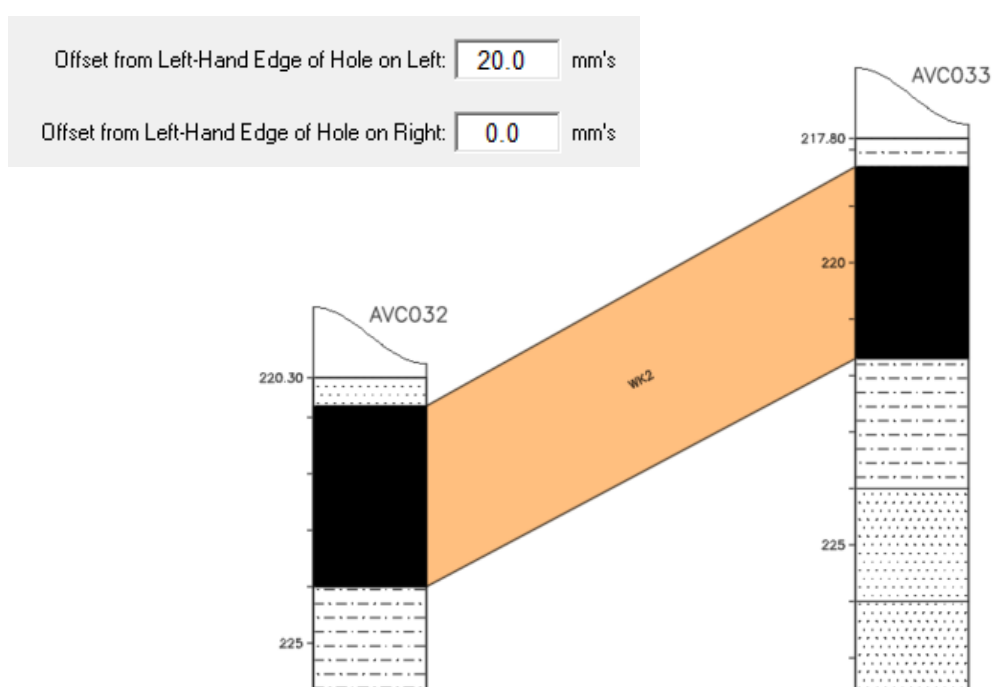
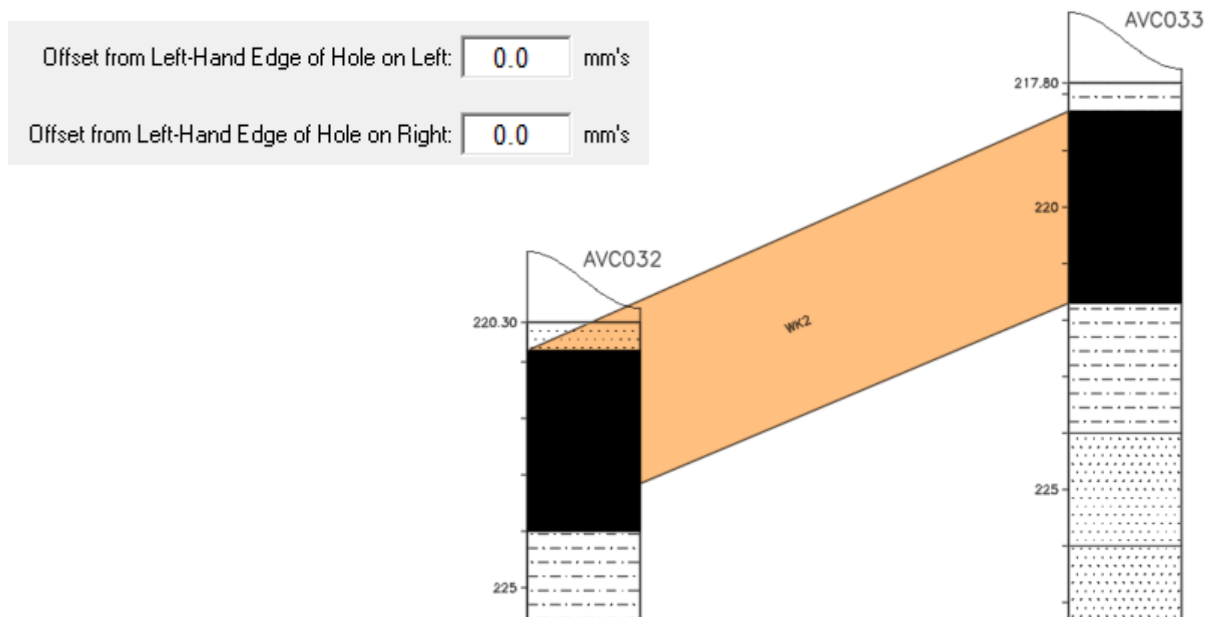
12.7.1 Connections between Adjacent Holes

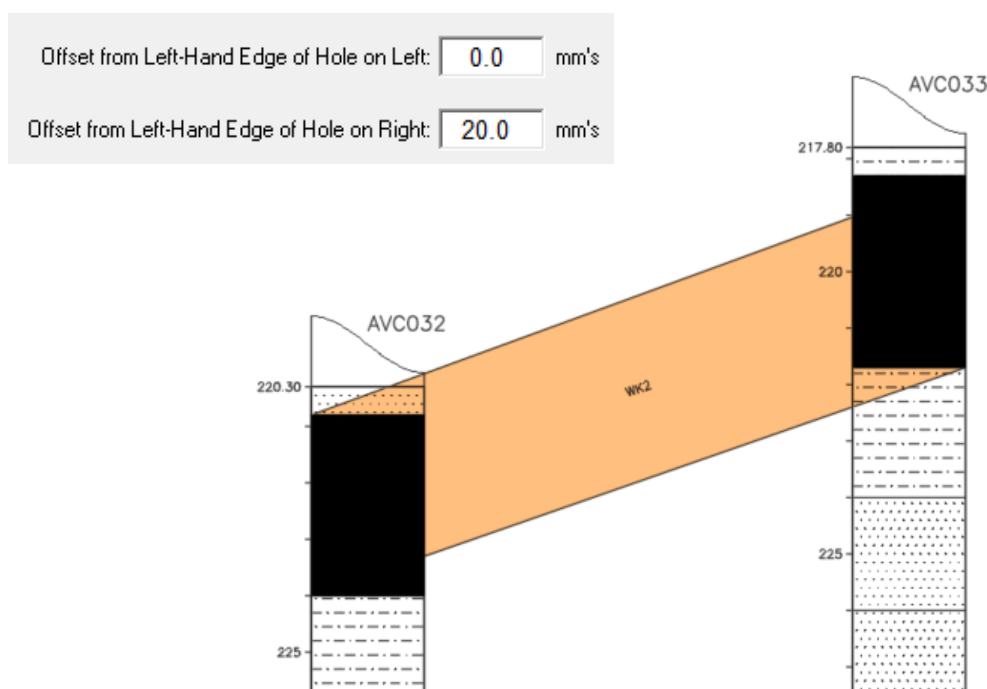
The stratigraphic units to be connected between neighbouring holes on the section:

- **Horizons** connect Horizons such as Base of Weathering.
- **Strats** connect non-coal stratigraphic marker units such as Yarrabee Tuff. These are recorded in the Seam columns of the Geology data but are classified as Strats by have a value of STRATS in the Group column of the Seam Dictionary.
- **Coals** connect coals. One of the following needs to be selected:
 - Seams as recorded in the Seam column of the Geology data
 - Plies as recorded in the Ply column of the Geology data
 - Seams + Plies the Seam and Ply as recorded in the Seam and Ply columns of the Geology data and then concatenated together.

12.7.2 Offsets from Left-Hand Edge of Holes

Horizontal offsets of connections can be specified with respect to the holes on the left and the right-hand side of each connection. If connections are drawn between holes, the values of the Offsets from Left-Hand Edge of Hole on Left and on Right alters the position of the connecting lines with respect to the lithology column. The effect of altering these values can be seen in the following examples where the width of the lithology columns is 20mm:





12.7.3 Layer and Text Height

The layer is the name of the layer in the dxf file on which the stratigraphy lines and colouring are written. If no layer is specified, they go on the default layer 0.

The text height is height for the text displaying the name of the Horizon, Strat or Coal Connection half-way between holes. If set to zero, no name appears.

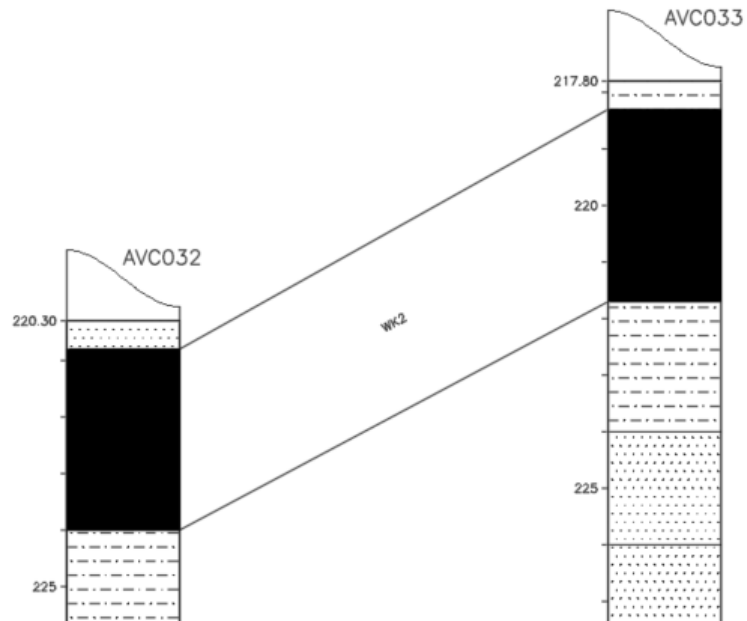
12.7.4 Fill with Strat / Seam Colour

If ticked, then the connection between holes is filled in. The colour used is that in the Colour column of the user's Seam Dictionary:

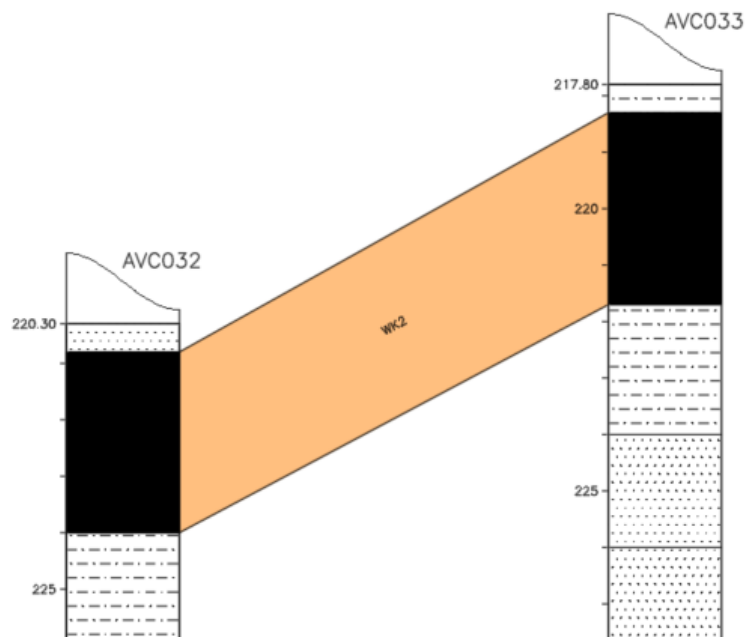
	Code	Desc	Historical	Group	Before	After	Pattern	Pattern2	Colour
	WK1	Warkworth 1 Seam		SEAM	Y	Y			60
	WK2	Warkworth 2 Seam		SEAM	Y	Y			31
	WK2L	Warkworth 2 Lower Seam		SEAM	Y	Y			
▶	WK2U	Warkworth 2 Upper Seam		SEAM	Y	Y			
	WK3	Warkworth 3 Seam		SEAM	Y	Y			4
	PF	Piercefield		SEAM	Y	Y			6

If no colour is specified in the dictionary for a the Seam or Strat then the connection is coloured black.

Example with Fill with Strat / Seam Colour not ticked:

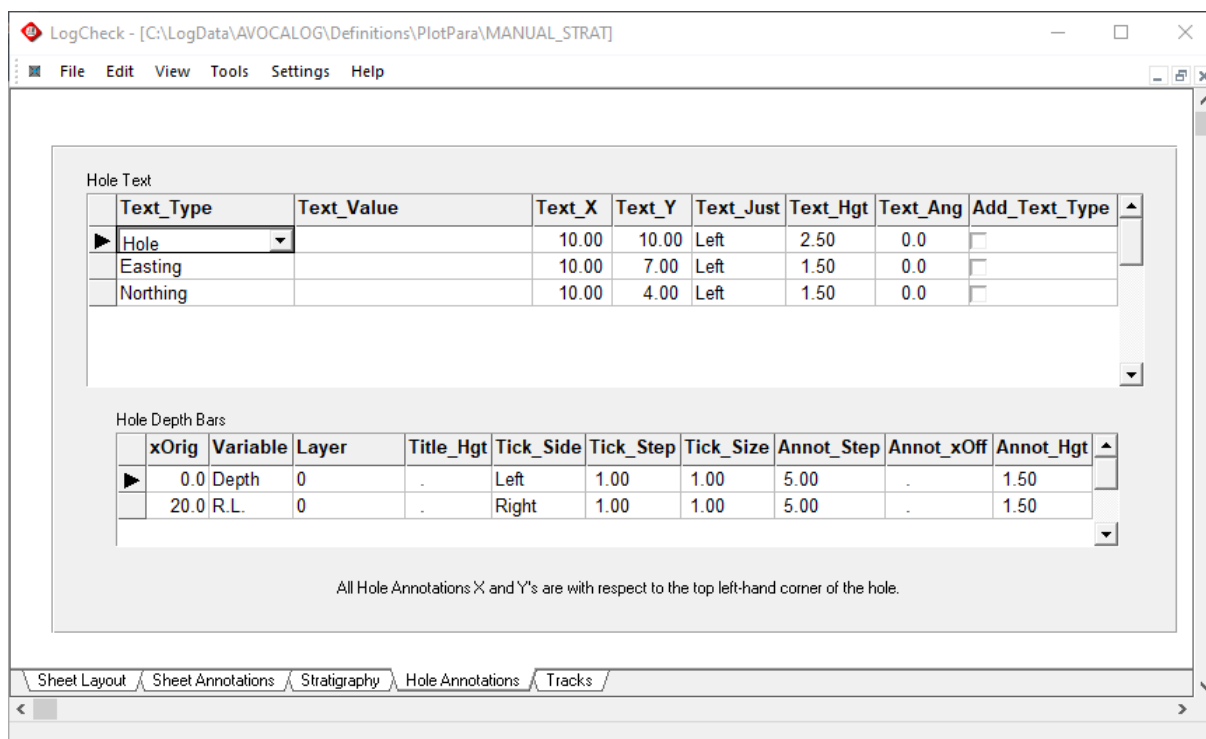


Example with Fill with Strat / Seam Colour ticked:



12.8 Plot Definition - Hole Annotations Page

An example of the Hole Annotations page:



The parameters that can be set in the Hole Annotations page include those for:

- Additional text to be plotted for each hole
- Depth/R.L. bars that are only displayed once per hole.

X and Y positions of items on the Hole Annotations page are in millimetres and are with respect to the top left-hand corner of the hole that it applies to. Negative Y values indicate going down from the top of the hole.

12.8.1 Hole Text

The user can add text to each hole on the plot. This can be text specified by the user or derived from the user's data. The text to be plotted, its position, height, angle and whether a prefix describing the text is specified by the user in the Hole Text grid:

Hole Text

	Text_Type	Text_Value	Text_X	Text_Y	Text_Just	Text_Hgt	Text_Ang	Add_Text_Type
	Hole		10.00	10.00	Left	2.50	0.0	<input type="checkbox"/>
▶	Easting		10.00	7.00	Left	1.50	0.0	<input type="checkbox"/>
	Northing		10.00	4.00	Left	1.50	0.0	<input type="checkbox"/>

Text entries can be added to each hole by adding rows to the above grid by going to the last row and then pressing the down arrow key. Rows can also be Appended, Inserted or Deleted and values can be Blanked or Copied from Above using the Edit menu at the top of the screen.

Each row has the following values that the user can set:

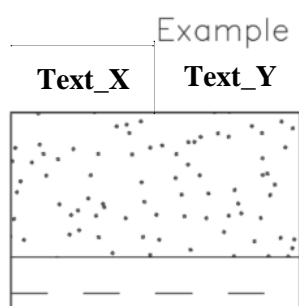
- **Text_Type:** The text type of the entry. This column has a drop-down box with available *LogCheck* variables that can be displayed on the plot. The following options are available:
 - Specify the user can specify a text string in the row's **Text_Value** column
 - Hole the name of the Hole being plotted
 - Easting the hole's Easting as recorded in its Header data
 - Northing the hole's Northing as recorded in its Header data
 - Elevation the hole's Elevation as recorded in its Header data
 - Total Depth the hole's Total Depth as recorded in its Header data
 - Hole Inclination the hole's Inclination as recorded in its Header data
 - Hole Azimuth the hole's Azimuth as recorded in its Header data
 - Start Date the hole's Start Date as recorded in its Header data
 - Total Depth the hole's Total Depth as recorded in its Header data
 - Geological Company the Geological Organization that logged the hole as recorded in its Header data
 - Geophys. Total Depth the hole's Geophysical Total Depth as recorded in its Header data
 - Header Comment the Header Comment as recorded in its Header data
 - Geologist the hole's Geologist(s) as recorded in its Geologists' data
 - Driller the hole's Driller as recorded in its Drilling data
 - Rig Type the hole's Rig Type as recorded in its Drilling data
- **Text_Value:** When **Text_Type** is *Specify*, the user specified text to be plotted on the sheet.
- **Text_X:** The X coordinate of the text in millimetres relative to the top left-hand corner of the hole. For **Text_Just:**
 - Left the X coordinate of the left-hand edge of the text.
 - Centre the X coordinate of the centre of the text
 - Right the X coordinate of the right-hand edge of the text
 See examples below.
- **Text_Y:** The Y coordinate of the text in millimetres relative to the top left-hand corner of the hole. Note that positive values are up and negative values down. For **Text_Just:**
 - Left the Y coordinate of the left-hand edge of the text.
 - Centre the Y coordinate of the centre of the text
 - Right the Y coordinate of the right-hand edge of the text
 See examples below.
- **Text_Just:** The text justification (Left, Right or Centre).
- **Text_Hgt:** The height of the text in millimetres.

- **Text_Ang:** The angular rotation of the text, 0 is horizontal, 90 vertical. See examples below.
- **Add_Text_Type:** If ticked, a prefix is added to the text describing the text. For example, if a hole has an Easting of 603451.12 and **Add_Text_Type** is ticked the text that would be plotted would be Easting: 603451.12 instead of just 603451.12.

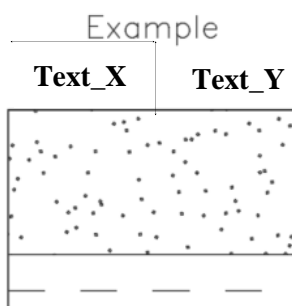
Examples of values for **Text_X**, **Text_Y**, **Text_Just** and **Text_Ang**:

Text_Ang = 0°

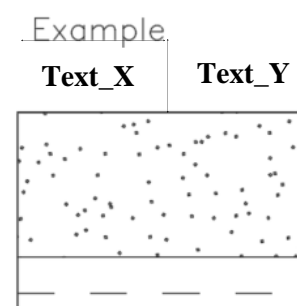
Text_Just = Left



Text_Just = Centre

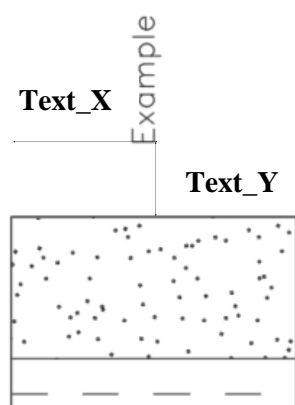


Text_Just = Right

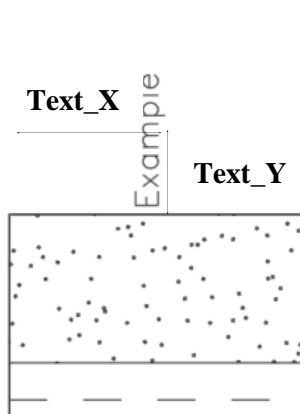


Text_Ang = 90°

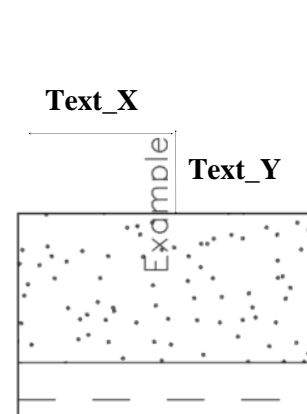
Text_Just = Left



Text_Just = Centre



Text_Just = Right



12.8.2 Hole Depth Bars

Depth and RL (Reduced Level) Bars can be defined to be displayed on plots. These bars fall into two categories: those that are plotted once for each sheet, called Sheet Depth Bars and those that are plotted once for each hole, called Hole Depth Bars. Generally, Hole Depth Bars are used for

displaying depth bars on plots but Sheet Depth Bars can be useful for including a single depth bar on a Section. The Hole Depth Bars to be displayed for each hole are specified in the Hole Depth Bars grid:

Hole Depth Bars										
	xOrig	Variable	Layer	Title_Hgt	Tick_Side	Tick_Step	Tick_Size	Annot_Step	Annot_xOff	Annot_Hgt
▶	0.0	Depth	0	.	Left	1.00	1.00	5.00	.	1.50
	20.0	R.L.	0	.	Right	1.00	1.00	5.00	.	1.50

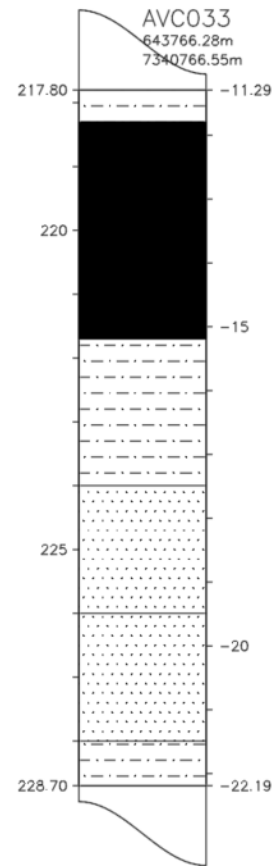
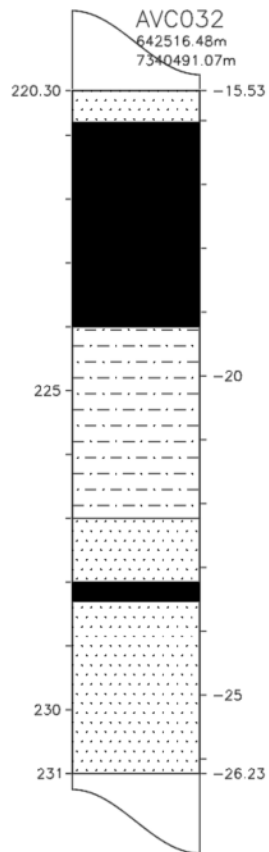
Depth Bars can be added to the plot by adding rows to the above grid by going to the last row and then pressing the down arrow key. Rows can also be Appended, Inserted or Deleted and values can be made Blank or Copied from Above using the Edit menu at the top of the screen.

The Hole Depth Bars for a hole have the same vertical position and extents as the displayed data for the hole they are attached to. As the Hole Depth Bars are only plotted when the plot is first created not when it is appended to, the depth range displayed will be that for the hole's data that is plotted when the plot is created.

Each row in the Hole Depth Bars grid has the following values:

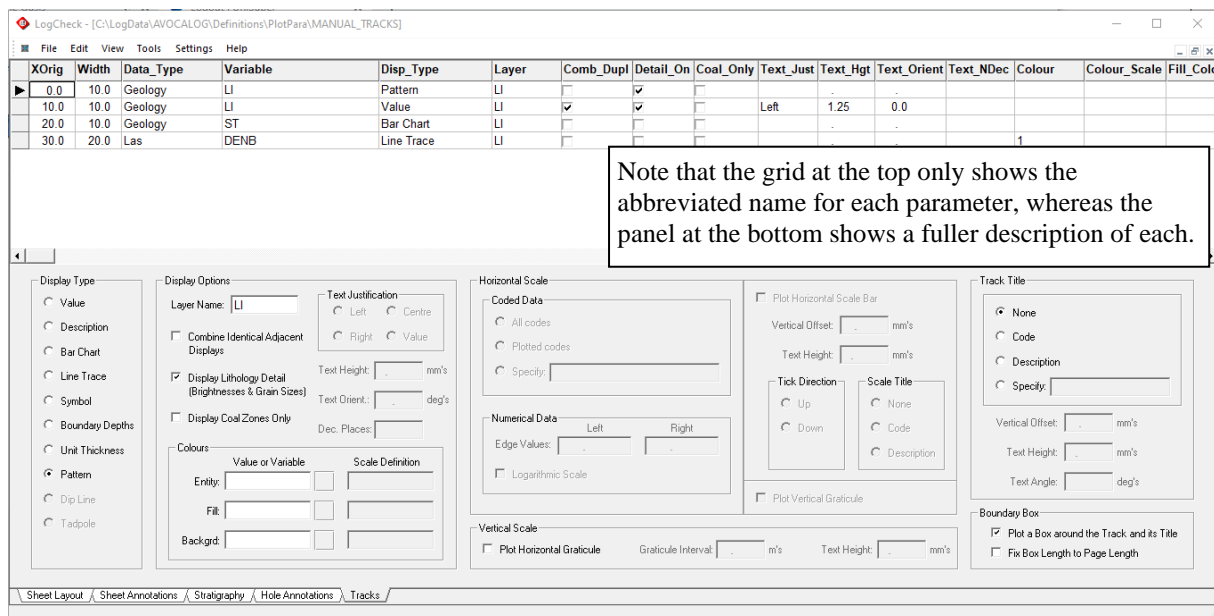
- **xOrig:** the position of the depth bar relative to the left-hand edge of the hole.
- **Variable:** Depth or R.L.
- **Layer:** the layer on which to plot the bar. The default layer generally used in .dxf plots is called 0.
- **Title_Hgt:** the text height in millimetres of the title (either “Depth” or “RL”) that appear at the top of the bar. If set to blank or zero, no title will appear on the bar.
- **Tick_Side:** Left or Right.
- **Tick_Step:** the depth interval between ticks. For example, a value of 0.2 means that a tick will be placed every 0.2 m down the hole.
- **Tick_Size:** the horizontal length of each tick in millimetres.
- **Annot_Step:** the depth interval between ticks that are annotated with their value – as generally a value is not required on every tick. **Annot_Step** has to be a multiple of the **Tick_Step**.
- **Annot_xOff:** the distance from the bar to the start of the annotation. Where the **Tick_Side** is Left then it is the distance to the right-hand edge of the annotation and where it is Right it is the distance to the left-hand edge of the annotation.
- **Annot_Hgt:** text height in millimetres of the values that appear on the depth bar. If this is blank or zero no annotations will be displayed on the plot.

For the Hole Text and Hole Depth Bars table shown above, the resulting plot is shown on the next page. Note the “Depth” on the left of each hole, and “R.L.” on the right of each hole. The **Tick_Step** is 1 metre and the **Annot_Step** 5.0 metres.



12.9 Plot Definition - Tracks Page

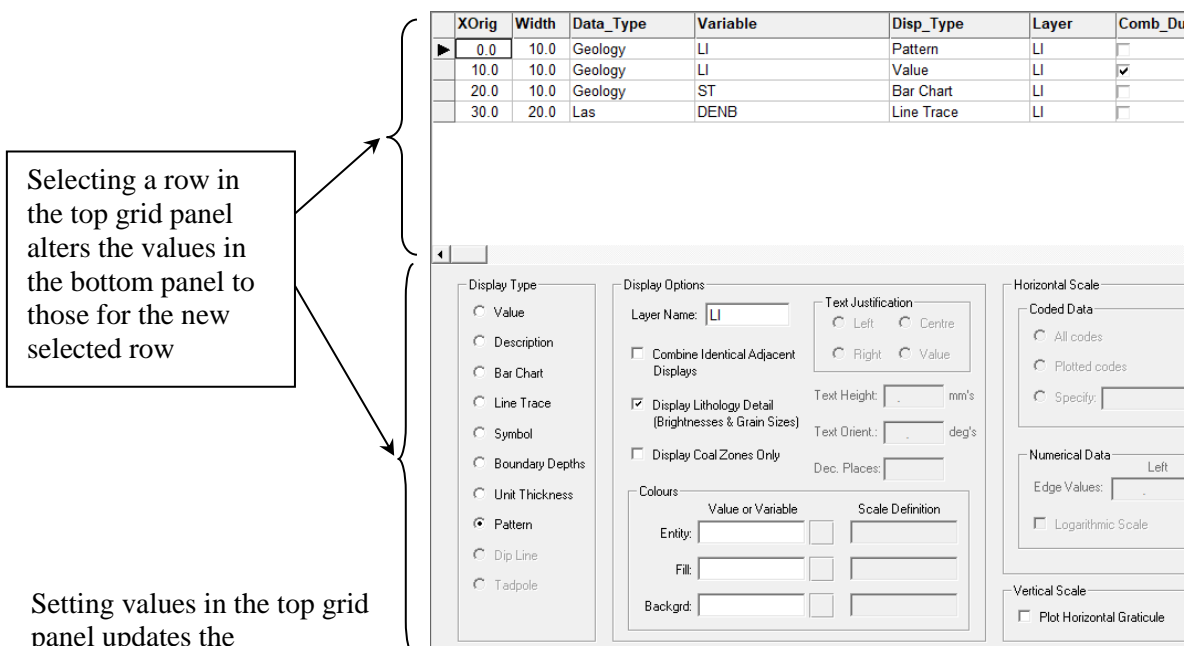
The Tracks page specifies the tracks, that is columns, to display and their appearance. Tracks can be inserted between existing tracks, added to the end of the existing tracks, or deleted. An example of the Tracks page is:



In this example, there are three Geology tracks and a Las track. The first track plots the LithoType as a Pattern. The second plots the LithoType as a Value, 10mm to the right of the left-hand edge of the first track. The third plots the Strength (ST) as a Bar Chart. The fourth the Short Spaced Density as a Line Trace.

12.9.1 How the Tracks Page Works

The top grid panel has columns for all the parameters that can be set for plotting a track. The values in the bottom panel change depending on which row in the top grid panel is currently selected.



corresponding values in the bottom panel and setting values in the bottom panel updates the corresponding values in the top grid panel.

To view the remaining columns in the grid panel, drag the knob in the scroll bar.

	XOrig	Width	Data_Type	Variable	Disp_Type	Layer	Comb_Dupl	Detail_On	Coal_Only
	0.0	10.0	Geology	LI	Pattern	LI	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
▶	10.0	10.0	Geology	LI	Value	LI	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	20.0	10.0	Geology	ST	Histogram	LI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	30.0	20.0	Las	DENB	Line Trace	LI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

bar.

The first four columns of the grid panel (**XOrig**, **Width**, **Data_Type** and **Variable**) are the Track identification columns and as the grid is scrolled, they remain fixed as the first four columns while the subsequent columns are moved left. After scrolling one column to the left, the grid shows:

	XOrig	Width	Data_Type	Variable	Layer	Comb_Dupl	Detail_On	Coal_Only	Text_Just
▶	0.0	10.0	Geology	LI	LI	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	10.0	10.0	Geology	LI	LI	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Left
	20.0	10.0	Geology	ST	LI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	30.0	20.0	Las	DENB	LI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Notice that the **Disp_Type** column has “disappeared”, and the remaining columns to the right are moved to the left.

The advantage of the grid panel at the top is that one can see the value of the same parameter across multiple tracks. This can be useful for example if one wants to ensure that the Text Height is the same for each track.

The bottom panel of the Tracks page does not include the Track identification columns (**XOrig**, **Width**, **Data_Type** and **Variable**) and the current row in the top grid panel needs to be checked to determine which track is currently shown in the bottom panel. This panel has six panels:

- Display Type panel
- Display Options panel
- Horizontal Scale panel
- Vertical Scale panel
- Track Title panel
- Boundary Box panel

The Track Identification variables and all the panels are described below.

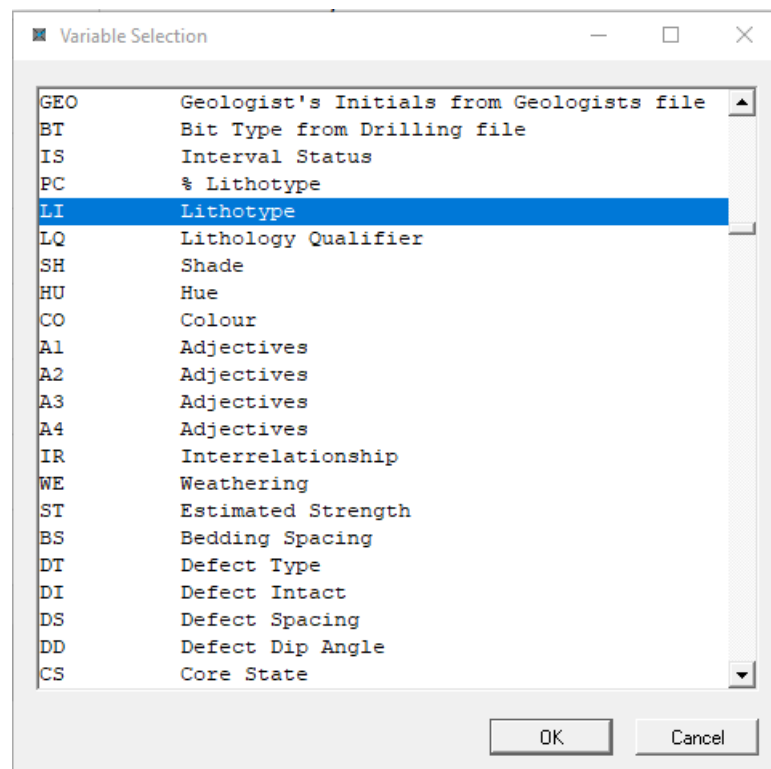
12.9.2 Track Identification Columns

The Track Identification Columns are:

- XOrig** the horizontal position in mm's of the left-hand edge of the track relative to the position of each hole. By convention, the left-hand edge of the lithology pattern track is usually given an **XOrig** of 0.0.
- Width** the width in mm's of the track
- Data_Type** the Data Type of the hole data to be used to populate the track. This is selected from a drop-down box which includes not only data supplied by the user such as Geology, Defects, Las but also calculated data such as Seam Composites, Run RQD's, Fracture Frequencies, Point Load Indices
- Variable** the variable in the specified **Data_Type** to be used to populate the track. Multiple variables separated by columns can be entered but if multiple variables are entered then the only available options for **Disp_Type** are Value and Description.

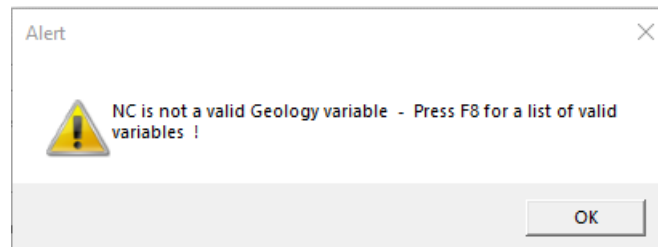
	XOrig	Width	Data_Type	V
▶	0.0	10.0	Geology	LI
	10.0	10.0	Geology	LI
	20.0	10.0	WaterFlows	S'
	30.0	20.0	SampDispatch	DI
			CoalQuality	
			Reflectance	
			GasContent	
			Las	
			Defects	

The name of the variable can either be typed into the grid column or selected from a list of valid variables for the **Data_Type**. This list can be displayed by pressing the F8 function key. For example, if **Data_Type** is set to Geology and F8 is pressed when the cursor is in the Variable column, the following menu is displayed:



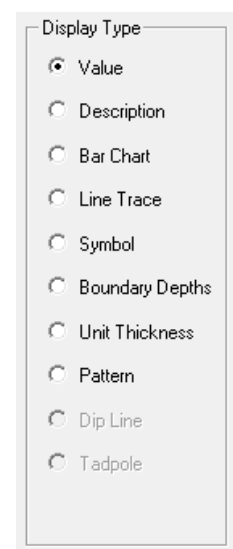
Each item selected from this list will be appended to any already displayed in the **Variable** column.

If the user types in a **Variable** name that does not exist in the specified **Data_Type** it is not accepted and a Warning similar to the following is displayed:



12.9.3 Track Display Type Panel

The manner in which the track's selected data is displayed is selected in the Display Type panel. The available options will depend on the variables that have been selected. What is more, the manner that some options display the data depends on whether the selected data is character or numerical. The available display types are:



- **Value** this option is available for all data including where **Variable** contains multiple variables separated by commas.

Character Variable

Lithotype
SS
CS

Numerical Variable

Bedding Dip Angle
10

Multiple Variables

Lithotype, Lithology Qualifier, Shade, Hue, Colour, Bedding Dip Angle
SS, FF, E, , G, 10
CS, , E, G, E,

- **Description**

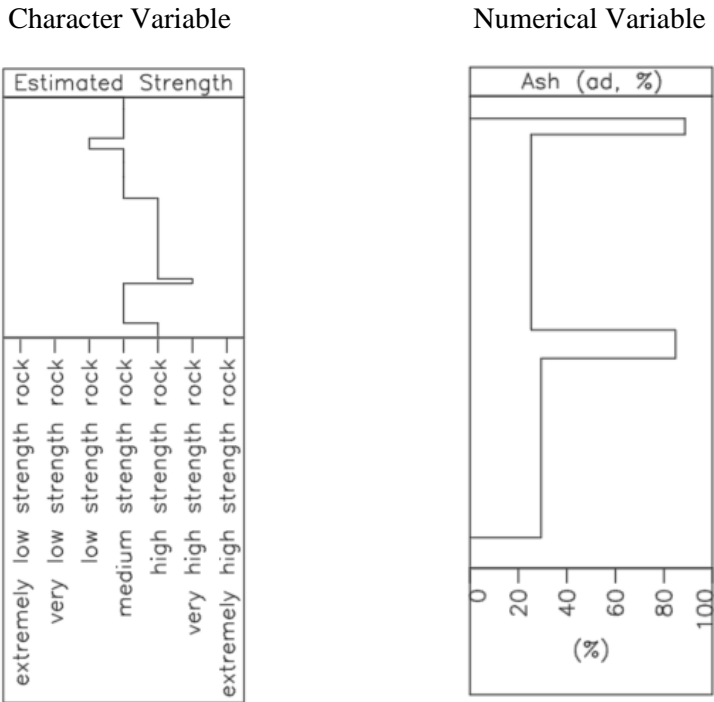
This option is available for all data including where **Variable** contains multiple variables separated by commas.

Character Variable	Numerical Variable	Multiple Variables
Lithotype	Bedding Dip Angle	Lithotype, Lithology Qualifier, Shade, Hue, Colour, Bedding Dip Angle
Sandstone	dipping at 10°	SANDSTONE, fine: medium grey, dipping at 10°.
Claystone		CLAYSTONE: medium greyish-green.

- **Bar Chart**

This option is available for all character and numerical variables but is best suited to values recorded over an interval such as Estimated Strength or Ash rather than data recorded at depth points such as Defect Type or geophysical readings. For character variables the horizontal scale will be the distinct set of values for the variable whereas for numerical variables it will be a scale bar. For more information on the Horizontal Scale see the section below on Track Horizontal Scale.

BarChart can be used for point depth data but in the case of point depth data the bar for each value is drawn from the depth half-way between the previous and current value to half-way between the current value and the next value.

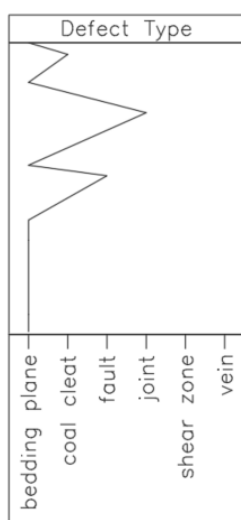


- **Line Trace**

This option is available for all character and numerical variables but is best suited to values recorded at depth points such as Defect Type or geophysical readings. For character variables the horizontal scale will be the distinct set of values for the variable whereas for numerical variables it will be a scale bar. For more information on the Horizontal Scale see the section below on Track Horizontal Scale.

Line Trace can be used for data recorded over an interval such as Estimated Strength or Ash but in the case of data recorded over an interval the line between a value and the next value is drawn from the depth at the half-way point of the current interval to the half-way point of the next interval.

Character Variable



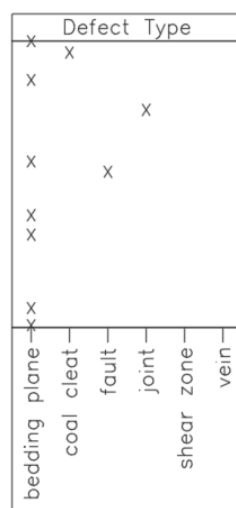
Numerical Variable



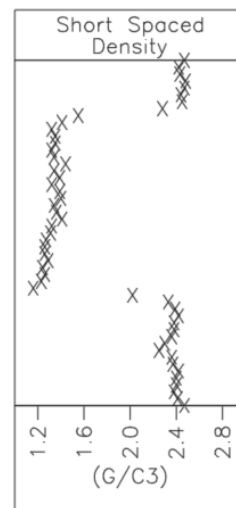
- **Symbol**

This option is available for all character and numerical variables but is best suited to values recorded for at depth points such as Defect Type or geophysical readings. This option produces a similar display as Line Trace but places a cross at each data point rather than joining the data points with lines.

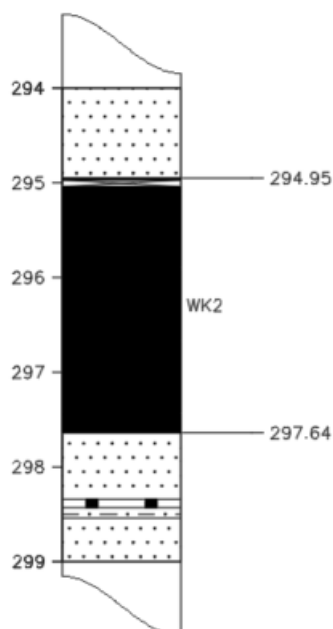
Character Variable



Numerical Variable

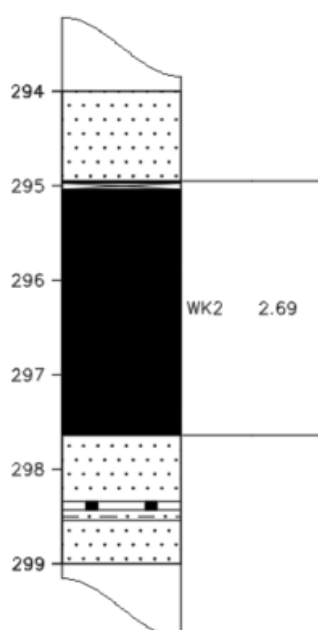


- Boundary Depth** This option is available for all character and numerical variables but is best suited to values recorded over an interval such as Seam or Ash. It displays the depths at the top and bottom of each unit. For example, it can be used for displaying the top and bottom depths of seams by selecting **Data_Type** of Geology and **Variable** of SEAM:



A tick is plotted along with the depth. If Left Justification is selected for the depth text then the tick will appear to the left of the text and if Right Justification is selected then the tick will appear to the right.

- Unit Thickness** This option is available for all character and numerical variables but is best suited to values recorded over an interval such as Seam or Ash. It displays the thickness of each unit. For example, it can be used for displaying the top and bottom depths of seams by selecting **Data_Type** of Geology and **Variable** of SEAM:



- **Pattern**

This option is available for all character variables whose values are limited to those specified in the dictionary for the **Data_Type** and who are recorded over an interval, for example LithoType or Rock Mass Unit Type. It displays a pattern for each value that has a pattern and/or fill recorded for it in the **Data_Type's** dictionary:

	Code	Desc	Pattern	Pattern2	Fill
	IS	Ironstone	IS1		
	IV	Intermediate Volcanic	VR3		
	KA	Kaolinite	CL6	K1	
	KK	Cone in Cone Carbonate	KK1		
	KL	Core Loss			NL
	LA	Laterite	AL1	L2	
	LC	Lost Coal (from geophysics)			NL
	LG	Lignite			BC
	LI	Limonite	CL6	L1	

The user can specify one or two patterns and a fill for each code and these will all be superimposed on top of each other. When editing the dictionary, the names of the available Patterns and Fills can be seen by turning on the dictionary menu by selecting View > Display Keypad/Dictionary Menu.

An example of **Display_Type** Pattern for LithoType data:



- **Defect Line**

This option is only available for the **Variable** DEFECT in Defect or Scanner data. It plots a line for each defect. It uses the dip angle recorded in the defect field named A1 and its shape as recorded in the defect field named Sh.

This is a symbolic representation rather than a display of the actual defect. In particular, even though the line is plotted at its actual angle, if the width of the column does not match the width of the core scaled as per the vertical depth scale then the length of core affected by the defect will be different to that recorded in the data variable DefLen. For example, if the vertical scale is 1:20 and the original core had a diameter of 61mm, then the column on the defect line column on the plot needs to be 3.05mm wide. If the column is wider, then the defect will appear to affect more of the core than it actually does.

An example of **Display_Type** Pattern for **Variable** RT and **Display_Type** Defect Line for **Variable** DEFECT:

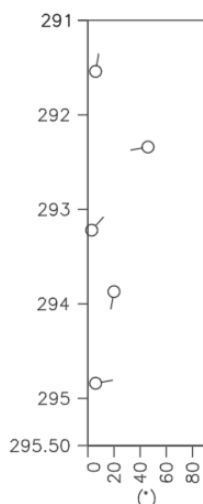


This depicts a broken Rock Mass Unit followed by:

- a low angle planar defect
- a high angle stepped defect
- a low angle undulose defect
- a medium angle irregular defect
- a low angle concave / convex defect

- **Tadpole**

This option is only available for the **Variable** A1 or AN (dip angle) in Defect or Scanner data. It plots a tadpole for each defect. The horizontal position of the tadpole indicates the dip of the defect and the tail indicates the orientation down dip as recorded in the variable DO. This data can only be recorded on orientated core or scanner interpretations. An example of a tadpole plot:



12.9.4 Display Options Panel

The Display Options panel of the Tracks page controls the way data is displayed on the plot.

Display Options

Layer Name:

☒ Combine Identical Adjacent Displays

☒ Display Lithology Detail (Brightnesses & Grain Sizes)

☐ Display Coal Zones Only

Text Justification

☒ Left ☐ Centre

☐ Right ☐ Value

Text Height: mm's

Text Orient.: deg's

Dec. Places:

Colours

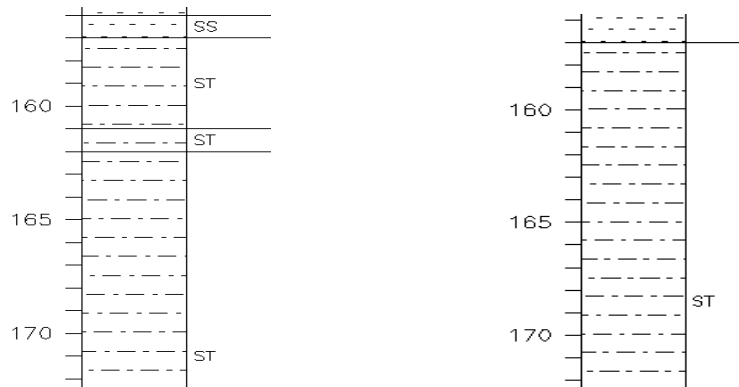
	Value or Variable	Scale Definition
Entity:	<input type="text"/>	<input type="text"/>
Fill:	<input type="text"/>	<input type="text"/>
Backgrd:	<input type="text"/>	<input type="text"/>

This panel includes the following parameters and the parameter's column name in the main grid shown in bold:

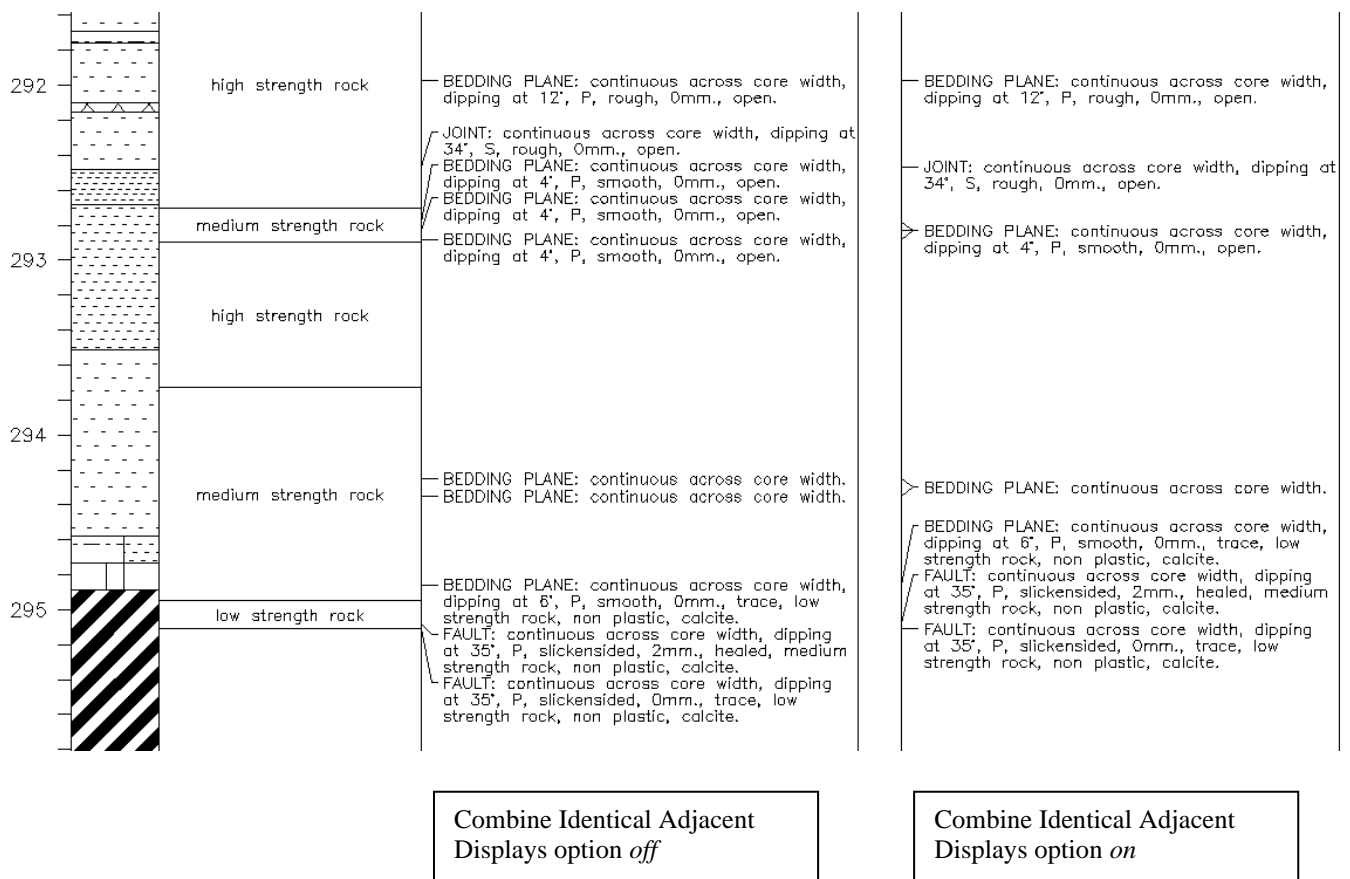
- Layer Name (**Layer**): The plot layer for the track. This is a user-defined layer name. When displaying the resulting .dxf file in a viewer such as AutoCad's TrueView, layers can be turned on or off. If a layer is not specified, the entity is plotted on Layer 0.
- Combine Identical Adjacent Displays (**Comb_Dupl**): combines identical adjacent displays. This is only available where the **Display_Type** is Value, Description, Boundary Depths, Unit Thickness or Pattern. Where adjacent units would display the same then they are combined into a single unit.

With the following example the siltstone has been divided in the data into three separate units since each unit has a slightly different colour. If **Comb_Dupl** is off as with the diagram on the

left then both the pattern and text shows the three separate siltstones whereas if it is on then the three are shown as a single unit.



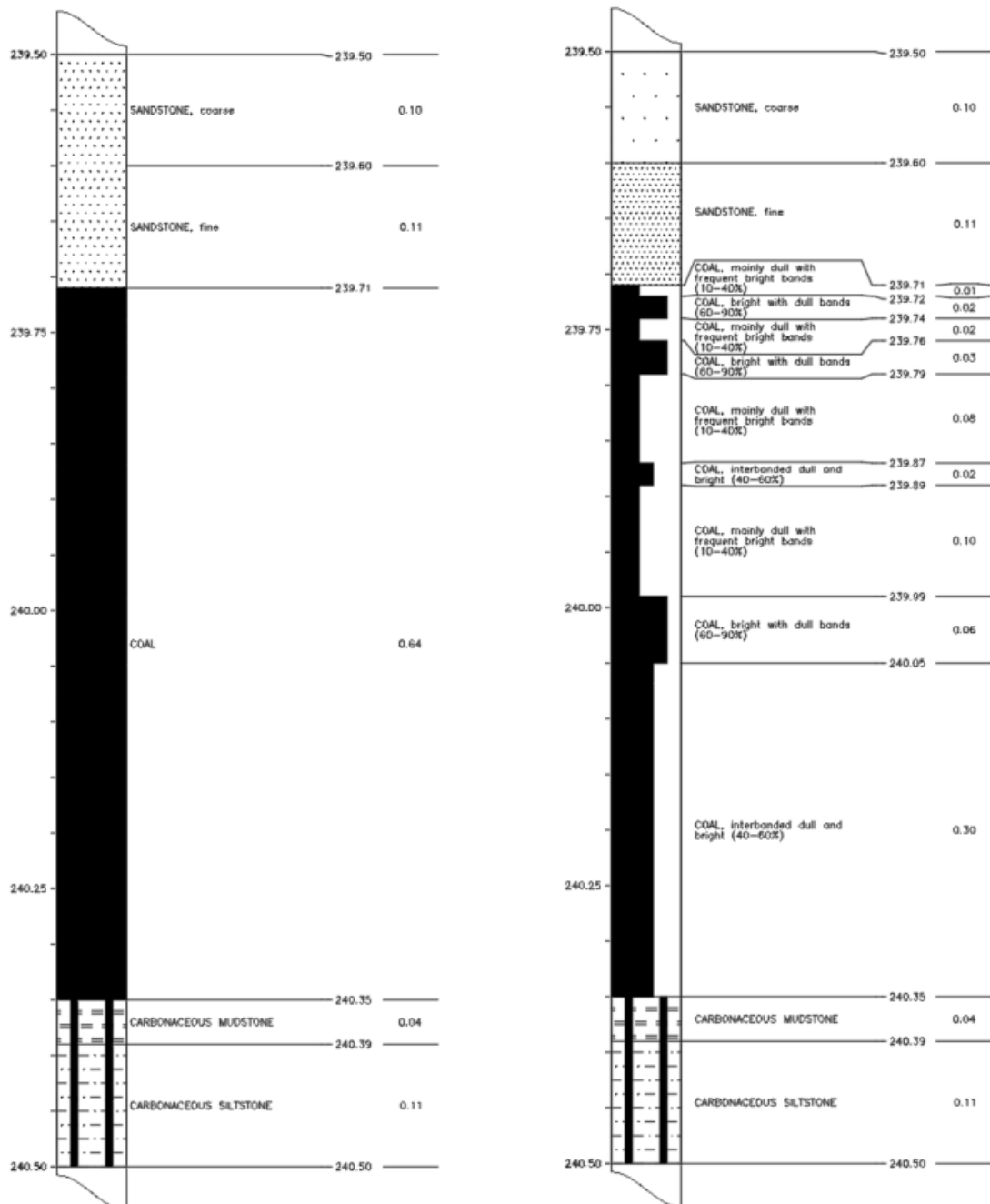
Another example of having **Comb_Dupl** on and off when plotting Defect Descriptions:



- Display Lithology Detail (Brightnesses & Grain Sizes) (**Detail_On**): this determines if coal brightnesses are displayed. It is only available for **Display_Types** of Description, Boundary Depths, Unit Thickness or Pattern. In addition for CoalLog data, if **Display_Type** is Pattern then if **Detail_On** is on, then the pattern used is based on the data's LithoTypes and

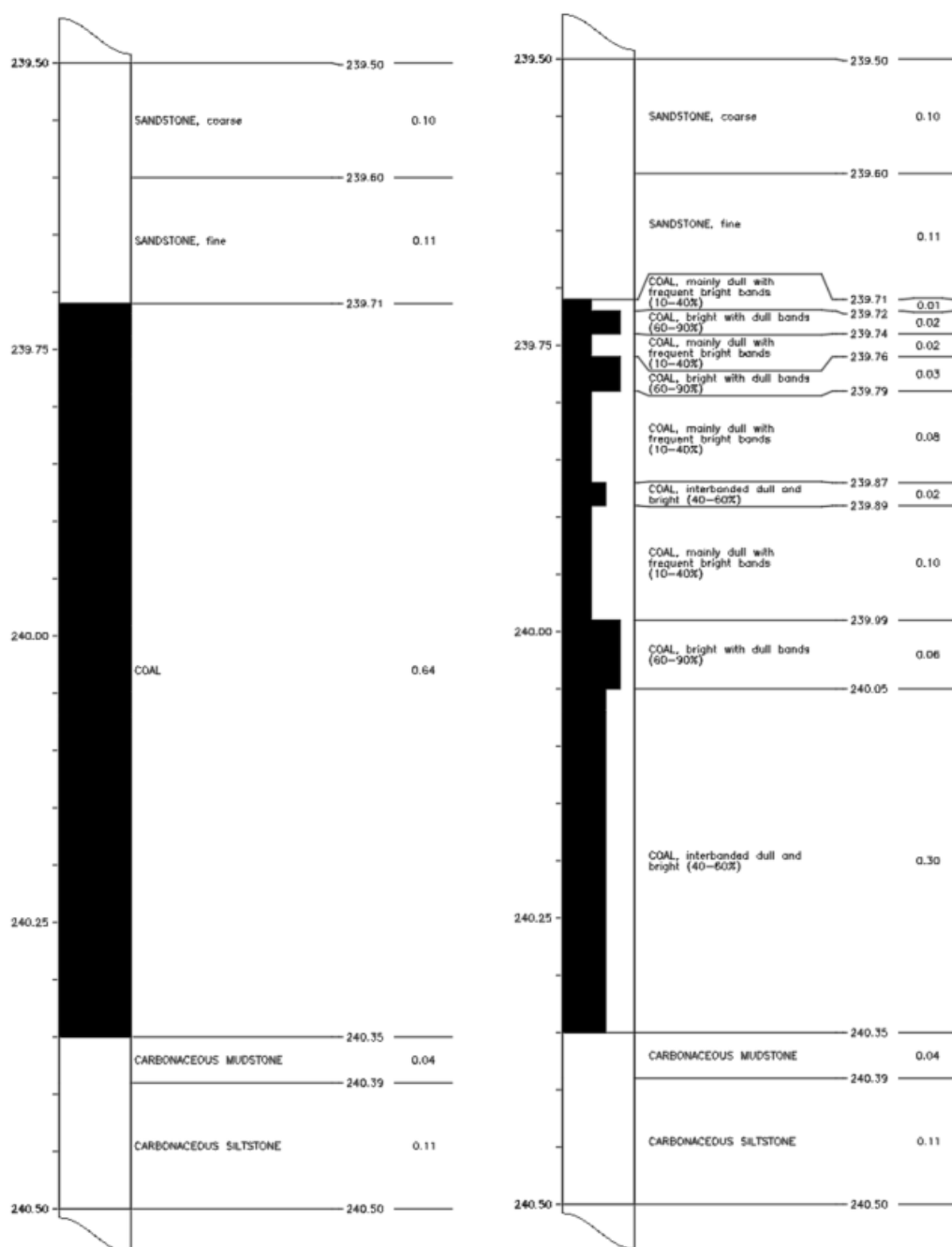
Lithological Qualifiers not just the LithoType. In other words, not only are coal brightnesses shown but also grain and clast sizes for clastic material.

The examples below display Pattern, Description, Boundary Depths and Unit Thickness for an interval. The image on the left has **Detail_On** turned off and the image on the right has it turned on.



- **Display Coal Zones Only (Coal_Only):** if this is set then only the coal zones are displayed. This option is only available for the **Display_Type** of Pattern. This can be particularly useful when doing sections and not wanting to be distracted by the non-coal units.

The example below, displays the previous images, however, now the **Coal_Only** flag has been turned on.

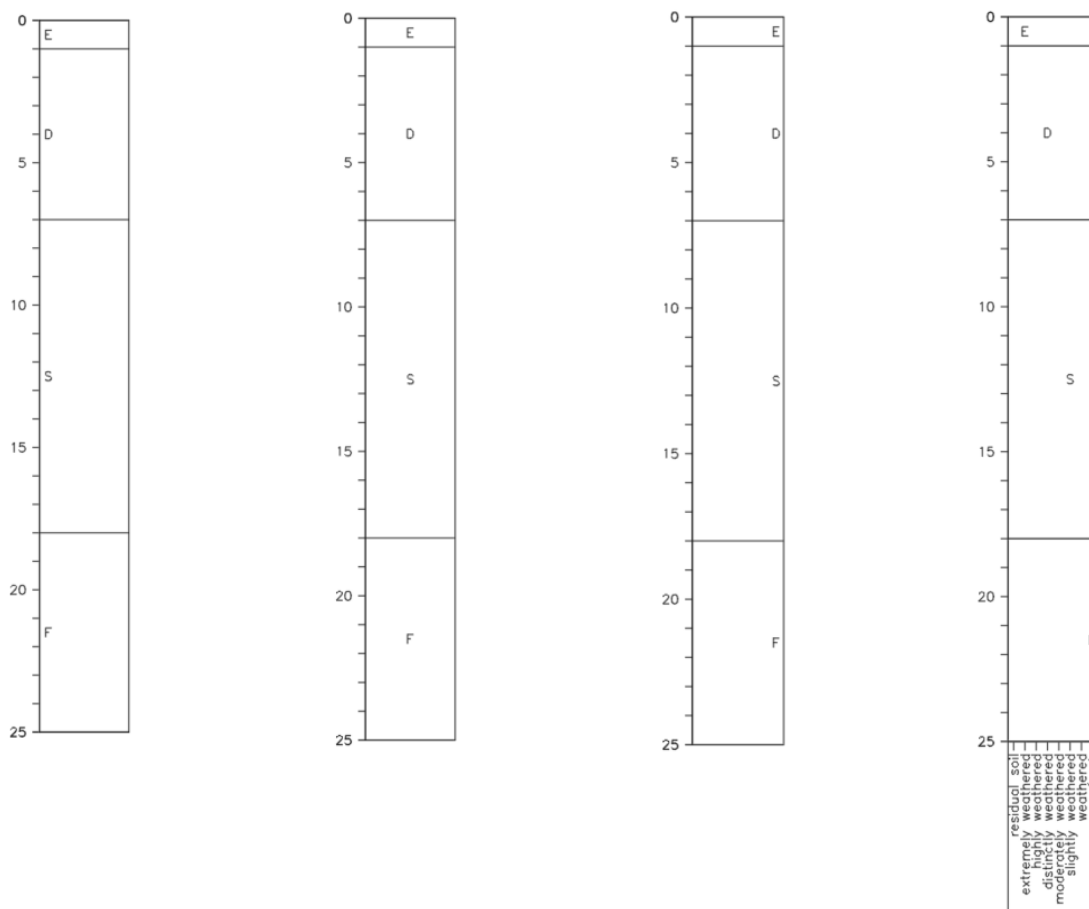


- Text Justification (**Text_Just**): can be Left, Centre, Right or Value. Left justifies the text to the left of the track. Centre justifies it to the centre. Right justifies it to the right. Value locates the text according to its value.

Text_Just can be selected for **Display_Types** of: Value, Description, Boundary Depths and Unit Thicknesses. For **Display_Type** of Symbol or Tadpole, **Text_Just** cannot be selected rather it is automatically set to Value

The **Text_Just** option of Value can only be selected for **Display_Type** of Value and then only if the **Variable** being displayed is one whose values come from a data dictionary.

Below are examples of weathering values plotted with Left, Centre, Right and Value justification:



- **Text Height (Text_Hgt):** is the height of the displayed text in millimetres. It is used for all **Disp_Types** except Bar Chart, Line Trace, Pattern and Defect Line.
- **Text Orientation (Text_Orient)** is the angle counter-clockwise from the horizontal for plotting text. It is used when **Disp_Type** is Value, Description, Boundary Depths or Unit Thickness.
- **Decimal Places (Text_NDec)** is the number of digits to display after the decimal point. It is used when **Disp_Type** is Value, Boundary Depth or Unit Thickness. For **Disp_Type** Value though it is only used when **Variable** is numeric variable.
- **Colours** enables the user to select the colours for displaying data. Colours can be selected for both Entities and Background for all **Disp_Types**. In addition, the Fill colour can also be selected for **Disp_Types** of Bar Chart, Line Trace, Pattern and Tadpole.

Colours		
	Colour No. or Variable	Scale Definition
Entity:	<input type="text"/>	<input type="text"/>
Fill:	<input type="text"/>	<input type="text"/>
Backgrd:	<input type="text"/>	<input type="text"/>

A single colour can be used for all the data displayed in a track or different colours can be used based on the value of the variable being plotted or based on any other variable that is on the same record in the data as the variable being plotted. For example, one could plot a pattern for each LithoType in a hole but then colour these patterns according to their Estimated Strengths or one could plot a bar chart for Ash and colour its fill according to its Calorific Value.

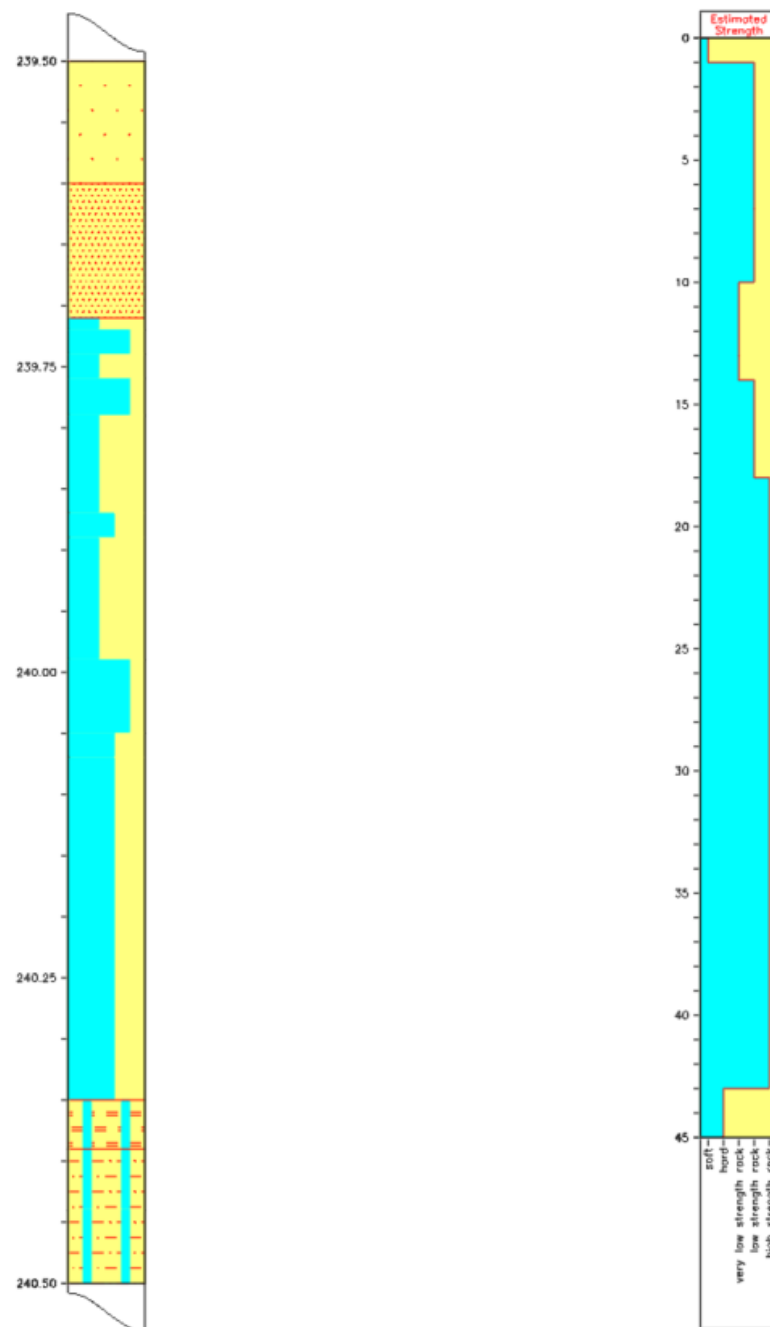
To assign a single colour for all the data displayed in a track then in the box under the title Colour No. or Variable enter the AutoCAD colour number required (see Appendix ?? for the AutoCAD colour numbers). After the colour number is entered, its actual colour will appear on the screen in the square to the right of the where the colour number has been entered. For example:

Colours		
	Colour No. or Variable	Scale Definition
Entity:	<input type="text" value="1"/>	<input type="text"/>
Fill:	<input type="text" value="4"/>	<input type="text"/>
Backgrd:	<input type="text" value="51"/>	<input type="text"/>

If the Colour Nos for Entity and Fill are left blank then when plotted they will be black when displayed on a white screen or plotted on paper and white when displayed on a black screen.

If the Background Colour No is left blank then the background will be left uncoloured.

The above Colour No specifications would generate the following results for a LithoType Pattern plot and an Estimated Strength Bar Chart:



For the Pattern plot the LithoType symbols are in red, the fill of the coals and the carbonaceous bars are in cyan and the background is in yellow..

For the Bar Chart, the outline of the bar is in red, the fill of that bar chart is in cyan and the background, that is the area to the right of the Bar Chart, is in yellow.

To colour images according to the value of one of the variables in the data then instead of specifying an AutoCAD colour number in the Colour No. or Variable box, enter the name of the variable to use for colouring. The names of all the data variables can be found at the top of the screen when editing the data.

In order to use a variable, it must either be a character variable which has a dictionary lookup or a numerical variable. For example, as Sample Numbers can contain non-numeric characters and do not have dictionary lookups, they cannot be used for specifying colours.

How variables control colours depends on whether they are character or numerical variables. For character variable such as LithoType, it looks up the LithoType in the dictionary and then uses the colour number in the dictionary Colour column if being used for Entities, uses that specified in the FillColour column if being used for Fills and uses that specified in the BgColour column if being used for the Background:

Code	Desc	Pattern	Pattern2	Colour	Fill	FillColour	BgColour
SY	Syenite	IN4		241			241
SZ	Schist	SZ1		6			6
TA	Talc	TA1					
TF	Tuff	TFTS					
TI	Tillite	TI1		92			92
TN	Tonstein	T1		32			32
TR	Trachyte	VR3		140			140
TS	Tar Sand	TR1	SA1	51			51
TT	Tuffite	TTTS					
VB	Volcanic Breccia	VB1		40			40
VD	Void				VD		
VR	Volcanic Rock, undifferentiated	VR1		140			140
XC	Carbonaceous Claystone	CS1		254	X1	1	254
XH	Carbonaceous Shale	SH1		92	X1	1	92
XM	Carbonaceous Mudstone	MS5		92	X1	1	92
XS	Carbonaceous Sandstone	SS13		51	X1	1	51
XT	Carbonaceous Siltstone	ST1		71	X1	1	71
ZC	Coaly Claystone	CS1		254	ZZ	3	254
ZH	Coaly Shale	SH1		92	ZZ	3	92
ZM	Coaly Mudstone	MS5		92	ZZ	3	92
ZS	Coaly Sandstone	SS13		51	ZZ	3	51
ZT	Coaly Siltstone	ST1		71	ZZ	3	71

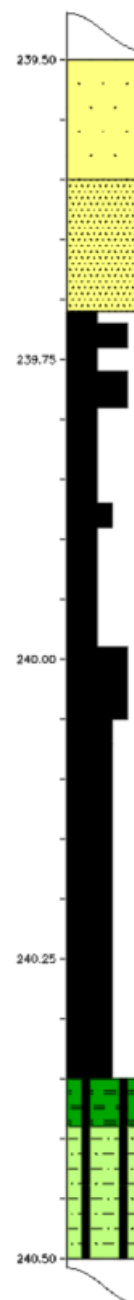
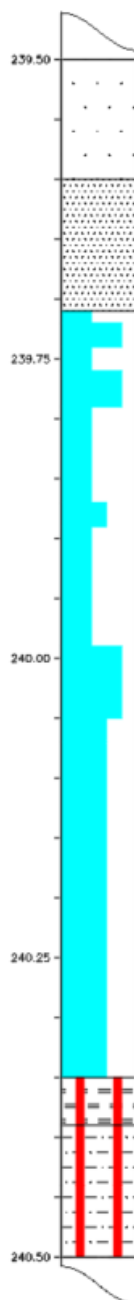
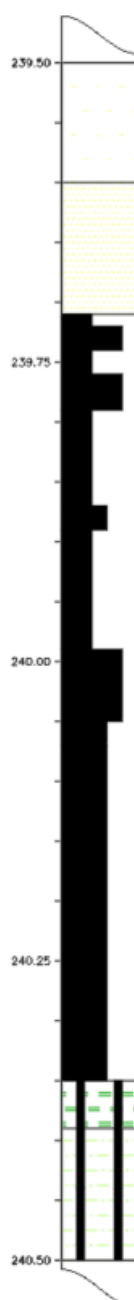
The Geology dictionary supplied with the CoalLog version of *LogCheck* already has the CoalLog standard LithoType colours setup in the Colour and BgColour columns of the LithoType dictionary.

The following examples show the LithoType value being used to colour a LithoType pattern plot:

Colours		
	Colour No. or Variable	Scale Definition
Entity:	LI	
Fill:		
Backgrd:		

Colours		
	Colour No. or Variable	Scale Definition
Entity:		
Fill:	LI	
Backgrd:		

Colours		
	Colour No. or Variable	Scale Definition
Entity:		
Fill:		
Backgrd:	LI	



In order to colour a plot using a numerical variable it is first necessary to create a Colour Scale Definition (see Creating and Editing Colour Scale Definitions) and then to specify in the Colour panel of the Plot Definition the name of the Variable and the name of the Scale Definition to be used. When

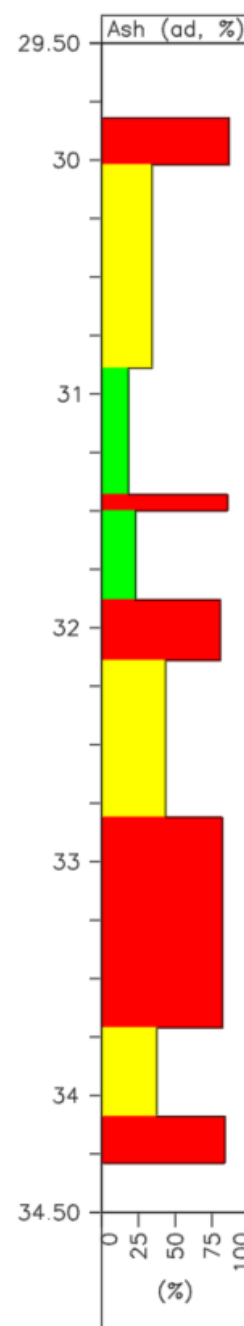
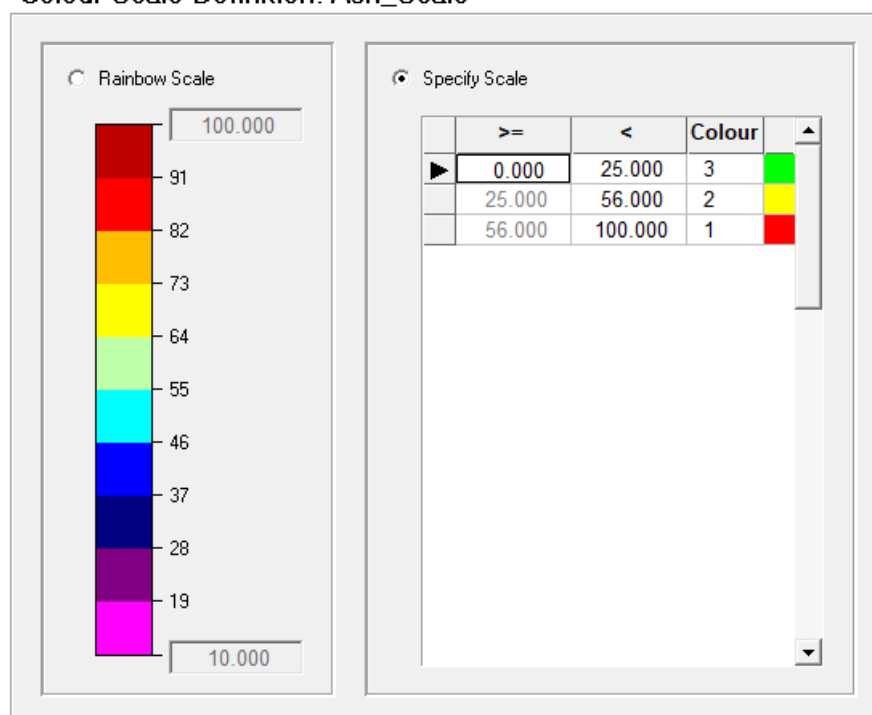
LogCheck is creating the plot, it searches for the specified Colour Scale Definition firstly in the ColourScale folder in the Definitions folder of the project folder of the data and if a ColourScale Definition of that name does not exist there it looks for it in the ColourScale folder of the Definitions folder in the *LogCheck* data folder which is generally called C:\LogData.

The following plots show two example Ash bar charts of the same hole interval, however, the first has the fill of the bar chart coloured according to the actual Ash value whereas the second is coloured according to the Volatile Matter values for the intervals. Both examples, not only show the resulting plot but also the Plot Definition Colour panel and the Colour Scale Definition used to generate them.

Colours

Entity:	Colour No. or Variable	Scale Definition
Entity:		
Fill:	ASH	ASH_SCALE
Backgrd:		

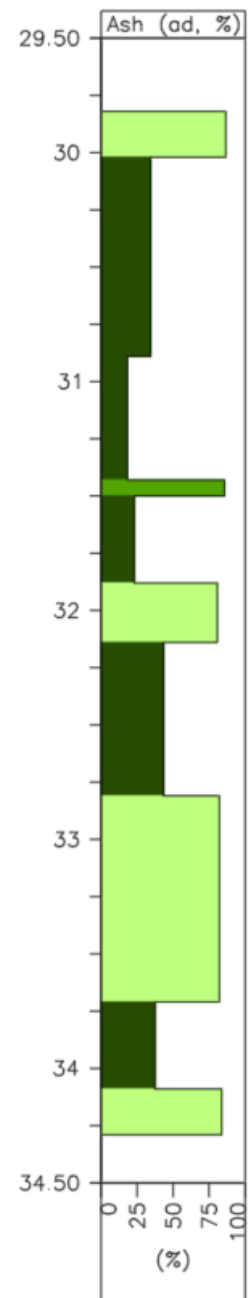
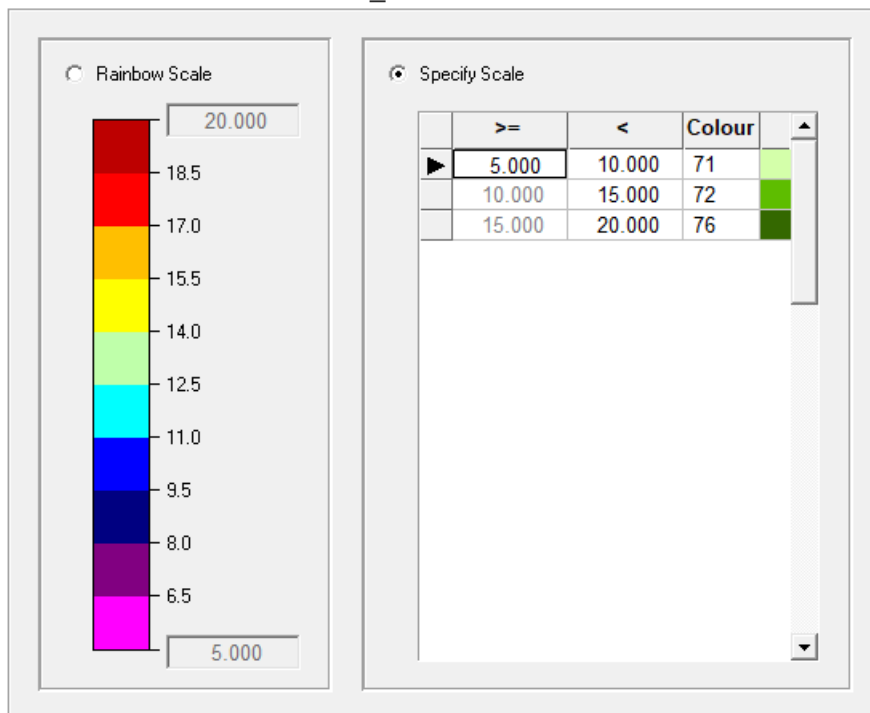
Colour Scale Definition: Ash_Scale



Colours

Entity:	Colour No. or Variable	Scale Definition
Entity:		
Fill:	VM	VM_SCALE
Backgrd:		

Colour Scale Definition: VM_Scale



With this second example it is notable that at around 31.5 metres there is a unit that is relatively higher in Volatile Matter despite the fact that it is also high in Ash.

12.9.5 Horizontal Scale Panel

The Horizontal Scale panel of the Tracks page controls both the horizontal scale and how it is displayed for each track. Specification of the Horizontal Scale is required for **Disp_Type** of Bar Chart, Line Trace, Symbol or Tadpole. It is also required where **Disp_Type** is Value and the **Text_Just** is set to Value.

Only one of the two panels Coded Data and Numerical Data is enabled depending on whether the **Variable** being plotted records coded values with dictionary lookups or numerical values.

12.9.5.1 Coded Data Panel

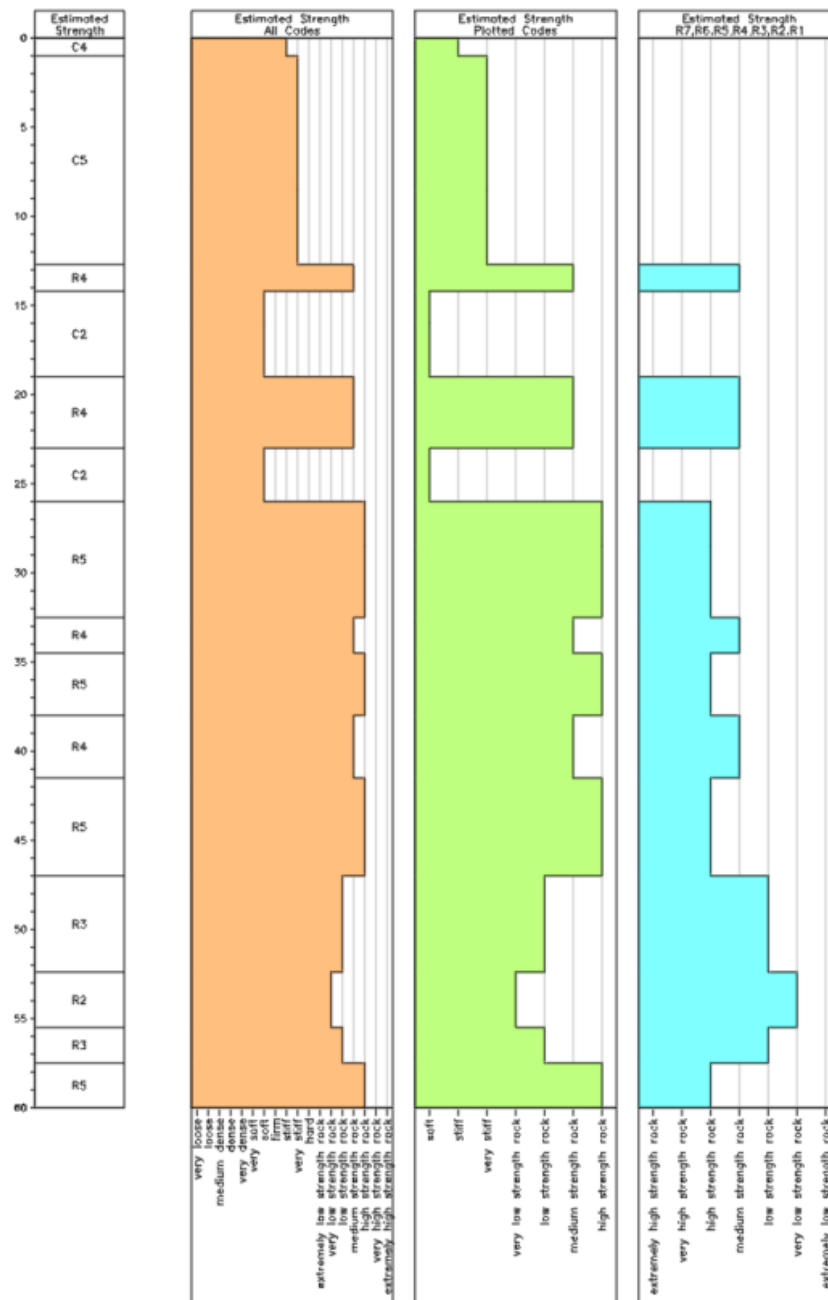
The Coded Data options (**Coded_Scale**) controls which values are used for the horizontal scale.

The available options are to use:

- All Codes all codes from the dictionary for the selected Variable, regardless of whether they occur on the plot or not.
- Plotted Codes only those codes occurring on the plot.
- Specify only those codes that are specified. The specified codes should be separated by commas. Any values that are not included in this list will not appear on the plot.

For the All Codes and Plotted Codes options, the codes occur on the scale in the order they appear in the dictionary whereas for the Specify option they appear in the order that they are specified. Therefore, Specify can also be used to plot all the codes but in an order different to that in which they appear in the dictionary.

The example below illustrates the effect of these three options:



12.9.5.2 Numerical Data Panel

The information in the Numerical Data panel controls the scale for plotting numerical data.

The values (**LVal** and **RVal**) for the left and right-hand edges of the track must be specified. These are in the units of the data. To plot in reverse, simply swap the left and right-hand edges so that the left-hand edge value is greater than the right-hand one.

Numerical Data

Left

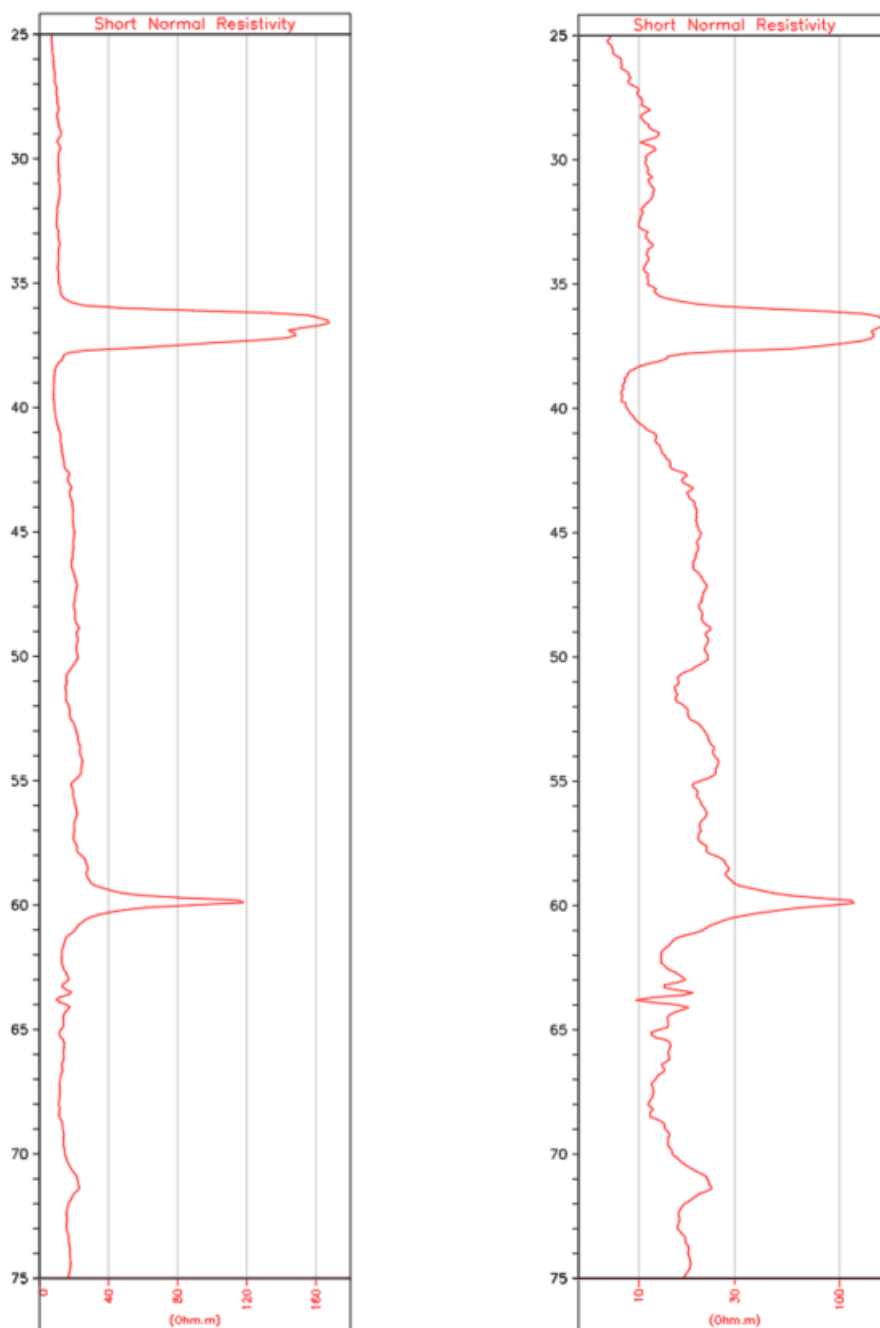
Right

Edge Values: 0.000 180.000

☐ Logarithmic Scale

If the Logarithmic Scale box (**Log**) is ticked then a logarithmic scale will be used. This is useful to see more resolution of low values while still being able to see higher values. When using a logarithmic scale both **LVal** and **Rval** must be greater than zero.

The following example shows on the left a Resistivity log plotted with left and right-hand values of 0 and 180 on a non-logarithmic scale and the on the right the same log with left and right-hand values of 5 and 180 but on a logarithmic scale:



12.9.5.3 Specifying the Horizontal Scale Bar

To display a horizontal scale bar at the bottom of a track, tick Plot Horizontal Scale Bar (**Scale_On**).

The Vertical Offset (**Scale_Y**) moves the scale bar in relation to the end of the track. A negative value moves the scale bar down and a positive value up.

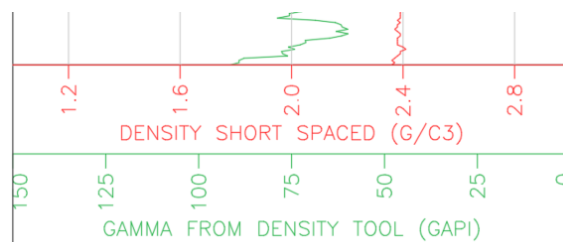
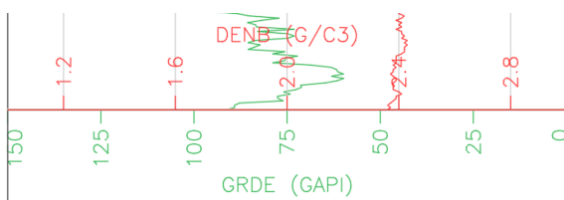
The Text Height (**Scale_Hgt**) specifies in mm's the height of the ticks, the scale annotation and the scale title.

The Tick Direction (**Scale_Tick**) controls whether the ticks go up or down.

The Scale Title (**Scale_Title**) can be:

- None no variable name is plotted on the scale bar
- Code name of the variable being plotted
- Description description of the variable being plotted

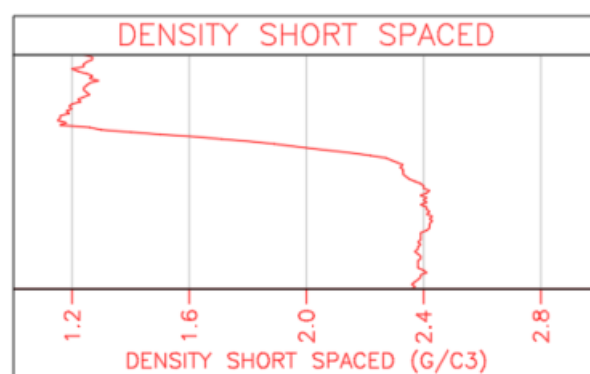
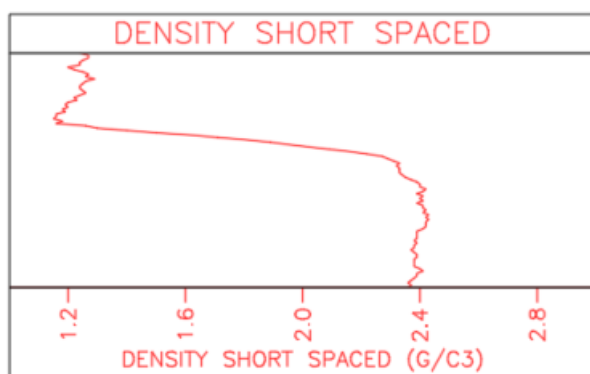
The following examples display horizontal scale bars for a downhole geophysical plot. The one on the left has **Scale_Title** set to Code for both DENB and GRDE and has **Scale_Tick** set to Up for DENB and set to Down for the GRDE. The example on the right has **Scale_Title** set to Description and **Scale_Tick** set to Down for both DENB and GRDE, however, it has **Scale_Y** set to 0 for DENB and -8.0 for GRDE.



12.9.5.4 Plotting Horizontal Scale Graticule

To plot vertical graticule that aligns with the annotation displayed on the Horizontal Scale Bar, tick Plot Scale Graticule (**SGrat_On**). This can be checked even if no Horizontal Scale Bar is displayed.

The following example show the bottom of two Short Spaced Density plot. The one on the left has no horizontal scale graticule whereas the one on the right does.



12.9.6 Vertical Scale Panel

This panel enables specification of Depth Graticule.

Vertical Scale

☒ Plot Depth Graticule
 Graticule Interval: m's
 Text Height: mm's

Tick Plot Depth Graticule (**DGrat_On**) to include horizontal graticule for depths. Graticule Interval (**DGrat_Step**) enables specification of the interval between depth graticule lines and if Text Height (**DGrat_Hgt**) is non-zero, depth values will be displayed on the right-hand edge of the track.

The following example shows two plots of Short Spaced Density. The one on the left without any depth graticule and the one on the right with depth graticule at an interval of 0.2 metres:



12.9.7 Track Title Panel

The Track Title panel enables the specification of title for the track.

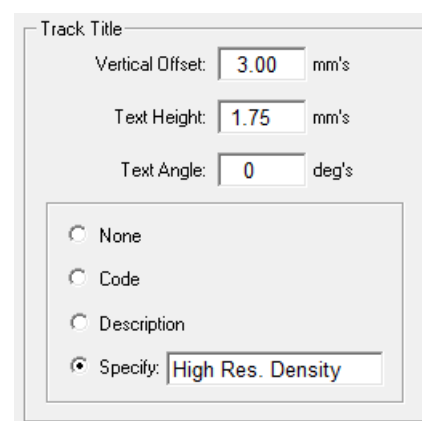
The Vertical Offset (**Title_Y**) specifies the vertical distance from the top of the track to the bottom of the title text.

The Text Height (**Title_Hgt**) specifies in mm's the height of the title text.

The Text Angle (**Title_Ang**) specifies the angle anti-clockwise from the horizontal to plot the title text.

The title type (**Title**) can be:

- None no title is plotted on the track
- Code name of the variable being plotted
- Description description of the variable being plotted
- Specify the user can specify their own title (**Title_Text**)



Track Title

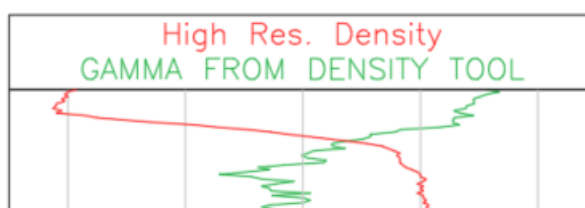
Vertical Offset: mm's

Text Height: mm's

Text Angle: deg's

☐ None
☐ Code
☐ Description
☒ Specify:

The following example displays the track title for a geophysical plot. The title for the Gamma track has **Title_Y** set to 0.0 and **Title** to Description whereas the Density track has **Title_Y** set to 3.0 and **Title** to Specify and **Title_Text** to High Res. Density.



12.9.8 Boundary Box Panel

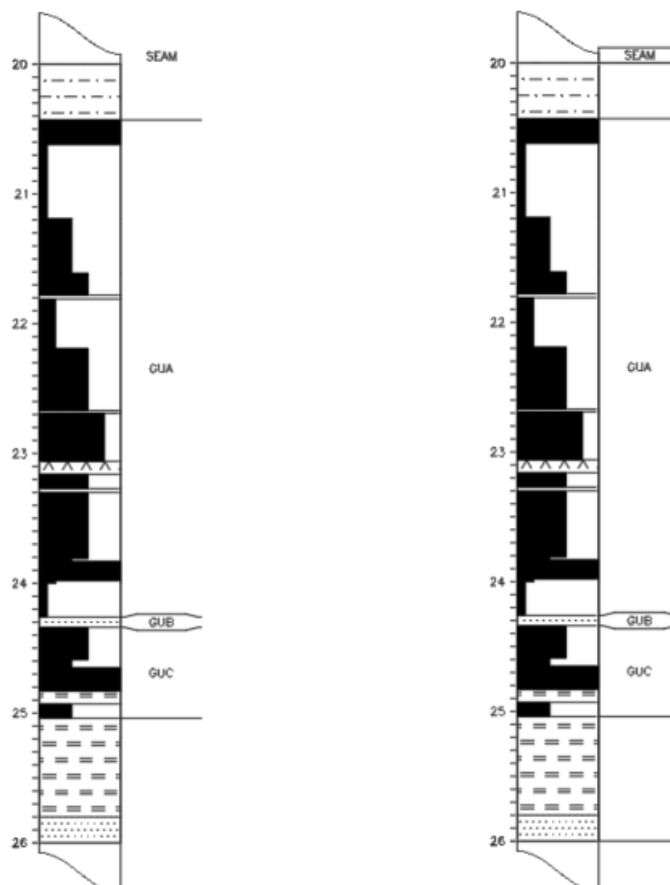
A box can optionally be drawn around the track (**Box**) and its length optionally fixed to the page length (**Box_Fixed**). These options are set in the Boundary Box panel:

Boundary Box

☒ Plot a Box around the Track and its Title

☐ Fix Box Length to Page Length

The following example shows the Lithology and Seam names for an interval. Both figures have a Box plotted around the Lithology track but only the one on the right has a box around the Seam track:



When plotting a single hole, it can be split over several pages by setting the Maximum Track Length on the Sheet Layout page:

Single Hole

Maximum Track Length: metres

If this is the case and one is plotting boxes around a track, the last page in the sequence of pages will look different to the previous pages as the boxes on this page will be the length of the deepest depth rather than the length of the page. This is particularly noticeable if plotting data from different data types that each have different final depths. To overcome this, tick Fix Box Length to Page Length (**Box_Fixed**).

12.9.9 Summary of Tracks Parameters

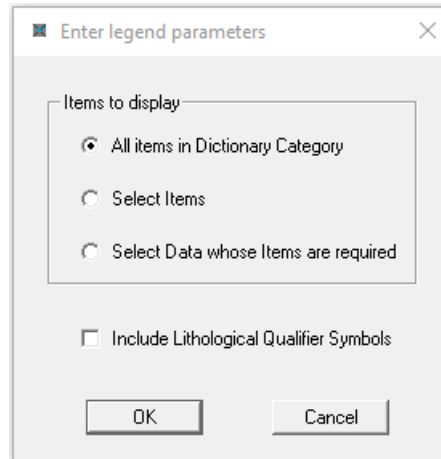
The parameters that can be set in the Tracks tab, in the order they appear in the Tracks grid are:

- **XOrig** Offset from the zero point of the particular hole to the left edge on the plot.
- **Width** Width in mm of the track.
- **Data_Type** Data type of the data used to populate the track. This column displays a drop down box with the available data types.
- **Variable** Variable or variables being plotted in the track
- **Disp_Type** The display type, for example, Value, Description or Histogram.
- **Layer** The plot layer for the track.
- **Comb_Dupl** Combine identical adjacent displays.
- **Detail_On** Display detailed lithology.
- **Coal_Only** Display only coal zones.
- **Text_Just** Text justification – left, right or centre.
- **Text_Hgt** Text height (mm).
- **Text_Orient** Text orientation in degrees anti-clockwise from the horizontal
- **Text_NDec** For numeric data, the number of numerals after the decimal point to display
- **Colour** The AutoCad colour number or variable for colouring the entities in the track
- **Colour_Scale** The name of the ColourScale Definition to use when colouring the entities according to a numerical variable
- **Fill_Colour** The AutoCad colour number or variable for colouring the fill in the track
- **Fill_Scale** The name of the ColourScale Definition to use when colouring the fill according to a numerical variable
- **Bg_Colour** The AutoCad colour number or variable for colouring the background of the track
- **Bg_Scale** The name of the ColourScale Definition to use when colouring the background of the track according to a numerical variable
- **Coded_Scale** Horizontal scale type (All, Plotted or Specify).
- **Specified_Codes** If Coded_Scale is set to Specify, list of specified codes to be plotted on a histogram.
- **LVal, RVal** Left and right-hand limits of the horizontal scale.
- **Log** Use a logarithmic scale for the horizontal scale.
- **Scale_On** Show the horizontal scale.
- **Scale_Y** The vertical offset of the horizontal scale.
- **Scale_Hgt** The horizontal scale text height (mm).
- **Scale_Tick** Tick direction of the horizontal scale (up or down).
- **Scale_Title** Optional title for the horizontal scale.
- **SGrat_On** Option to plot horizontal scale graticule.
- **DGrat_On** Option to plot the depth graticule.
- **DGrat_Hgt** Depth graticule annotation height (mm).
- **DGrat_Step** Depth graticule interval (mm).
- **Title_Y** Vertical offset of title (mm).
- **Title_Hgt** Track title height (mm).
- **Title_Ang** Track title orientation (degrees).
- **Title** Title for a track (none, variable name, variable description or specify)
- **Title_Text** Text to plot for the title if Title is set to Specify
- **Box** Draw a box around the track and its title.
- **Box_Fixed** Fix box length to page length.

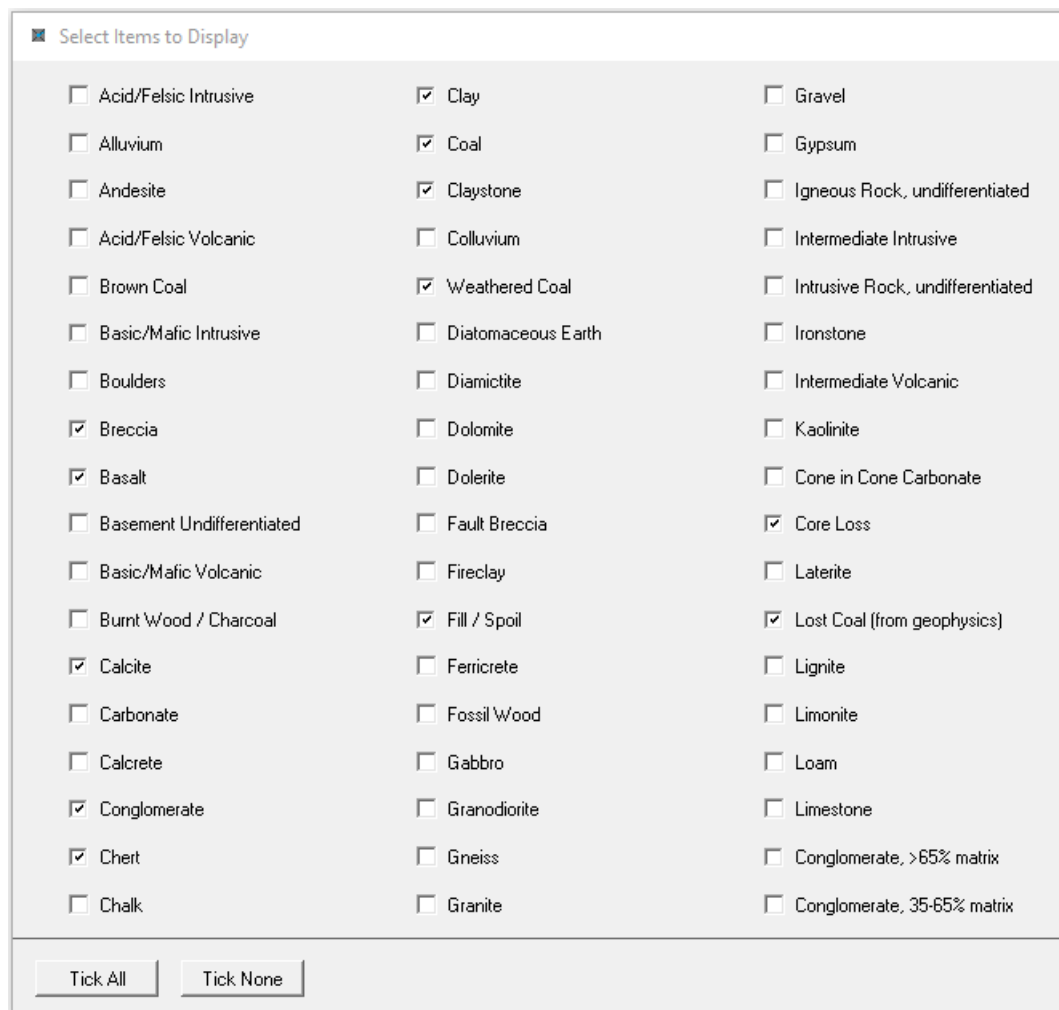
12.10 Plotting a Legend

A legend of the patterns and fills can be generated to accompany downhole plots. To create a legend, open the appropriate category of the dictionary, for example, Lithology (File > Open > Dictionary) and select File > Plot.

Next select items to include:



- All items in Dictionary Category will display All items in Dictionary Category.
- Select Items enables the user to select which items to include. For example:



- Select Data whose Items are Required. This can be for one or more holes and for the entire hole or part of the hole, for example:

Select required Hole Data

Project: **AVOCA** Data Type: **Geology**

Hole Selection

☐ All Holes

☐ Hole Set: **2002 Drilling**

☒ Single Hole: **AVC030C**

Interval Selection

☒ Entire Hole

☐ Specify Top and Bottom Depths:

Top Depth: **0.00** m's

Bottom Depth: **.** m's

☐ Use Interval Definition: **Top Seam**

OK **Cancel**

If using CoalLog and plotting Lithologies the additional option Include Lithological Qualifiers Symbols is displayed. If this is ticked then not only the patterns and fills for each LithoType are displayed but also those for all their Lithological Qualifiers.

Next a Plot Legend Definition is asked for:

Select required Plot Legend Definition

Plot Legend Definition Category

☒ User's Default Plot Legend Definitions

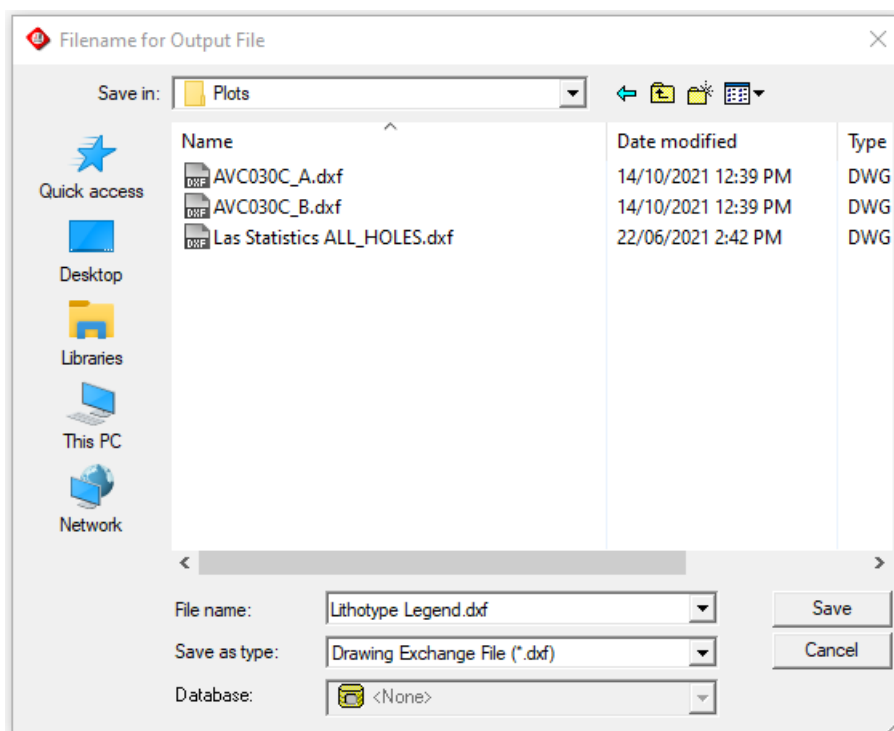
☐ Plot Legend Definitions for Project: **AVOCA**

Plot Legend Definition Name: **LEGEND**

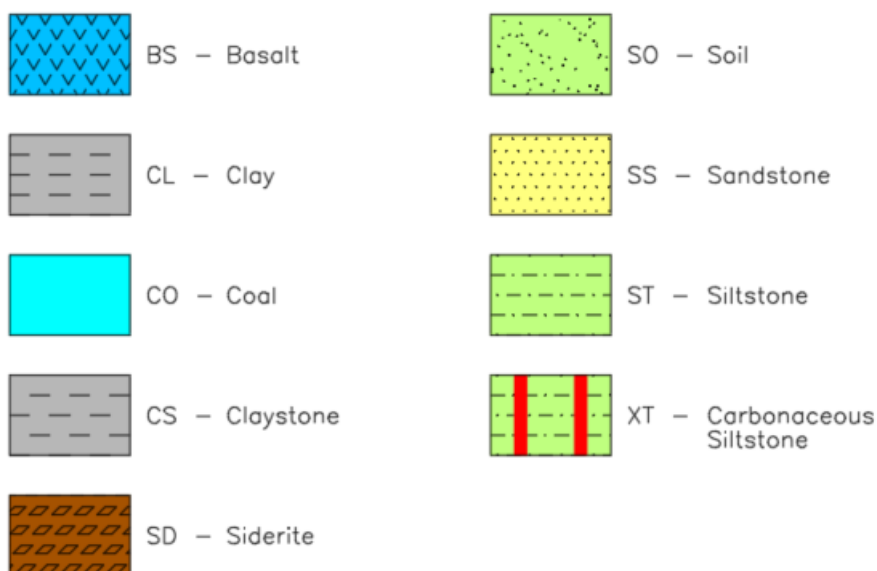
OK **Cancel**

See the next section for further information on creating and editing a Plot Legend Definition.

Next, the folder and filename for the generated plot is prompted for:

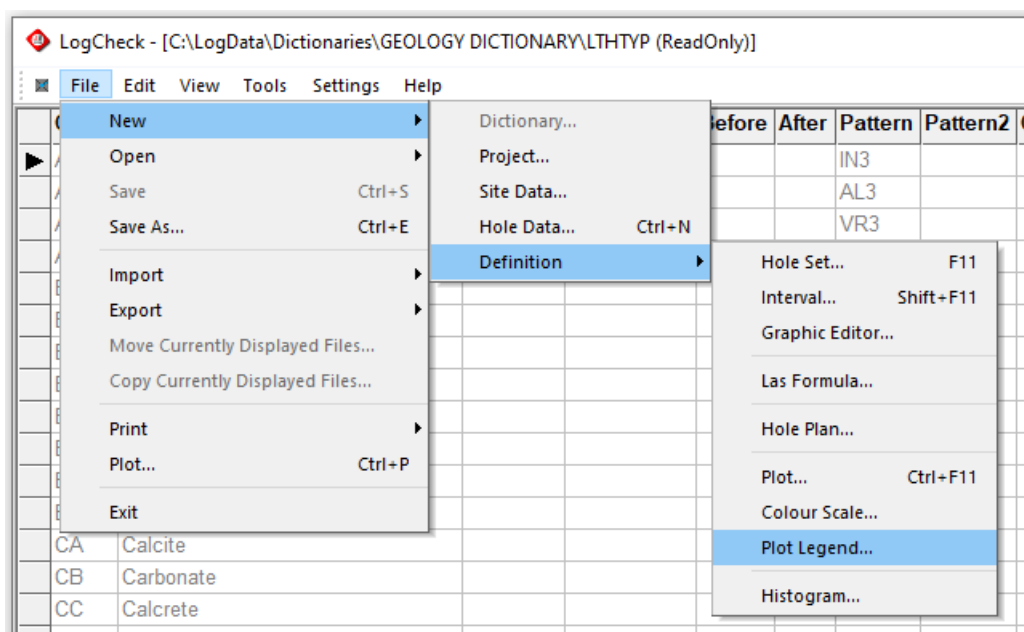


An example plot of the legend for the LithoTypes that occur in AVC030C:

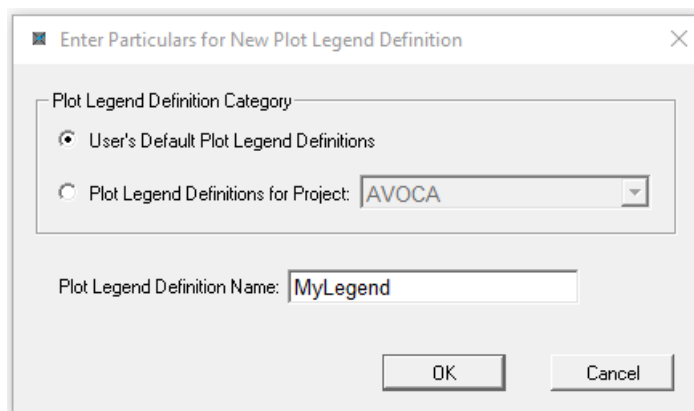


12.10.1 Creating a Plot Legend Definition

To create a Plot Legend Definition, select:



The user is then prompted for the location and name for the Plot Legend Definition:



The new Plot Legend Definition will then display for editing:

LogCheck - [C:\LogData\Definitions\PlotLegendPara\MyLegend]

File Edit View Tools Settings Help

Plot Legend Definition: MyLegend

Sheet Border

DXF Template File

☐ Plot Sheet Border ☒ Plot Corner Ticks

Sheet Size: A4

Orientation: ☒ Portrait ☐ Landscape

Legend Layout

No. of Columns: 99999 No. of Rows: 19

Top Left Corner Position: Horizontal: 10.00 mm's Vertical: -10.00 mm's

Pattern Box Size: Horizontal: 15.00 mm's Vertical: 10.00 mm's

Offset between Boxes: Horizontal: 100.00 mm's Vertical: 15.00 mm's

Annotation Height: 2.00 mm's

Sheet Text

Text_Type	Text_Value	Text_X	Text_Y	Sheet_Size_Tie	Text_Just	Text_Hgt	Text_Ang	Add_Text_Type
+		0.00	0.00		Left	1.25	0.0	

There are three panels in this screen:

12.10.1.1 Sheet Border

For a description of the options in this panel, see Section 12.6.1 Sheet Border for downhole plots.

12.10.1.2 Legend Layout

This includes:

- No. of Columns Number of columns across each page of the legend.
- No. of Rows Number of rows down each page of the legend.
- Top Left Corner Position Offset from the Top Left corner of the sheet to the top left corner of the first pattern box.
- Pattern Box Size The dimensions in mm's for each pattern box
- Offset between Boxes Distance between pattern boxes
- Annotation Height The size of the annotation describing each pattern

12.10.1.3 Sheet Text

For a description of the options in this panel, see Section 12.6.2 Sheet Text for downhole plots.

Chapter 13

Geotechnical Extension

By the end of this chapter, you will be able to understand:

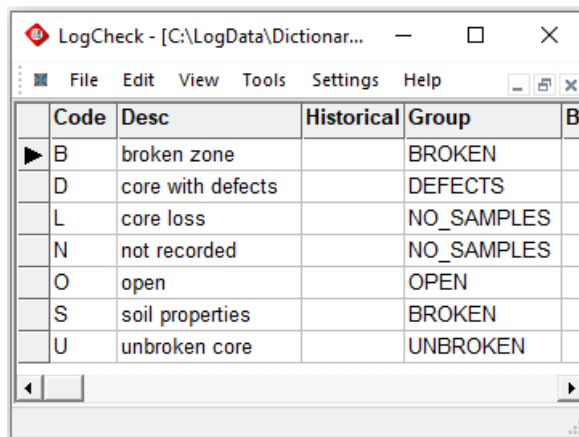
- The setting up of Groups in Defect Dictionaries.
- The *LogCheck* Geotechnical data formats.
- Generating Geotechnical summaries.

13.1 The Defect Dictionary Group Column

The Group column is used by *LogCheck*'s audits, summaries and statistical tools. For most dictionary categories it is not required, however it is required for the following Defects Dictionary categories:

13.1.1 Defects Dictionary – Rock Mass Unit Category Groups

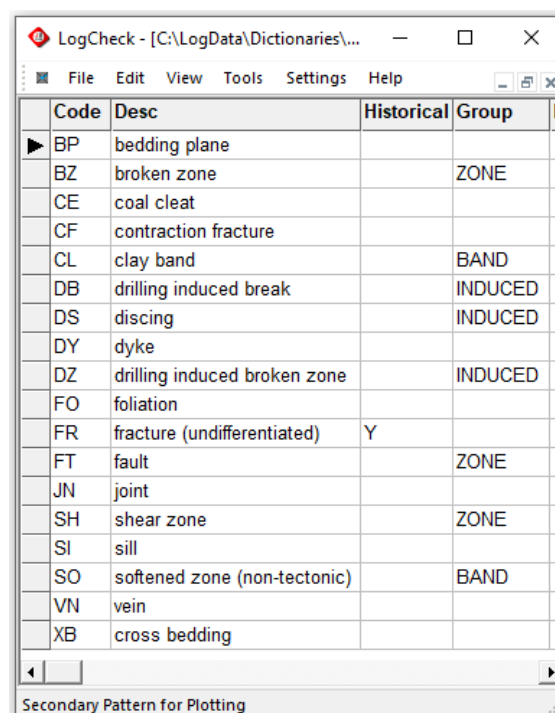
Group is required for all items in the Rock Mass Unit Category of the Defects Dictionary so that procedures calculating Rock Quality Designator (RQD), Fracture Frequency and Defect Spacing know how to calculate these for each RMU. The Group must be one of BROKEN, DEFECTS, NO_SAMPLES, OPEN and UNBROKEN. An example of the Rock Mass Unit Category:



	Code	Desc	Historical	Group	B
▶	B	broken zone		BROKEN	
	D	core with defects		DEFECTS	
	L	core loss		NO_SAMPLES	
	N	not recorded		NO_SAMPLES	
	O	open		OPEN	
	S	soil properties		BROKEN	
	U	unbroken core		UNBROKEN	

13.1.2 Defects Dictionary – Defect Type Category Groups

In order to correctly calculate RQD, Fracture Frequency and Defect Spacing, the Defect Type category of the Defects Dictionary needs INDUCED against any Defect Types that are induced and BAND against any solid bands so that they are not included in the calculation. It also needs ZONE against anything that represents a broken zone so that it is treated appropriately in the calculations.

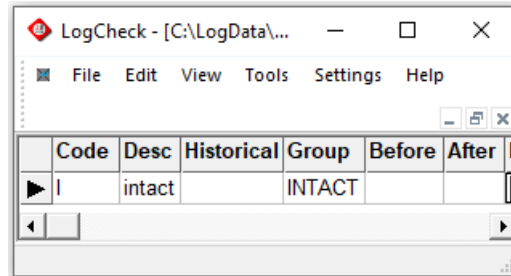


	Code	Desc	Historical	Group	E
▶	BP	bedding plane			
	BZ	broken zone		ZONE	
	CE	coal cleat			
	CF	contraction fracture			
	CL	clay band		BAND	
	DB	drilling induced break		INDUCED	
	DS	discing		INDUCED	
	DY	dyke			
	DZ	drilling induced broken zone		INDUCED	
	FO	foliation			
	FR	fracture (undifferentiated)	Y		
	FT	fault		ZONE	
	JN	joint			
	SH	shear zone		ZONE	
	SI	sill			
	SO	softened zone (non-tectonic)		BAND	
	VN	vein			
	XB	cross bedding			

Secondary Pattern for Plotting

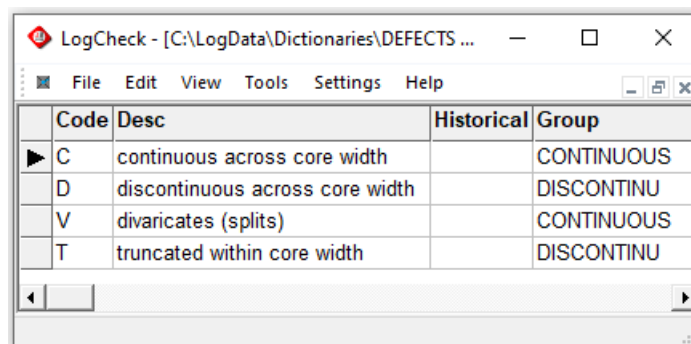
13.1.3 Defects Dictionary – Intact Category Groups

In order to ignore any intact defects when calculating RQD, Fracture Frequency and Defect Spacing, the Intact category of the Defects Dictionary needs INTACT against any values that indicate that the defect is intact:



13.1.4 Defects Dictionary – Defect Continuity Category Groups

In order to plot any defects that are discontinuous across the core as discontinuous, any Defect Continuity values that represent Discontinuous Defects need to have DISCONTINU in the Group column of the Defect Continuity Category in the Defects Dictionary:



13.2 LogCheck Geotechnical Data Types

13.2.1 Defect Data

Defect data consists of two parts:

- Rock Mass Unit (RMU) details, from the Depth column up to but not including the Defect column. Each RMU has uniform geotechnical characteristics. It is a broader grouping than just a single lithology and will often consist of multiple lithology units.
- Defect details for each defect, starting with the Defect column.

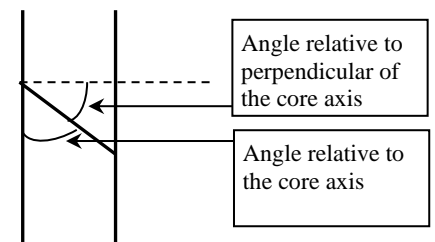
The RMU variables in the CoalLog version of *LogCheck* are:

- **CalcThick** Thickness of the RMU interval, that is the difference as calculated by *LogCheck*, between the base depths of this interval and the previous one (read-only)
- **Depth** Base depth of each RMU. The interval top is assumed to be the base depth of the previous unit. Interval base depth must be greater than the base depth of the previous unit. Blank Depth values are used in *LogCheck* to indicate that the row in the table is a continuation of the data for the lithological unit on the previous row.
- **RT** RMU Type – broken zone (B), defects (D), core loss (L), etc. **RT** is used by *LogCheck* to guide it on how to calculate summary information such as Rock Quality Designator (RQD), Fracture Frequency or Average Stick Length for units not containing any defects.
- **We** Weathering – fresh (F), distinctly weathered (D), etc.
- **Al** Alteration – fresh (F), distinctly altered (D), etc.
- **ES** Estimated strength – firm (C3), loose (S1), medium strength rock (R4), etc.
- **BS** Bed spacing – irregular spaced bedding (IR), thinly bedded (TB), etc.
- **BD** Bedding dip angle
- **MS** Moisture Sensitivity – low sensitivity (L), high sensitivity (H), etc.
- **Pl** Plasticity – brittle (B), high plasticity (H), etc.

The only mandatory variables for RMU's are **Depth** and **RT**.

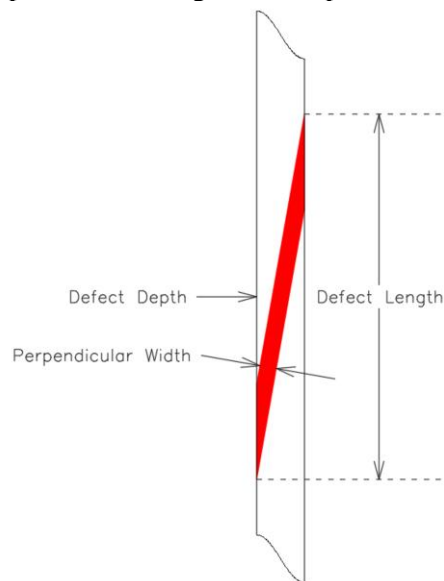
The Defect variables in the CoalLog version of *LogCheck* are:

- **Defect** The mid-point depth in metres for the defect, see figure on the next page.
- **DefLen** The length in metres of core affected by the defect, see figure on the next page.
- **DT** Defect Type of defect – bedding plane (BP), joint (JN), vein (VN), etc.
- **DI** Flag indicating if the defect is intact (I).
- **DC** Defect Continuity, whether the defect crosses the entire width of core. If not, then it does not constitute a break in the core.
- **A1 & A2** Minimum and maximum dip angle in degrees. For individual defects only A1 is used but A2 is also used when describing broken zones. Different users have different conventions as to whether the angle is measured relative to the core axis or relative to the perpendicular to the core axis. In general, the Australian coal industry uses the second convention, that is relative to the perpendicular to the core axis. It does not overly matter which convention is selected, just that everybody in the organisation is using the same convention.



- **DO** Defect dip orientation (azimuth) in degrees. That is the direction down dip of the defect. Having this data is rare as it can only be obtained from either oriented core or acoustic scanner interpretation.
- **DOM** Dip orientation method – directly measured from reference line (D), measured from televiewer (A), etc.
- **Sh** Surface shape of the defect – planar (P), stepped (S), etc.
- **Ro** Surface roughness – slickensided (K), smooth (S), etc.
- **Width** Infill Perpendicular Width in millimetres, see figure below.
- **PT** Primary Infill Type – calcite (CA), plant fragments (PF), etc.
- **ST** Secondary Infill Type – carbonaceous remains (XR), carbonate (CB), etc.
- **Mo** Infill mode – blebs (L), surface completely coated (C), etc.
- **IS** Infill strength – medium strength rock (R4), firm (C3), etc.
- **IP** Infill plasticity – brittle (B). high plasticity (H), etc.

Figure demonstrating Defect Depth, Defect Length and Perpendicular Width:



The mandatory Defect fields are **Defect** and **DT** though **DefLen** can also be set by the database manager to also be compulsory, see Section 3.4.1 CoalLog Validations Settings in Chapter 3.

An example of Defect data:

LogCheck - [C:\LogData\AVOCA\DEFECTS\AVC030C]																			
Depth	RT	We	AI	ES	BS	BD	MS	PI	Defect	DT	DI	DC	A1	A2	Sh	Ro	Width	PT	ST
285.18	O	F		R4				N											
									285.18	JN		C	3		P	R	0		O
289.76	D	F		R5				N	287.48	JN		T	88		U	R	0		O
291.29	U	F		R5				N											
									291.94	BP	I	C	12		P	R	0		O
292.70	D	F		R5				N	292.34	JN		C	34		S	R	0		O
									292.77	BP	I	C	3		P	S	0		O
292.90	D	F		R4				N	292.87	BP	I	C	4		P	S	0		O
293.73	U	F		R5				N											
294.95	D	F		R5				N	294.84	BP		C	6		P	S	0	CA	T
									294.97	FT	I	C	35		P	K	2	CA	H
295.11	D	F		R3				N	295.09	FT		C	35		P	K	0	CA	T
									298.10	BP	I	C	3		P	R	0		O
298.34	D	F		R4				N	298.20	BP	I	C	7		P	R	0		O
									298.38	BP	I	C	9		P	S	0		O

This shows the first 285.18m of the hole was Open followed by a Defects RMU to 289.76m with joints at 285.18m and 287.48m, and then an Unbroken RMU to 291.29m.

The following table describes how *LogCheck* calculates RQD, Fracture Frequency and Defect Spacing

RMU Type Code	Description	RQD	Fracture Frequency	Defect Spacing
O	Open	blank	blank	blank
L	Core Loss	blank	blank	blank
N	Not Recorded	blank	blank	blank
U	Unbroken Core	100	0	Calculated
D	Core with Defects	Calculated from the individual recorded defects		
B	Broken Zone	0	50	0.02
S	Soil Properties	0	50	0.02

13.2.2 Acoustic Scanner Analysis Data

Acoustic Scanner Analysis data records just the results of interpretation of acoustic scanner data rather than the actual acoustic scanner data.

The RMU variables in the CoalLog version of *LogCheck* are:

- **Depth** Base depth of each lithological unit. The interval top is assumed to be the base depth of the previous unit. Interval base depth must be greater than the base depth of the previous unit. Blank Depth values are used in *LogCheck* to indicate that the row in the table is a continuation of the data for the lithological unit on the previous row.
- **RT** RMU Type – broken zone (B), defects (D), core loss (L), etc

Both **Depth** and **RT** for each RMU.

The Defect variables in Acoustic Scanner data are:

- **Defect** The mid-point depth in metres for the defect, see figure on the next page.
- **DefLen** The length in metres of core affected by the defect, see figure on the next page.
- **DT** Defect Type of defect – bedding plane (BP), joint (JN), vein (VN), etc.
- **DI** Flag indicating if the defect is intact (I).
- **An** Dip angle in degrees.
- **DO** Defect dip orientation (azimuth) in degrees. That is the direction down dip of the defect.
- **DC** Defect Continuity, whether the defect crosses the entire width of core. If not, then it does not constitute a break in the core.

The mandatory Defect fields are **Defect** and **DT**.

An example of Acoustic Scanner data:

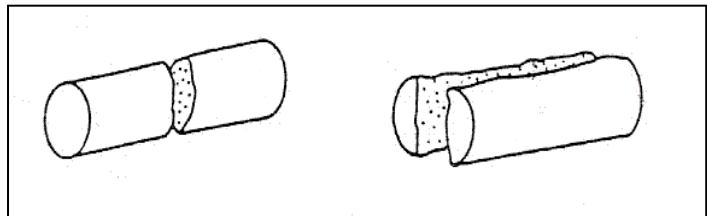
Depth	RT	Defect	DefLen	DT	DI	An	DO	DC	Comments
.		381.21		FR		75	177	2	
.		381.31		FR		74	177	2	
.		381.50		FR		74	169	2	
.		381.73		FR		73	175	2	
.		382.09		SH		6	176	13	
.		382.59		FR		60	162	2	
.		382.73		FR		53	40	2	
.		382.83		BP		12	66	4	
.		383.34		FR		4	333	3	
.		387.54		FR		18	241	2	
389.18	D	.							

13.2.3 Point Load Test Data

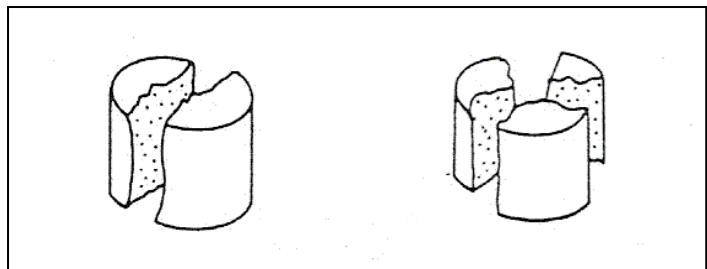
In a point load test, a stick of core is subject to compressive forces in either an axial (along the axis of the core) or diametral (across the core) directions, until the core fails. The force measured is the force in kN at which the core fails. An established testing procedure involves:

1. An initial diametral test, where pressure is applied across the core, until it breaks into two sticks of core.
2. A diametral test is then applied to each of the two sticks derived from 1.
3. This usually results in four pieces of core on which axial tests are done.

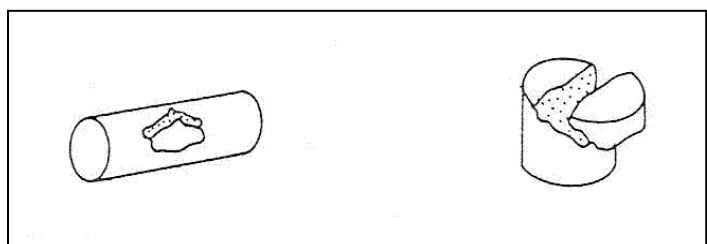
Examples of valid diametral failures are as shown on the right:



Examples of valid axial failures are as shown on the right:



Examples of invalid failures are shown on the right (diametral on the left, and axial on the right):



The results can be standardised to a 50 mm diameter core and then averaged for a sample. These are known as Point Load indices. For test results to be included in the calculation of Point Load Indices, they must be:

- A valid test,
- If it is a diametral test, the core length must be greater than the diameter, or
- If it is an axial test, the core length must be less than or equal to the diameter and greater than 0.3 times the diameter.

The Point Load data variables in the CoalLog version of *LogCheck* are:

- **Depth** The depth to the base of the sample.
- **Thickness** The original length of the sample.
- **SampState** Either wet (W) or dry (D).
- **SampNumb** Sample Number
- **TestId** A unique number within each sample to uniquely identify a particular test sample.
- **TestMidDep** The depth at the mid-point of each test sample.
- **TestType** Refers to the direction that the pressure was applied to the core, either diametral (D) or axial (A).
- **PlatenSep** Separation of the platens in the testing device. For diametral tests this will be the core diameter. For axial tests, it is the length of the individual sample being tested.
- **Width** The width of the core perpendicular to the load direction. For diametral tests, this will be the length of the individual sample. For axial tests, it will be the core diameter.
- **Load** The force in kN at which the core failed.
- **FailMode** Mode of failure – invalid test as shown in the previous diagram (I), bedding plane (B), joint (J) and penetrative (P).
- **Index** Point Load Index (MPa) calculated by *LogCheck* for each sample. (read-only)

Depth, **Thickness** and **SampState** are required for each initial sample from the core. **TestId**, **TestType**, **PlatenSep**, **Width** and **FailMode** are required for each test sample.

Some non-CoalLog versions have **Length** and **Diameter** instead of **PlatenSep** and **Width**. In this case, **Length** for diametral tests will be the length of the core perpendicular to the load direction and for axial tests, it will be the platen separation. **Diameter** for diametral tests will be the platen separation and for axial tests, it will be the core diameter.

An example of Point Load Test data:

In this data display, for the sample with a base depth of 285.30, Test Id. 1 is the initial diametral test, Test Ids. 2 and 3 are the tests on the two sticks of core derived from Test Id. 1 and Test Ids. 4, 5 and 6 are the results of the axial tests on the sticks of core derived from the diametral tests.

Depth	Thickness	SampState	TestId	TestType	PlatenSep	Width	Load	FailMode
285.30	0.12	D	1	D	64	120	10.74	V
			2	D	64	62	6.71	V
			3	D	64	58	10.30	V
			4	A	31	64	6.06	V
			5	A	34	64	6.16	V
			6	A	24	64	3.67	V
286.35	0.13	D	7	D	64	130	9.98	V
			8	D	64	76	10.01	V
			9	D	64	68	6.71	V
			10	A	30	64	4.25	V
			11	A	46	64	5.48	V
			12	A	37	64	6.72	V
			13	A	31	64	7.10	V

13.2.4 Geotechnical Laboratory Test Data

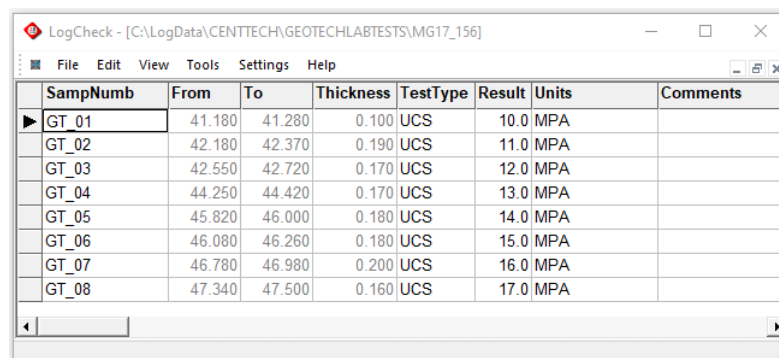
Geotechnical Laboratory Test Data records the results from Laboratory Tests

The Geotechnical Laboratory Test variables are:

- **Depth** Base depth of sample in metres
- **SampNumb** Sample number for sample
- **From** From Depth of the sample as determined from the drillhole's Geology data.
(read-only)
- **To** To Depth of the sample as determined from the drillhole's Geology data.
(read-only)
- **Thickness** Sample thickness as automatically calculated from the difference between its
From and To depths. (read-only)
- **TestType** Type of test such as UCS for Uniaxial Compressive Strength or ITS for Indirect
Tensile Strength
- **Result** Result value of test
- **Units** Result's units
- **Comments** Comments

The variables **SampNumb**, **TestType**, **Result** and **Units** are required for every record.

An example of Geotechnical Laboratory Test Data:



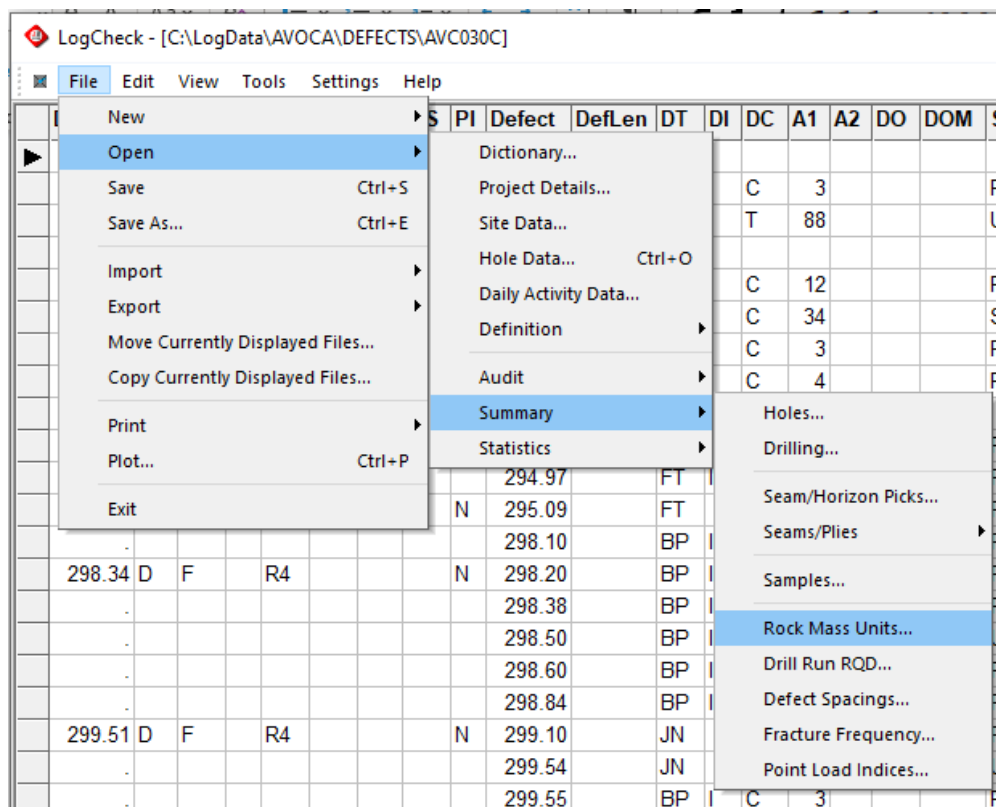
SampNumb	From	To	Thickness	TestType	Result	Units	Comments
GT_01	41.180	41.280	0.100	UCS	10.0	MPA	
GT_02	42.180	42.370	0.190	UCS	11.0	MPA	
GT_03	42.550	42.720	0.170	UCS	12.0	MPA	
GT_04	44.250	44.420	0.170	UCS	13.0	MPA	
GT_05	45.820	46.000	0.180	UCS	14.0	MPA	
GT_06	46.080	46.260	0.180	UCS	15.0	MPA	
GT_07	46.780	46.980	0.200	UCS	16.0	MPA	
GT_08	47.340	47.500	0.160	UCS	17.0	MPA	

13.3 Geotechnical Summaries

Geotechnical Summaries are summaries *LogCheck* generates from its geotechnical data. The summaries that it can generate are:

- Rock Mass Units
- Drill Run RQD
- Defect Spacing
- Fracture Frequency
- Point Load Indices

To open the required summary, select:

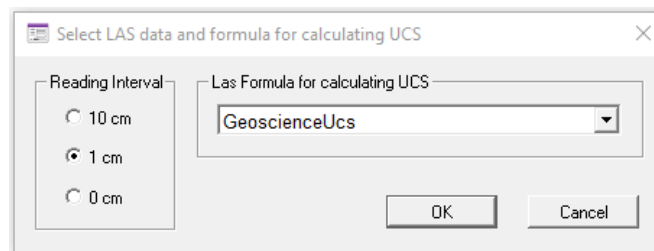


For all Geotechnical Summaries, if one chooses to generate a summary for more than one hole at a time, then *LogCheck* just displays a list of holes whose summary will be generated. However, these summaries can all then be exported or plotted and the results for each hole will be generated as they are exported or plotted.

13.3.1 Rock Mass Unit Summary

The Rock Mass Unit Summary displays the recorded data for each individual Rock Mass Unit, summary values calculated from the recorded defects in each Rock Mass Unit (RMU), indices calculated from the Point Load data, UCS's from various sources and finally a Unit Rating calculated from the other calculated results. The Unit Rating values for the roof can then combined together outside *LogCheck* to calculate a Coal Mining Roof Rating (CMRR).

By selecting File > Open > Summary > Rock Mass Unit Summary from the *LogCheck* menu then *LogCheck* will calculate the RMU Summary. As the RMU Summary calculates UCS from sonic logs, before calculating the summary *LogCheck* prompts for which Las file resolution and which Las Formula Definition to use:



For more information Las Formula Definitions see Section 6.4.5 – Opening Las Data.

The variables in the Rock Mass Unit Summary are:

- **CalcThick** Thickness of the RMU interval, that is the difference as calculated by *LogCheck*, between the base depths of this interval and the previous one.
- **Depth** Base depth of each RMU. The interval top is assumed to be the base depth of the previous unit. Interval base depth must be greater than the base depth of the previous unit. Blank Depth values are used in *LogCheck* to indicate that the row in the table is a continuation of the data for the lithological unit on the previous row.
- **RT** RMU Type – broken zone (B), defects (D), core loss (L), etc. **RT** is used by *LogCheck* to guide it on how to calculate summary information such as Rock Quality Designator (RQD), Fracture Frequency or Average Stick Length for units not containing any defects.
- **We** Weathering – fresh (F), distinctly weathered (D), etc.
- **Al** Alteration – fresh (F), distinctly altered (D), etc.
- **ES** Estimated strength – firm (C3), loose (S1), medium strength rock (R4), etc.
- **BS** Bed spacing – irregular spaced bedding (IR), thinly bedded (TB), etc.
- **BD** Bedding dip angle
- **MS** Moisture Sensitivity – low sensitivity (L), high sensitivity (H), etc.
- **PI** Plasticity – brittle (B), high plasticity (H), etc.
- **RQD** Rock Quality Designator calculated as percentage of unbroken lengths of core greater than or equal to 10cms in the RMU
- **FracSpac** Average distance between defects in the RMU
- **FracFreq** Frequency of fractures (fracts/m) in the RMU
- **DiIndex** Average Diametral Point Load Index in the RMU
- **AxIndex** Average Axial Point Load Index in the RMU
- **UCSAxial** UCS for RMU calculated from **AxIndex**
- **UCSSonic** UCS for RMU calculated from Sonic log using a Las Formula Definition
- **UCSTest** UCS for RMU calculated from average laboratory test UCS value for the RMU
- **US** Source of UCS used in calculating the Unit Rating. *LogCheck* preferably uses **UCSTest** (US set to L). If there is no value for **UCSTest** then it uses **UCSSonic**

- **UCS** (US set to S). Finally if there is no value for **UCSTest** or **UCSSonic** then it uses **UCSAxial** (US set to A)
- **MSD** UCS used in calculating the unit rating
Moisture Sensitivity Deduction. This is given one of the following values:
 - 0 if **MS** is N for Not Sensitive
 - 3 if **MS** is L for Low Sensitivity
 - 7 if **MS** is M for Medium Sensitivity
 - 15 if **MS** is H for High Sensitivity
- **UnitRat** Unit Rating calculated from **RQD**, **FracSpac**, **DiIndex**, **UCS** and **MSD**

A number of intermediate values are calculated in order to calculate UnitRat. These are also incorporated in the RMU Summary but are Hidden. To see these select View > Display/Hide Fields. These fields are:

- **UCSRat** UCS rating calculated form **UCS**
- **RQDRat** RQD rating calculated from **RQD**
- **FSRat** Fracture Spacing Rating calculated from **FracSpac**
- **SpacRat** Discontinuity Spacing Rating, the minimum of **RQDRat** and **FSRat**
- **DPLTRat** Diametral Point Load Testing Rating calculated from **DiIndex**
- **DiscRat** Discontinuity Rating, the minimum of **SpacRat** and **DPLTRat**

Finally, **UnitRat** is calculated by adding together **UCSRat**, **DiscRat** and **MSD**

An example of RMU Summary Data:

CalcThick	Depth	RT	We	AI	ES	BS	BD	MS	PI	RQD	FracSpac	FracFreq	DiIndex	AxIndex	UCSAxial	UCSSonic	UCSTest	US	UCS	MSD	UnitRat
40.33	40.33	D						H		100	8.066	0.1		1.05	22.05	31.62		S	31.62	-15	-3.11
0.08	40.41	D						L		0	0.040	50.0				31.65		S	31.65	-3	26.90
2.76	43.17	D						L		52	0.154	6.5		1.13	23.73	34.12	11.15	L	11.15	-3	38.64
0.12	43.29	D						L		0	0.040	50.0				33.92		S	33.92	-3	27.39
0.14	43.43	D						L		0	0.020	50.0				33.89		S	33.89	-3	27.39
0.63	44.06	D						M		92	0.210	44.4		1.42	29.82	33.98		S	33.98	-7	41.37
4.01	48.07	D						L		95	0.544	9.2				32.91	15.00	L	15.00	-3	46.60

13.3.2 Drill Run RQD

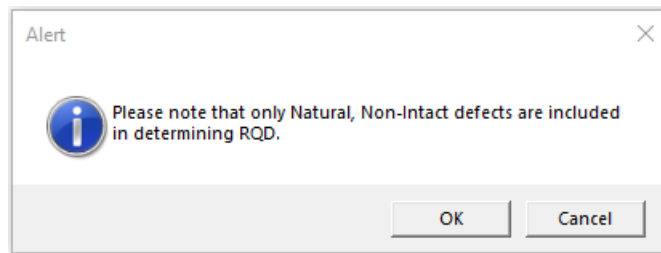
Even though many geotechnical engineers calculate Rock Quality Designator (RQD), many prefer to stick to the original definition for RQD which is based on Drill Core Runs. One caution is that statistically calculating RQD's based on core run lengths only makes sense if all ones core runs are approximately equal in length.

By selecting File > Open > Summary > Drill Run RQD from the *LogCheck* menu then *LogCheck* will calculate the RQD. Clearly though in order to use this facility one needs to have for a hole not only Defect data but also Drilling data including Core Runs.

The variables in the Drill Run RQD Summary are:

- **CalcThick** Thickness of each Core Run
- **Depth** Base depth of each Core Run
- **RunNo** The Run Number
- **RQD** Rock Quality Designator calculated as percentage of unbroken lengths of core greater than or equal to 10cms in the core run

When calculating Drill Run RQD, *LogCheck* warns the user that:



An example of Drill Run RQD generated by *LogCheck*:

CalcThick	Depth	RunNo	RQD
284.99	284.99		
3.00	287.99	1	
2.50	290.49	2	100
0.80	291.29	3	100
3.00	294.29	4	100
0.82	295.11	5	98
2.69	297.80	6	100
3.00	300.80	7	97
2.84	303.64	8	96

13.3.3 Defect Spacings Summary

The Defect Spacings Summary calculates the spacing between defects occurring in each hole. This is a useful measure of the potential of the rock to break up.

Select File > Open > Summary > Defect Spacings menu item to open the Defect Spacing Summary. Then select the required holes and intervals from the standard Hole Selection dialog.

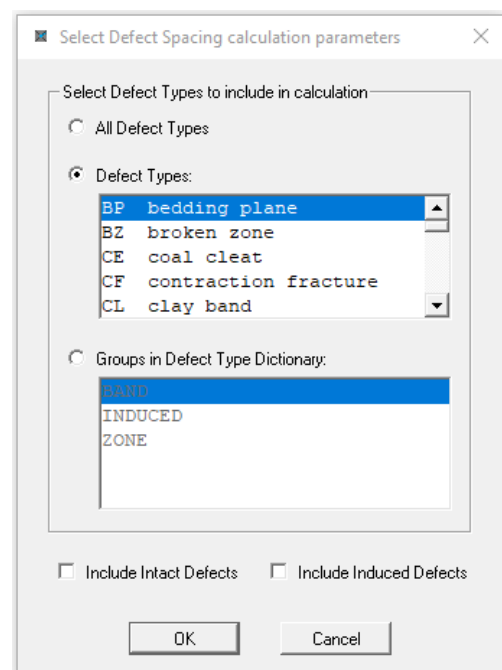
Next the popup window is displayed:

Enabling the user to choose between:

- All Defect Types
- Particular Defect Types
- Groups in Defect Type Category in the Defects Dictionary

If selecting from the list of Defect Types or Groups in the Defect Type Category, one can select more than one by using the Shift and Ctrl keys while selecting.

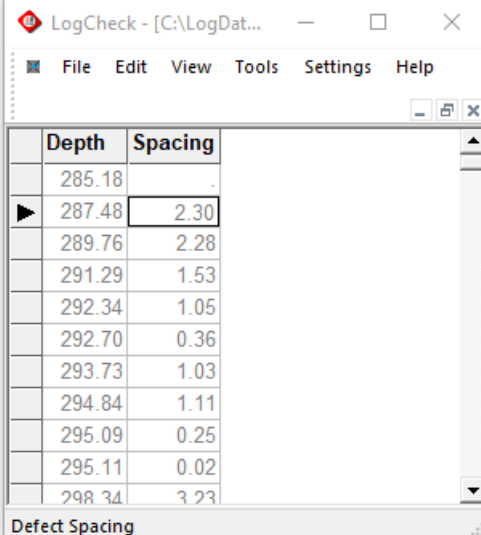
Unless Include Intact Defects and/or Include Induced Defects are ticked these Defects are not included in the calculations.



The variables in the Defect Spacing Summary are:

- **Depth** Depth of each defect
- **Spacing** Defect Spacing calculated as the length from halfway to the previous defect to halfway to the next defect. For RMU's of Broken (B) or Soil Properties (S), the Spacing is set to 0.02 for the entire RMU. For RMU's of Open (O), Core Loss (L) or Not Recorded (N), the Spacing is set to blank for the entire RMU

An example of a Defect Spacing Summary:



The screenshot shows the LogCheck application window with a menu bar (File, Edit, View, Tools, Settings, Help) and a toolbar. Below the toolbar is a table titled 'Defect Spacing' with two columns: 'Depth' and 'Spacing'. The table contains the following data:

Depth	Spacing
285.18	.
287.48	2.30
289.76	2.28
291.29	1.53
292.34	1.05
292.70	0.36
293.73	1.03
294.84	1.11
295.09	0.25
295.11	0.02
298.34	3.23

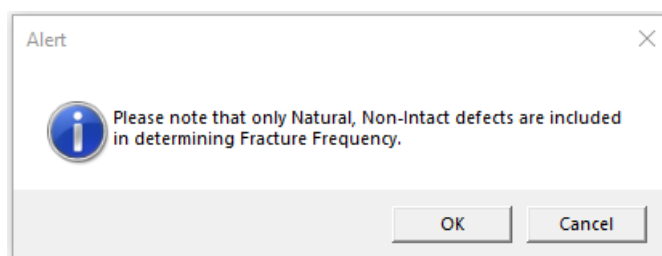
The status bar at the bottom of the window displays 'Defect Spacing'.

13.3.4 Fracture Frequency Summary

The Fracture Frequency Summary calculates the number of fractures per metre from the Defect Data. This is another useful measure of the potential of the rock to break up.

Select File > Open > Summary > Fracture Frequency menu item to open the Fracture Frequency Summary. Then select the required holes and intervals from the standard Hole Selection dialog.

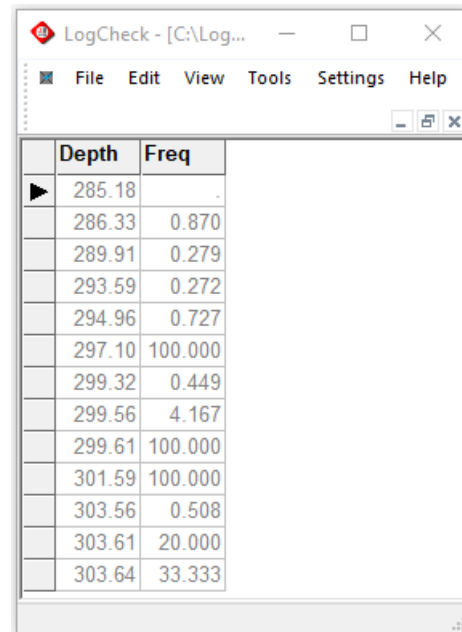
When calculating Fracture Frequency Summary, *LogCheck* warns the user that:



The variables in the Fracture Frequency Summary are:

- **Depth** Depth of halfway between each defect
- **Freq** Fracture Frequency calculated as 1.0 divided by the length from the previous value of Depth to this value of Depth. For RMU's of Broken (B) or Soil Properties (S), the Fracture Frequency is set to 50.0 for the entire RMU. For RMU's of Open (O), Core Loss (L) or Not Recorded (N), the Fracture Frequency is set to blank for the entire RMU

An example of a Fracture Frequency Summary:



The screenshot shows the LogCheck application window with a menu bar (File, Edit, View, Tools, Settings, Help) and a toolbar. The main window displays a table with two columns: 'Depth' and 'Freq'. The table contains 14 rows of data. A small black triangle icon is visible in the first row of the 'Depth' column.

Depth	Freq
285.18	.
286.33	0.870
289.91	0.279
293.59	0.272
294.96	0.727
297.10	100.000
299.32	0.449
299.56	4.167
299.61	100.000
301.59	100.000
303.56	0.508
303.61	20.000
303.64	33.333

13.3.5 Point Load Indices Summary

The Point Load Index as calculated in *LogCheck*, is a size-corrected value that is the equivalent Point Load Index for a sample that would have been measured by a diametral test for a core diameter of 50 mm.

The uncorrected point load index¹ is calculated as follows:

$$I = P / D^2$$

Where:

- I: Uncorrected point load strength;
- P: The load at failure;
- D: The equivalent core diameter.

The equivalent core diameter depends on whether the test was:

- (a) *Diametral*, where D is the core diameter.

For a diametral test, if the sample length is less than the diameter, a value for the point load index is not calculated.

- (b) *Axial*, where D is given by the following formula:

$$D = 4 * A / \pi I$$

For an axial test, if the sample length is greater than the diameter or the length is less than 0.3 of the diameter, a value for the point load index is not calculated.

Where A is the minimum cross-sectional area of a plane through the platen contact points:

$$A = \text{Core length} * \text{Width (perpendicular to the loading direction)}$$

¹ Journal of Geomechanics, Vol. 22, No.2, pp51-60, 1985. "Suggested method for Determining Point Load Strength"

The size-corrected Point Load Strength Index of a sample uses the following Size Correction Factor, F :

$$F = (D / 50)^{0.45}$$

The size-corrected Point Load Index used by *LogCheck* is given by the following formula:

$$I_{s(50)} = F * 1000 * I \quad \text{that is:}$$

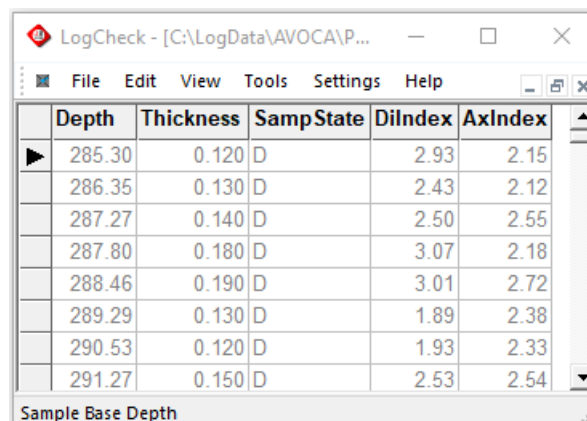
$$I_{s(50)} = F * 1000 * (P / D^2)$$

Select File > Open > Summary > Point Load Indices menu item to open the Point Load Indices Summary. Then select the required holes and intervals from the standard Hole Selection dialog.

The variables in the Point Load Indices Summary are:

- **Depth** Depth of base of Point Load Sample
- **Thickness** Thickness of Point Load sample
- **SampState** Either wet (W) or dry (D)
- **DiIndex** Diametral Point Load Index
- **AxIndex** Axial Point Load Index

An example of a Point Load Indices Summary:



	Depth	Thickness	SampState	DiIndex	AxIndex
▶	285.30	0.120	D	2.93	2.15
	286.35	0.130	D	2.43	2.12
	287.27	0.140	D	2.50	2.55
	287.80	0.180	D	3.07	2.18
	288.46	0.190	D	3.01	2.72
	289.29	0.130	D	1.89	2.38
	290.53	0.120	D	1.93	2.33
	291.27	0.150	D	2.53	2.54

Sample Base Depth

Chapter 14

Coal Quality Extension

By the end of this chapter, you will be able to understand:

- The *LogCheck* Coal Quality data formats.
- Importing Coal Quality data into *LogCheck*.
- Opening, viewing and editing Coal Quality data in *LogCheck*.
- Using *LogCheck* to generate Seam and Ply composite values.
- Auditing the *LogCheck* database to determine what Coal Quality data it contains

14.1 Introduction

Standard *LogCheck* includes a Basic Coal Quality system that will suffice for most coal exploration but once a project reaches a full feasibility study and it is necessary to model the coal preparation that will be required and markets that may purchase the coal then a far more sophisticated coal quality database system such as the *LogCheck* Coal Quality Extension is required.

LogCheck's Basic Coal Quality System *LogCheck* enables the entry, validation, storage, plotting and export of:

- mass
- relative density
- total moisture
- proximate analysis (moisture, ash, volatile matter and fixed carbon)
- energy
- impurities (total sulphur, phosphorus, chlorine, fluorine)
- Crucible Swell Number (CSN)
- Gieseler maximum fluidity

on an air-dried basis for raw ply samples.

Whereas the extended system covers the full CoalLog coal quality suite. That is, it covers various sample preparations such as:

- crushing
- drop shattering
- wet or dry tumbling
- wet or dry sizing
- compositing of ply samples
- clean coal compositing

and allows results to be recorded for various:

- size fractions including cumulative size fractions
- float fractions including cumulative float fractions
- froth fractions

Data can be entered, reported and exported on different bases. However, all data is stored in the system on the bases that CoalLog specifies for the particular variable.

The system handles all 207 coal quality variables that are specified in the CoalLog standard.

Like the Basic Coal Quality system numeric variables can not only be pure numeric values but as per the CoalLog standard can also be:

- a numeric value preceded with a < to indicate that it is below the lower detection limit that follows the < sign
- a numeric value preceded with a > to indicate that it is above the upper detection limit that follows the > sign
- IS for insufficient sample
- NS for not sampled
- NR for not reported
- TBA for to be advised
- CO for contraction only (only used for Dilatometer Maximum Dilatation and Maximum Dilatation Temperature)
- NF for no fluidity (only used for Gieseler measurements)

14.2 Coal Quality Data Types

LogCheck supports all five of the CoalLog Coal Quality data types:

- 1) **Coal Quality Results** for reporting all analyses except Reflectance. It can be used for reporting ply and composite results, and for particular float and sizing fractions.
- 2) **Reflectance Results.**
- 3) **Composite Constituents**, for listing the sample number of all the individual ply or composite samples that have been included in each composite.
- 4) **Clean Coal Composite Definitions**, for listing the parameters such as size fractions and density cut-points that have been included in a Clean Coal Composite (CCC).
- 5) **Test Specifications**, for each test as identified by its Report Number and Variable Name and listing:
 - the standard to which it was tested
 - the lower detection limit of the testing
 - the upper detection limit of the testing

14.2.1 Coal Quality Results

This includes the following key fields that are used for storing and finding results in the database:

- **SampType**
 - **PLY** individual samples
 - **COMP** analysed composited samples
 - **CALC** calculated composited samples
- **SampNumb** a valid individual/ply sample number or a composite sample number
- **CCCType** a name the user or the laboratory has assigned to a Clean Coal Composite to identify its composition
- **LabName** where the test was performed
- **ReportNo** the laboratory report number for the report providing the result
- **PreTreat**
 - **CRSH** crushed
 - **DROP** drop shatter
 - **DPHK** drop shatter followed by hand knapping
 - **DPHD** drop shatter, hand knapped, dry tumbled
 - **DPHW** drop shatter, hand knapped, wet tumbled
 - **CLPV** coal pulverisation sieve analysis
 - **CKPP** coke properties sieve analysis
 - **GSUN** uncrushed gas sample
 - **GSCR** crushed gas sample
- **DropCount** the number of drops before sizing
- **SizeType**
 - **W** wet
 - **D** dry
- **MinusSz** the upper sizing cut-off in millimetres
- **PlusSz** the lower sizing cut-off in millimetres
- **Sink** the sink density in g/cm³ for the fraction
- **Float** the float density in g/cm³ for the fraction
- **Froth** the froth fraction name

Every result must have non-blank values for **SampType**, **SampNumb**, **LabName** and **ReportNo**. Before a result for a **SampNumb** can be entered, the **SampNumb** must be defined by the user. Ply **SampNumb**'s are defined in the **SampNumb** column of the Geology data for the borehole and Composite **SampNumb**'s are defined in the Composite Constituents data for the borehole (see Section below). Similarly, before entering a result for a **CCCType**, the **CCCType** must be defined by the user as Clean Coal Composite Definition (see Section below).

Other data describing the samples and results that can be entered along with the actual results are:

- **VR** volume recovery
- **SampLith**
 - **CO** coal
 - **SN** stone
 - **PA** parting
 - **RF** roof
 - **FL** floor
- **DispNumb** dispatch number
- **PrevTest** previous test
 - **GD** gas desorption
 - **GT** geotech
- **ReportDate** date of laboratory report
- **LabSampleNo** the laboratory's sample identifier

In addition to these fields, whenever *LogCheck* opens Coal Quality Results, it uses the supplied **SampType** and **SampNumb** to determine from the Composite Constituent, Geology and Drilling data the following current values for each sample and then display them:

- **From** the depth at the top of the sample
- **To** the depth at the bottom of the sample
- **Thickness** the sample thickness
- **FromSeam** the seam at the top of the sample
- **ToSeam** the seam at the bottom of the sample
- **FromPly** the ply at the top of the sample
- **ToPly** the ply at the bottom of the sample
- **LR** the linear recovery
- **DrillDate** the date the sample was drilled

Where the **FromSeam**, **ToSeam**, **FromPly** or **ToPly** are not actually in seam or ply but in the roof or floor of a seam or ply, they are given the name of the seam or ply plus **_RF** for roof or **_FLR** for floor.

The full list of results that can be recorded are listed in Appendix G.

14.2.2 Coal Reflectance Results

This includes the following key fields that are used for storing and finding results in the database:

- **SampType**
 - **PLY** individual samples
 - **COMP** analysed composited samples
 - **CALC** calculated composited samples
- **SampNumb** a valid individual/ply sample number or a composite sample number
- **CCCType** a name the user or the laboratory has assigned to a Clean Coal Composite to identify its composition
- **LabName** where the test was performed
- **ReportNo** the laboratory report number for the report providing the result
- **VitType**
 - **TELO** Vitrinite Reflectance A (Telovitrinite)
 - **DETRO** Vitrinite Reflectance B (Detrovitrinite)
 - **ALL** Vitrinite Reflectance (A & B)
- **StepMin** the minimum reflectance value for the step
- **StepMax** the maximum reflectance value for the step

Every result must have non-blank values for **SampType**, **SampNumb**, **LabName**, **ReportNo**. and **VitType**.

Before a result for a **SampNumb** can be entered, the **SampNumb** must be defined by the user. Ply **SampNumb**'s are defined in the **SampNumb** column of the Geology data for the borehole and Composite **SampNumb**'s are defined in the Composite Constituents data for the borehole (see Section below). Similarly, before entering a result for a **CCCType**, the **CCCType** must be defined by the user as Clean Coal Composite Definition (see Section below).

Other data describing the samples and results that can be entered along with the reflectance results are:

- **DispNumb** dispatch number
- **ReportDate** date of laboratory report
- **LabSampleNo** the laboratory's sample identifier

In addition to these fields, whenever *LogCheck* opens Reflectance Results, it uses the supplied **SampType** and **SampNumb** to determine from the Composite Constituent, Geology and Drilling data the following current values for each sample and then display them:

- **From** the depth at the top of the sample
- **To** the depth at the bottom of the sample
- **Thickness** the sample thickness
- **FromSeam** the seam at the top of the sample
- **ToSeam** the seam at the bottom of the sample
- **FromPly** the ply at the top of the sample
- **ToPly** the ply at the bottom of the sample
- **DrillDate** the date the sample was drilled

Where the **FromSeam**, **ToSeam**, **FromPly** or **ToPly** are not actually in seam or ply but in the roof or floor of a seam or ply, they are given the name of the seam or ply plus **_RF** for roof or **_FLR** for floor.

The results that can be recorded for reflectance are:

- **RoMax** Mean Maximum Vitrinite Reflectance
- **No** Number of Readings
- **Freq** Frequency
- **RvMin** Minimum Vitrinite Reflectance
- **RvMax** Maximum Vitrinite Reflectance

- **SD** Standard Deviation of Mean determining Reflectance
- **StepMin** Step Minimum Reflectance
- **StepMax** Step Maximum Reflectance
- **StepFreq** Frequency of Reflectance Results for Step

For each sample number, only one line for each **VitType** can have results for RoMax, No, Freq, RvMin, RvMax and SD.

All other lines for the sample number and **VitType**, must have values for **StepMin**, **StepMax** and **StepFreq**.

An example of Reflectance data in *LogCheck* is:

SampType	SampNum	From	To	Thickness	FromSeam	ToSeam	LabName	ReportNo	ReportDate	LabSampNo	VitType	RoMax	No	Freq	RvMin	RvMax	SD	StepMin	StepMax	StepFreq
COMP	34_13_14	394.900	396.000	1.100	HCL	HCL	BVMKY	NE0098	02/11/2007	B77955	TELO	1.56	40	80.0	1.51	1.63	0.030	15.0	16.0	68.0
COMP	34_13_14	394.900	396.000	1.100	HCL	HCL	BVMKY	NE0098	02/11/2007	B77955	TELO							16.0	17.0	12.0
COMP	34_13_14	394.900	396.000	1.100	HCL	HCL	BVMKY	NE0098	02/11/2007	B77955	DETRO	1.54	10	20.0	1.50	1.59	0.030	15.0	16.0	20.0
COMP	34_13_14	394.900	396.000	1.100	HCL	HCL	BVMKY	NE0098	02/11/2007	B77955	ALL	1.56	50	100.0	1.50	1.63	0.030	15.0	16.0	88.0
COMP	34_13_14	394.900	396.000	1.100	HCL	HCL	BVMKY	NE0098	02/11/2007	B77955	ALL							16.0	17.0	12.0
COMP	34_15_16	396.000	398.020	2.020	HCL	HCL	BVMKY	NE0098	02/11/2007	B77956	TELO	1.60	44	88.0	1.42	1.67	0.050	14.0	15.0	4.0
COMP	34_15_16	396.000	398.020	2.020	HCL	HCL	BVMKY	NE0098	02/11/2007	B77956	TELO							15.0	16.0	28.0
COMP	34_15_16	396.000	398.020	2.020	HCL	HCL	BVMKY	NE0098	02/11/2007	B77956	TELO							16.0	17.0	56.0
COMP	34_15_16	396.000	398.020	2.020	HCL	HCL	BVMKY	NE0098	02/11/2007	B77956	DETRO	1.58	6	12.0	1.48	1.64	0.050	14.0	15.0	2.0
COMP	34_15_16	396.000	398.020	2.020	HCL	HCL	BVMKY	NE0098	02/11/2007	B77956	DETRO							15.0	16.0	4.0
COMP	34_15_16	396.000	398.020	2.020	HCL	HCL	BVMKY	NE0098	02/11/2007	B77956	DETRO							16.0	17.0	6.0
COMP	34_15_16	396.000	398.020	2.020	HCL	HCL	BVMKY	NE0098	02/11/2007	B77956	ALL	1.60	50	100.0	1.42	1.67	0.050	14.0	15.0	6.0
COMP	34_15_16	396.000	398.020	2.020	HCL	HCL	BVMKY	NE0098	02/11/2007	B77956	ALL							15.0	16.0	32.0
COMP	34_15_16	396.000	398.020	2.020	HCL	HCL	BVMKY	NE0098	02/11/2007	B77956	ALL							16.0	17.0	62.0

Sample Type (Ply/Comp)

14.2.3 Composite Constituents

Each Composite Number referred to in Coal Quality Results or Reflectance Results needs to have its Constituent Samples defined in the Composite Constituents data for the hole. Constituent Samples may be Individual Ply Samples, other Composite Samples or a mixture of both. An example of Composite Constituents in *LogCheck* is shown in the following figures. Normally for Composite Constituents, there would only be Composite Numbers in the first Composite Number column (CompNumb1) but the other three Composite Number columns are used where different Composite Samples overlap. The window in the top right of each screen displays the composite constituents of the currently selected composite and enables the creation and editing of composites and their constituents. The following figures demonstrate a slightly artificial situation where:

- **CompNumb1** contains a series of Composites, each created from two or three individual ply samples.
- **CompNumb2** contains a single composite made up of just Individual Ply Samples.
- **CompNumb3** contains a single composite made up from the Composites in **CompNumb1**.
- **CompNumb4** contains a single composite made up from both Individual Ply Samples and Composites in **CompNumb1**.

Example of a Composite made up of Individual Ply Samples:

LogCheck - [DEMOCQ\Composites\DEMO040]

File Edit View Tools Settings Help

	CalcThick	Depth	Seam	PC	Li	LQ	SampNumb	CompNumb1	CompNumb2	CompNumb3	CompNumb4
	0.03	85.33			CO	BB	733				
	0.07	85.40			CO	BD	733				
	0.16	85.56			CO	DD	733				
	0.02	85.58			CO	BB	733				
	0.03	85.61			TF		733				
	0.09	85.70			ZM		733				
	0.17	85.87			TF		734				
	0.11	85.98			CO	DD	735				
	0.10	86.08			TF		736				
	0.23	86.31			ZM		737				
	0.07	86.38			CO	DD	737				
	0.15	86.53			ZM		738				
	0.56	87.09			TF		739				
	0.28	87.37			CO	DD	740				
	0.11	87.48			TF		741				
	0.11	87.59			TF		742				
▶	0.18	87.77	S		ZM		743	743_44	743_48_P	743_48_C	743_48_PC
	0.16	87.93	S		TF		743	743_44	743_48_P	743_48_C	743_48_PC
	0.14	88.07	S		ZM		744	743_44	743_48_P	743_48_C	743_48_PC
	0.05	88.12	S		TF		744	743_44	743_48_P	743_48_C	743_48_PC
	0.31	88.43	S		CO	DD	744	743_44	743_48_P	743_48_C	743_48_PC
	0.05	88.48	S		TF		744	743_44	743_48_P	743_48_C	743_48_PC
	0.17	88.65	S		ZM		744	743_44	743_48_P	743_48_C	743_48_PC
	0.23	88.88			TF		745	745_46	743_48_P	743_48_C	743_48_PC
	0.16	89.04			XT		745	745_46	743_48_P	743_48_C	743_48_PC
	0.20	89.24	QU		CO	DM	746	745_46	743_48_P	743_48_C	743_48_PC
	0.04	89.28	QU		TF		746	745_46	743_48_P	743_48_C	743_48_PC
	0.17	89.45	QU		CO	DM	746	745_46	743_48_P	743_48_C	743_48_PC
	0.11	89.56	QU		TF		746	745_46	743_48_P	743_48_C	743_48_PC
	0.21	89.77	QU		CO	DM	746	745_46	743_48_P	743_48_C	743_48_PC
	0.16	89.93	QU		XM		746	745_46	743_48_P	743_48_C	743_48_PC
	0.38	90.31	QU		CO	DM	747	747_48	743_48_P	743_48_C	743_48_PC
	0.05	90.36	QU		TF		747	747_48	743_48_P	743_48_C	743_48_PC
	0.16	90.52	QU		CO	BD	748	747_48	743_48_P	743_48_C	743_48_PC
	0.02	90.54	QU		TF		748	747_48	743_48_P	743_48_C	743_48_PC
	0.41	90.95	QU		CO	BD	748	747_48	743_48_P	743_48_C	743_48_PC
	0.04	90.99	QU		TF		748	747_48	743_48_P	743_48_C	743_48_PC
	0.14	91.13	QU		CO	DM	749				
	0.06	91.19	QU		TF		206757				
	0.18	91.37	QL		CO	BD	206758				

Edit Composite Constituents

Composite Number: 743_44

Constituents

Sample Type	Top Sample	Bottom Sample
Ply	743	744

Update Rename Delete

Another Example of a Composite made up of Individual Ply Samples:

LogCheck - [DEMOCQ\Composites\DEMO040]

File Edit View Tools Settings Help

	CalcThick	Depth	Seam	PC	Li	LQ	SampNum	CompNum1	CompNum2	CompNum3	CompNum4
	0.03	85.33			CO	BB	733				
	0.07	85.40			CO	BD	733				
	0.16	85.56			CO	DD	733				
	0.02	85.58			CO	BB	733				
	0.03	85.61			TF		733				
	0.09	85.70			ZM		733				
	0.17	85.87			TF		734				
	0.11	85.98			CO	DD	735				
	0.10	86.08			TF		736				
	0.23	86.31			ZM		737				
	0.07	86.38			CO	DD	737				
	0.15	86.53			ZM		738				
	0.56	87.09			TF		739				
	0.28	87.37			CO	DD	740				
	0.11	87.48			TF		741				
	0.11	87.59			TF		742				
▶	0.18	87.77	S		ZM		743	743_44	743_48_P	743_48_C	743_48_PC
	0.16	87.93	S		TF		743	743_44	743_48_P	743_48_C	743_48_PC
	0.14	88.07	S		ZM		744	743_44	743_48_P	743_48_C	743_48_PC
	0.05	88.12	S		TF		744	743_44	743_48_P	743_48_C	743_48_PC
	0.31	88.43	S		CO	DD	744	743_44	743_48_P	743_48_C	743_48_PC
	0.05	88.48	S		TF		744	743_44	743_48_P	743_48_C	743_48_PC
	0.17	88.65	S		ZM		744	743_44	743_48_P	743_48_C	743_48_PC
	0.23	88.88			TF		745	745_46	743_48_P	743_48_C	743_48_PC
	0.16	89.04			XT		745	745_46	743_48_P	743_48_C	743_48_PC
	0.20	89.24	QU		CO	DM	746	745_46	743_48_P	743_48_C	743_48_PC
	0.04	89.28	QU		TF		746	745_46	743_48_P	743_48_C	743_48_PC
	0.17	89.45	QU		CO	DM	746	745_46	743_48_P	743_48_C	743_48_PC
	0.11	89.56	QU		TF		746	745_46	743_48_P	743_48_C	743_48_PC
	0.21	89.77	QU		CO	DM	746	745_46	743_48_P	743_48_C	743_48_PC
	0.16	89.93	QU		XM		746	745_46	743_48_P	743_48_C	743_48_PC
	0.38	90.31	QU		CO	DM	747	747_48	743_48_P	743_48_C	743_48_PC
	0.05	90.36	QU		TF		747	747_48	743_48_P	743_48_C	743_48_PC
	0.16	90.52	QU		CO	BD	748	747_48	743_48_P	743_48_C	743_48_PC
	0.02	90.54	QU		TF		748	747_48	743_48_P	743_48_C	743_48_PC
	0.41	90.95	QU		CO	BD	748	747_48	743_48_P	743_48_C	743_48_PC
	0.04	90.99	QU		TF		748	747_48	743_48_P	743_48_C	743_48_PC
	0.14	91.13	QU		CO	DM	749				
	0.06	91.19	QU		TF		206757				
	0.18	91.37	QL		CO	BD	206758				

Edit Composite Constituents

Composite Number: 743_48_P

Constituents

Sample Type	Top Sample	Bottom Sample
Ply	743	748

Update Rename Delete

An Example of a Composite made up of other Composite Samples:

LogCheck - [DEMOCQ\Composites\DEMO040]

File Edit View Tools Settings Help

	CalcThick	Depth	Seam	PC	Li	LQ	SampNum	CompNum1	CompNum2	CompNum3	CompNum4
	0.03	85.33			CO	BB	733				
	0.07	85.40			CO	BD	733				
	0.16	85.56			CO	DD	733				
	0.02	85.58			CO	BB	733				
	0.03	85.61			TF		733				
	0.09	85.70			ZM		733				
	0.17	85.87			TF		734				
	0.11	85.98			CO	DD	735				
	0.10	86.08			TF		736				
	0.23	86.31			ZM		737				
	0.07	86.38			CO	DD	737				
	0.15	86.53			ZM		738				
	0.56	87.09			TF		739				
	0.28	87.37			CO	DD	740				
	0.11	87.48			TF		741				
	0.11	87.59			TF		742				
▶	0.18	87.77	S		ZM		743	743_44	743_48_P	743_48_C	743_48_PC
	0.16	87.93	S		TF		743	743_44	743_48_P	743_48_C	743_48_PC
	0.14	88.07	S		ZM		744	743_44	743_48_P	743_48_C	743_48_PC
	0.05	88.12	S		TF		744	743_44	743_48_P	743_48_C	743_48_PC
	0.31	88.43	S		CO	DD	744	743_44	743_48_P	743_48_C	743_48_PC
	0.05	88.48	S		TF		744	743_44	743_48_P	743_48_C	743_48_PC
	0.17	88.65	S		ZM		744	743_44	743_48_P	743_48_C	743_48_PC
	0.23	88.88			TF		745	745_46	743_48_P	743_48_C	743_48_PC
	0.16	89.04			XT		745	745_46	743_48_P	743_48_C	743_48_PC
	0.20	89.24	QU		CO	DM	746	745_46	743_48_P	743_48_C	743_48_PC
	0.04	89.28	QU		TF		746	745_46	743_48_P	743_48_C	743_48_PC
	0.17	89.45	QU		CO	DM	746	745_46	743_48_P	743_48_C	743_48_PC
	0.11	89.56	QU		TF		746	745_46	743_48_P	743_48_C	743_48_PC
	0.21	89.77	QU		CO	DM	746	745_46	743_48_P	743_48_C	743_48_PC
	0.16	89.93	QU		XM		746	745_46	743_48_P	743_48_C	743_48_PC
	0.38	90.31	QU		CO	DM	747	747_48	743_48_P	743_48_C	743_48_PC
	0.05	90.36	QU		TF		747	747_48	743_48_P	743_48_C	743_48_PC
	0.16	90.52	QU		CO	BD	748	747_48	743_48_P	743_48_C	743_48_PC
	0.02	90.54	QU		TF		748	747_48	743_48_P	743_48_C	743_48_PC
	0.41	90.95	QU		CO	BD	748	747_48	743_48_P	743_48_C	743_48_PC
	0.04	90.99	QU		TF		748	747_48	743_48_P	743_48_C	743_48_PC
	0.14	91.13	QU		CO	DM	749				
	0.06	91.19	QU		TF		206757				
	0.18	91.37	QL		CO	BD	206758				

Edit Composite Constituents

Composite Number: 743_48_C

Constituents

Sample Type	Top Sample	Bottom Sample
Comp	743_44	747_48

Update Rename Delete

An Example of a Composite made up of both Individual Ply Samples and other Composite Samples:

LogCheck - [DEMOCQ\Composites\DEMO040]

File Edit View Tools Settings Help

	CalcThick	Depth	Seam	PC	Li	LQ	SampNumb	CompNumb1	CompNumb2	CompNumb3	CompNumb4
	0.03	85.33			CO	BB	733				
	0.07	85.40			CO	BD	733				
	0.16	85.56			CO	DD	733				
	0.02	85.58			CO	BB	733				
	0.03	85.61			TF		733				
	0.09	85.70			ZM		733				
	0.17	85.87			TF		734				
	0.11	85.98			CO	DD	735				
	0.10	86.08			TF		736				
	0.23	86.31			ZM		737				
	0.07	86.38			CO	DD	737				
	0.15	86.53			ZM		738				
	0.56	87.09			TF		739				
	0.28	87.37			CO	DD	740				
	0.11	87.48			TF		741				
	0.11	87.59			TF		742				
▶	0.18	87.77	S		ZM		743	743_44	743_48_P	743_48_C	743_48_PC
	0.16	87.93	S		TF		743	743_44	743_48_P	743_48_C	743_48_PC
	0.14	88.07	S		ZM		744	743_44	743_48_P	743_48_C	743_48_PC
	0.05	88.12	S		TF		744	743_44	743_48_P	743_48_C	743_48_PC
	0.31	88.43	S		CO	DD	744	743_44	743_48_P	743_48_C	743_48_PC
	0.05	88.48	S		TF		744	743_44	743_48_P	743_48_C	743_48_PC
	0.17	88.65	S		ZM		744	743_44	743_48_P	743_48_C	743_48_PC
	0.23	88.88			TF		745	745_46	743_48_P	743_48_C	743_48_PC
	0.16	89.04			XT		745	745_46	743_48_P	743_48_C	743_48_PC
	0.20	89.24	QU		CO	DM	746	745_46	743_48_P	743_48_C	743_48_PC
	0.04	89.28	QU		TF		746	745_46	743_48_P	743_48_C	743_48_PC
	0.17	89.45	QU		CO	DM	746	745_46	743_48_P	743_48_C	743_48_PC
	0.11	89.56	QU		TF		746	745_46	743_48_P	743_48_C	743_48_PC
	0.21	89.77	QU		CO	DM	746	745_46	743_48_P	743_48_C	743_48_PC
	0.16	89.93	QU		XM		746	745_46	743_48_P	743_48_C	743_48_PC
	0.38	90.31	QU		CO	DM	747	747_48	743_48_P	743_48_C	743_48_PC
	0.05	90.36	QU		TF		747	747_48	743_48_P	743_48_C	743_48_PC
	0.16	90.52	QU		CO	BD	748	747_48	743_48_P	743_48_C	743_48_PC
	0.02	90.54	QU		TF		748	747_48	743_48_P	743_48_C	743_48_PC
	0.41	90.95	QU		CO	BD	748	747_48	743_48_P	743_48_C	743_48_PC
	0.04	90.99	QU		TF		748	747_48	743_48_P	743_48_C	743_48_PC
	0.14	91.13	QU		CO	DM	749				
	0.06	91.19	QU		TF		206757				
	0.18	91.37	QL		CO	BD	206758				

Edit Composite Constituents

Composite Number: 743_48_PC

Constituents

Sample Type	Top Sample	Bottom Sample
Ply	743	744
Comp	745_46	745_46
Ply	747	748

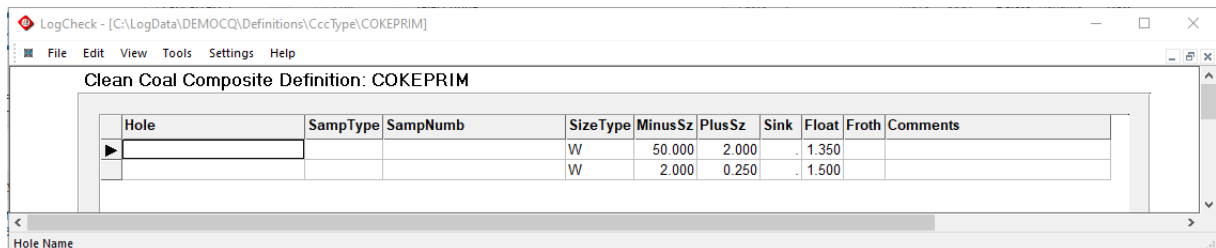
Update Rename Delete

14.2.4 Clean Coal Composite Type Definitions

Each Clean Coal Composite Type referred to in Coal Quality Results or Reflectance Results needs to be defined by a Clean Coal Composite Type Definition. The user can create as many Clean Coal Type Definitions for a project as they like and each must have a unique name as supplied by the user. There is considerable flexibility how the user defines each Clean Coal Composite Type. The possible variables they can define are:

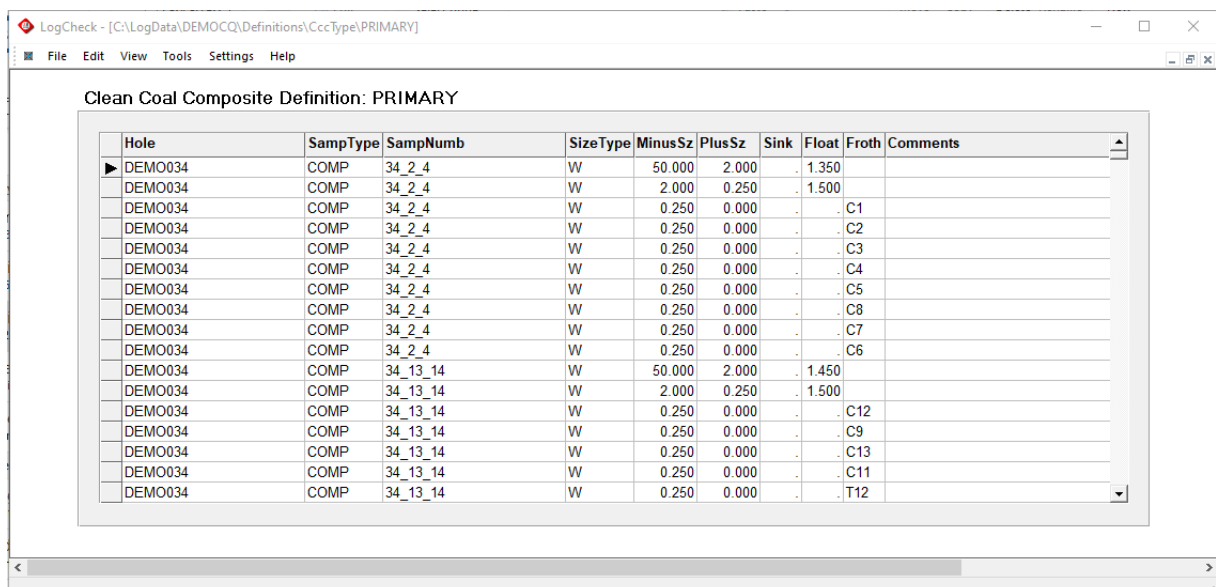
- **Hole:** hole name
- **SampType:**
 - **PLY** individual samples
 - **COMP** analysed composited samples
- **SampNumb:** a valid individual/ply sample number or a composite sample number
- **SizeType:**
 - **W** wet
 - **D** dry
- **MinusSz:** the upper sizing cut-off in millimetres
- **PlusSz:** the lower sizing cut-off in millimetres
- **Sink:** the sink density in g/cm3 for the fraction
- **Float:** the float density in g/cm3 for the fraction
- **Froth:** the froth fraction name
- **Comment:** any other comments. This field is particularly useful where the other variables don't adequately define the Clean Coal Composite Type

For a particular Clean Coal Composite Type, the user may like to define a common definition for their entire project:



Hole	SampType	SampNumb	SizeType	MinusSz	PlusSz	Sink	Float	Froth	Comments
			W	50.000	2.000	1.350	1.500		
			W	2.000	0.250	1.500			

Or they may like to define a different definition for each hole:



Hole	SampType	SampNumb	SizeType	MinusSz	PlusSz	Sink	Float	Froth	Comments
DEMO034	COMP	34_2_4	W	50.000	2.000	1.350	1.500		
DEMO034	COMP	34_2_4	W	2.000	0.250	1.500			
DEMO034	COMP	34_2_4	W	0.250	0.000			C1	
DEMO034	COMP	34_2_4	W	0.250	0.000			C2	
DEMO034	COMP	34_2_4	W	0.250	0.000			C3	
DEMO034	COMP	34_2_4	W	0.250	0.000			C4	
DEMO034	COMP	34_2_4	W	0.250	0.000			C5	
DEMO034	COMP	34_2_4	W	0.250	0.000			C8	
DEMO034	COMP	34_2_4	W	0.250	0.000			C7	
DEMO034	COMP	34_2_4	W	0.250	0.000			C6	
DEMO034	COMP	34_13_14	W	50.000	2.000	1.450	1.500		
DEMO034	COMP	34_13_14	W	2.000	0.250	1.500			
DEMO034	COMP	34_13_14	W	0.250	0.000			C12	
DEMO034	COMP	34_13_14	W	0.250	0.000			C9	
DEMO034	COMP	34_13_14	W	0.250	0.000			C13	
DEMO034	COMP	34_13_14	W	0.250	0.000			C11	
DEMO034	COMP	34_13_14	W	0.250	0.000			T12	

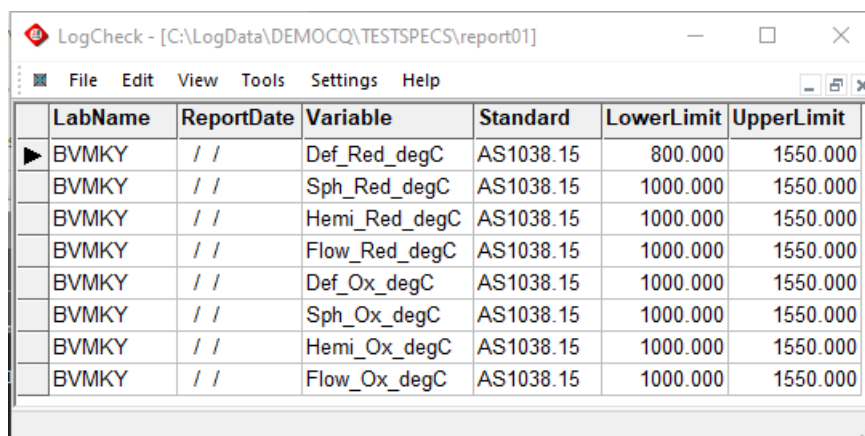
14.2.5 Test Specification Definitions

For each report provided by the laboratory, the specifications for each test that was performed can be recorded in the Test Specifications for the Report. The information that can be recorded is:

- **LabName:** where the test was performed
- **ReportDate:** date of laboratory report
- **Variable:** the CoalLog variable name for the test (see Appendix A)
- **Standard:** the standard to which the test was performed
- **LowerLimit:** the lower detection limit
- **UpperLimit:** the upper detection limit

The mandatory fields for each record are: **LabName**, **Variable** and **LowerLimit**.

An example of a Test Specification Definition:



The screenshot shows the LogCheck application window with the title bar 'LogCheck - [C:\LogData\DEMOCQ\TESTSPECS\report01]'. The menu bar includes File, Edit, View, Tools, Settings, and Help. The main area displays a table with the following data:

	LabName	ReportDate	Variable	Standard	LowerLimit	UpperLimit
▶	BVMKY	/ /	Def_Red_degC	AS1038.15	800.000	1550.000
	BVMKY	/ /	Sph_Red_degC	AS1038.15	1000.000	1550.000
	BVMKY	/ /	Hemi_Red_degC	AS1038.15	1000.000	1550.000
	BVMKY	/ /	Flow_Red_degC	AS1038.15	1000.000	1550.000
	BVMKY	/ /	Def_Ox_degC	AS1038.15	1000.000	1550.000
	BVMKY	/ /	Sph_Ox_degC	AS1038.15	1000.000	1550.000
	BVMKY	/ /	Hemi_Ox_degC	AS1038.15	1000.000	1550.000
	BVMKY	/ /	Flow_Ox_degC	AS1038.15	1000.000	1550.000

14.3 Importing Coal Quality Data

As with importing all CoalLog data types into *LogCheck*, there are two possible Data Layouts for importing data into *LogCheck*:

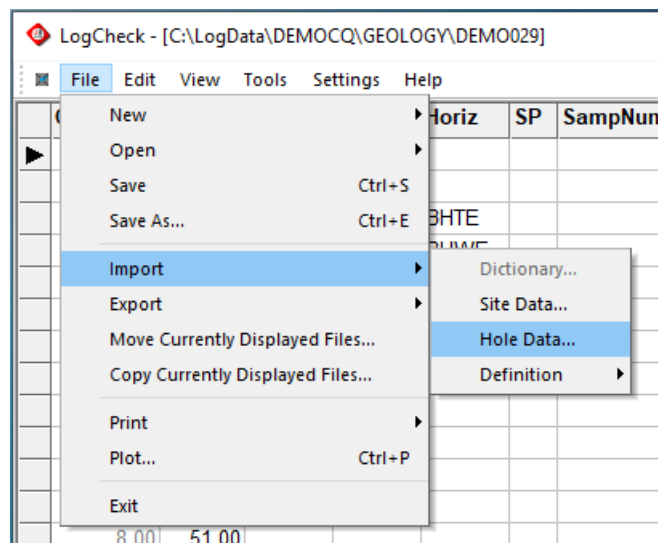
- *LogCheck*
- CoalLog Data Transfer

The advantage of *LogCheck* layout is that the user can have whatever column headings they like on their data and can specify the basis of the data being imported. The disadvantage is that the user must include a Basis column in their data and they must set up a mapping between the columns in their imported data and the names of the appropriate *LogCheck* variable for each column. *LogCheck*, though does save the mappings to be the default mapping when the same type of data is being imported.

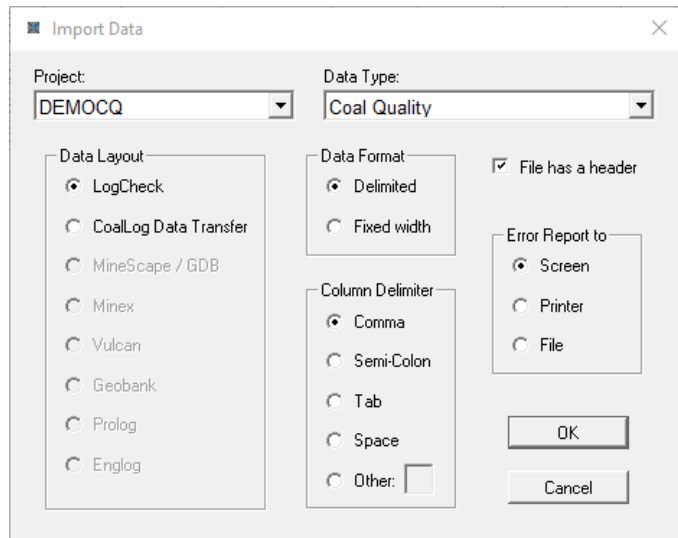
The advantage of CoalLog Data Transfer is that there is no setup required by the user before importing the data as the program already contains the mappings between the CoalLog variables and a CoalLog Data Transfer file. With a CoalLog Data Transfer format, there is also no need to specify the basis of the results as they will be recorded on the basis as specified in the CoalLog standard (see Appendix A).

14.3.1 Importing Coal Quality Results in *LogCheck* Layout

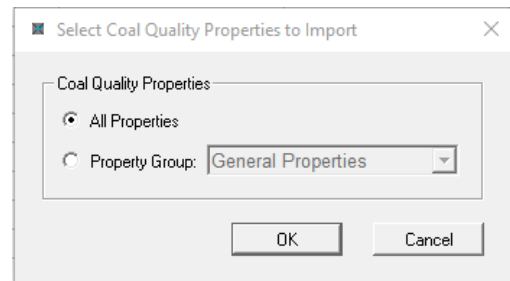
To import Coal Quality Results into *LogCheck*, select:



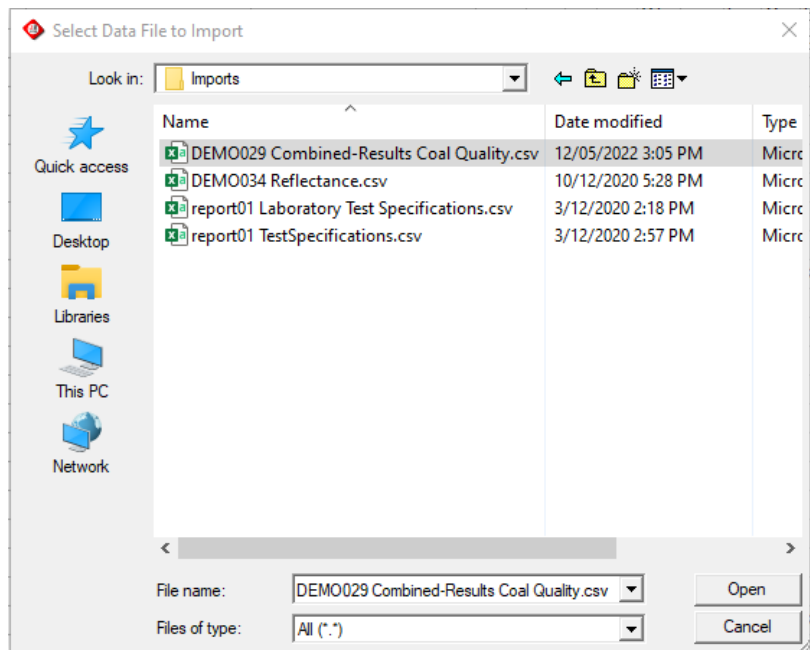
Then for *LogCheck* layout, select Data Layout of *LogCheck* and Data Type of Coal Quality:



Then select whether importing data including All Properties or a particular Property Group. See Appendix A to see the results in each Property Group.



Then enter the location and name of the import file:



If All Properties was selected, the following table will be displayed. Enter the mappings between the *LogCheck* Coal Quality Results columns and the Column Names in the import file into this table:

LogCheck Column Description	Import File Column Name
Hole Name	Hole
Sample Type (Ply/Comp)	SampType
Sample Number	SampNumb
Volume Recovery	
Litho Category	
Dispatch Number	
Previous Test	
Comments	
Laboratory	LabName
Laboratory Report No.	ReportNo
Laboratory Report Date	ReportDate
Laboratory Sample No.	
Clean Coal Composite Type	
Treatment before Testing	
No of Drops	
Size Type (Dry/Wet)	
Upper Sizing	
Lower Sizing	
Sink Density	
Float Density	
Froth Fraction	

OK Cancel

When selecting the Import File Column Name, pressing the drop down arrow will display the list of column names in the import file:

LogCheck Column Description	Import File Column Name
Hole Name	Hole
Sample Type (Ply/Comp)	SampType
Sample Number	SampNumb
Volume Recovery	SampNumb
Litho Category	From_Depth
Dispatch Number	To_Depth
Previous Test	Thickness
Comments	FromSeam
Laboratory	ToSeam
Laboratory Report No.	FromPly
Laboratory Report Date	ToPly
Laboratory Sample No.	LR
Clean Coal Composite Type	VR
Treatment before Testing	DrillDate
No of Drops	SampLith
Size Type (Dry/Wet)	DispNumb
Upper Sizing	PrevTest
Lower Sizing	Comments
Sink Density	LabName
Float Density	ReportNo
Froth Fraction	ReportDate
	LabSampNo
	CCCType

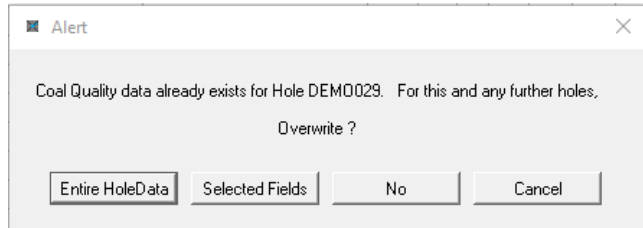
OK Cancel

If a particular Property Group was selected, a window similar to the following will be displayed. Enter the mappings between the *LogCheck* Coal Quality Results columns and the Column Names in the import file:

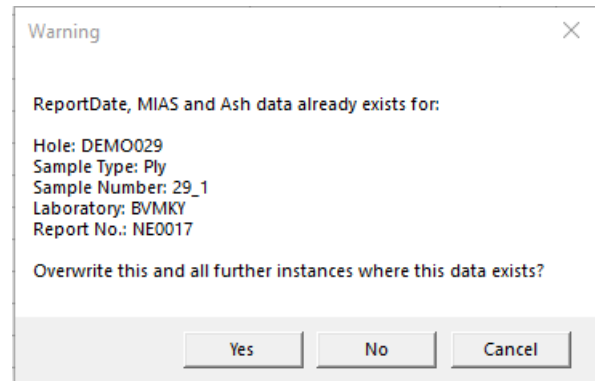
Similar to the All Properties, pressing the drop down arrow will display the list of column names in the import file:

Whether using All Properties or a Property Group, it is necessary to specify columns for **SampType**, **SampNumb**, **LabName**, **ReportNo** and **Basis**. If the various variables are to the Basis specified in the CoalLog standard then each line in the file should have a **Basis** of ARP for As Reported. Each variable will be stored in *LogCheck* with the **Basis** that is defined by CoalLog for that **Basis** (see Appendix A). Any results that are not on that **Basis** will be converted to that Basis on import into *LogCheck*.

If Coal Quality results already exist for the borehole, the warning on the right will be displayed:

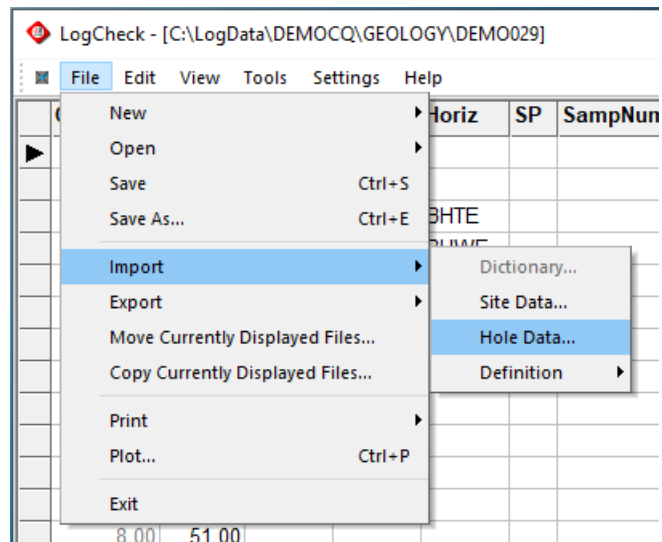


If Selected Fields is pressed and if any results for a particular already exist in *LogCheck* for their particular **SampType**, **SampNumb**, **CCCType**, **LabName**, **ReportNo**, **PreTreat**, **DropCount**, **SizeType**, **MinusSz**, **PlusSz**, **Sink**, **Float** and **Froth** then a message such as the following will be displayed:

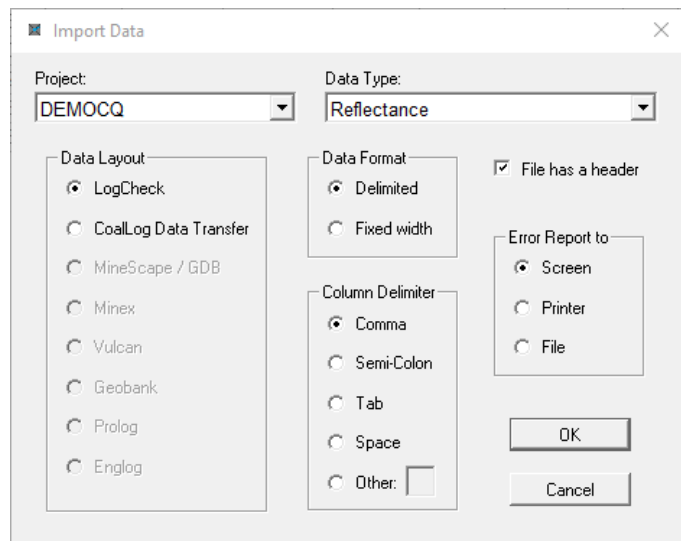


14.3.2 Importing Reflectance Results in *LogCheck* Layout

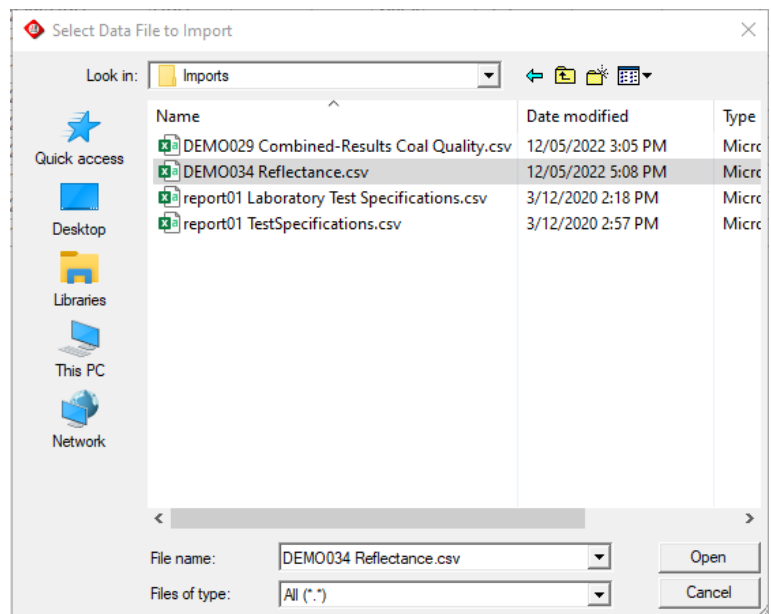
To import Reflectance Results in *LogCheck* Layout into *LogCheck*, select:



Then for *LogCheck* layout, select Data Layout of *LogCheck* and Data Type of Reflectance:



Then enter the location and name of the import file:



Enter the mappings between the *LogCheck* Reflectance columns and the Column Names in the import file into the following window:

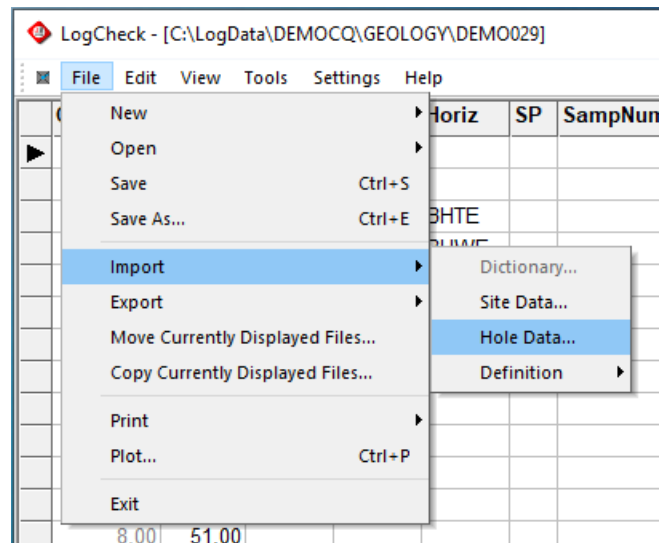
It is necessary to specify columns for **SampType**, **SampNumb**, **LabName**, **ReportNo** and **VitType**.

If reflectance results already exist for the borehole, the warning on the right will be displayed:

Unlike Coal Quality results the user can not add further results to those for a borehole that already has Reflectance data. It is only possible to overwrite the results for the entire hole.

14.3.3 Importing Composite Constituents Data

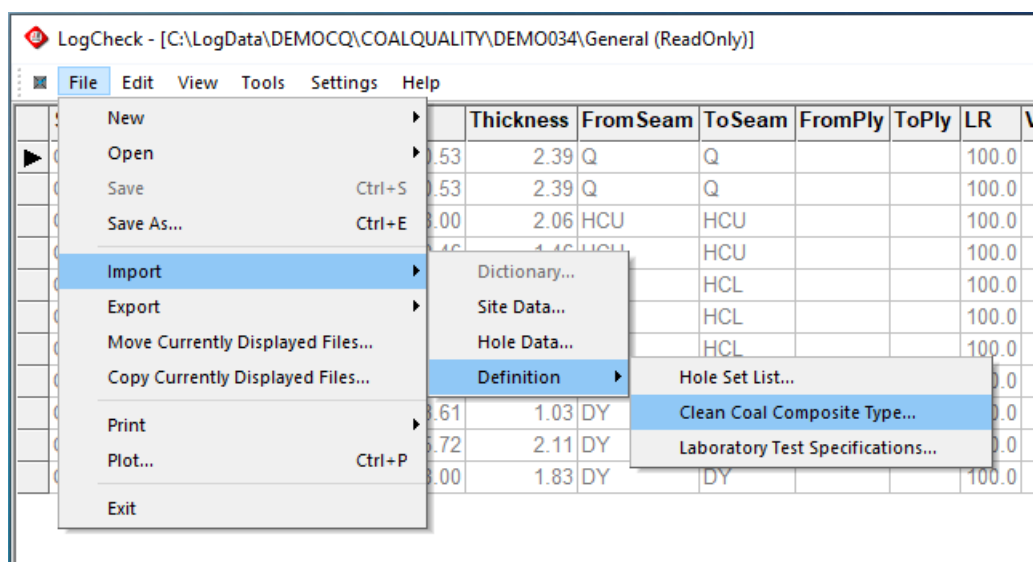
To import Composite Constituents Data select :



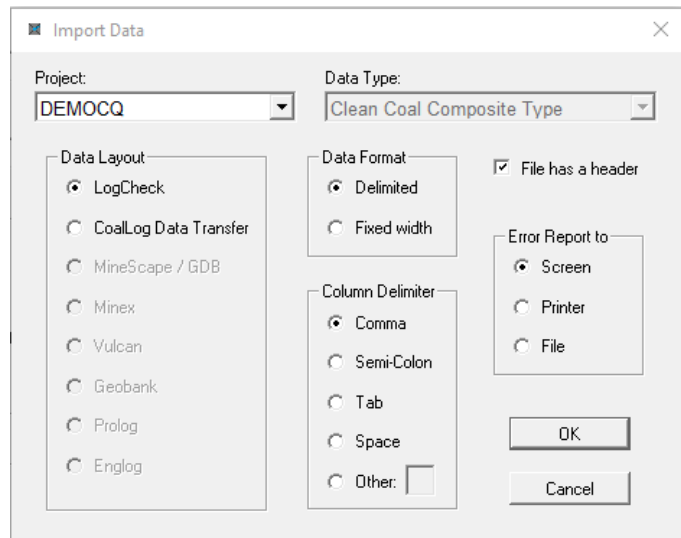
Note that CoalLog Data Transfer is the only option for Data Layout for importing Composite Constituents.

14.3.4 Importing Clean Coal Composite Type Definitions in LogCheck Layout

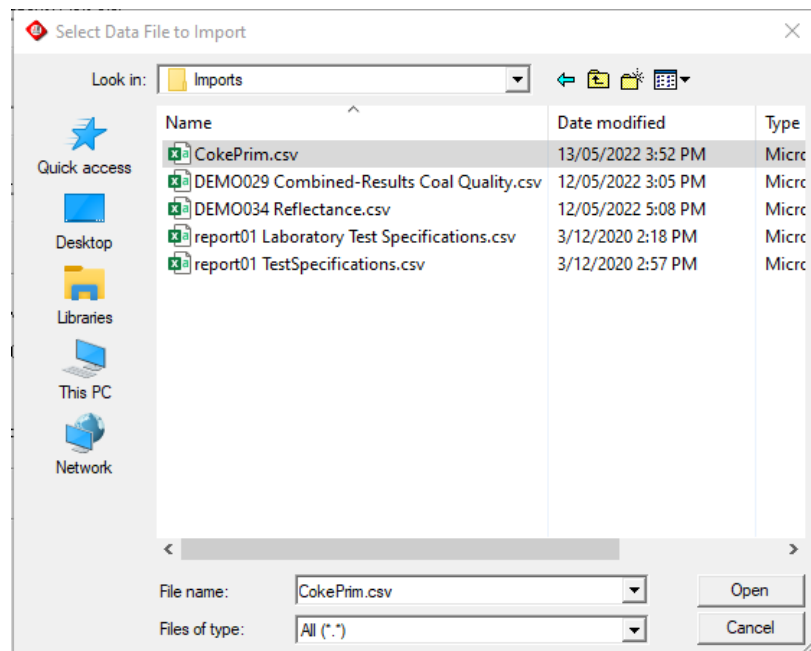
To import Clean Coal Composite Definitions in *LogCheck* Layout into *LogCheck*, select:



Next select *LogCheck* Data Layout:



Then enter the location and name of the import file:



Then enter the mappings between the *LogCheck* Clean Coal Composite Type columns and the Column Names in the import file into the window:

Select columns to import

Clean Coal Composite Type
CCCType

Hole Name
Hole

Sample Type (Fly/Comp)
SampType

Sample Number
SampNumb

Size Type (Dry/Wet)
SizeType

Upper Sizing
MinusSz

Lower Sizing
PlusSz

Sink Density
Sink

Float Density
Float

Froth Fraction
Froth

Comments
Comments

OK Cancel

If any Clean Coal Composites Types in the import file already exist in *LogCheck*, the warning to the right will be displayed:

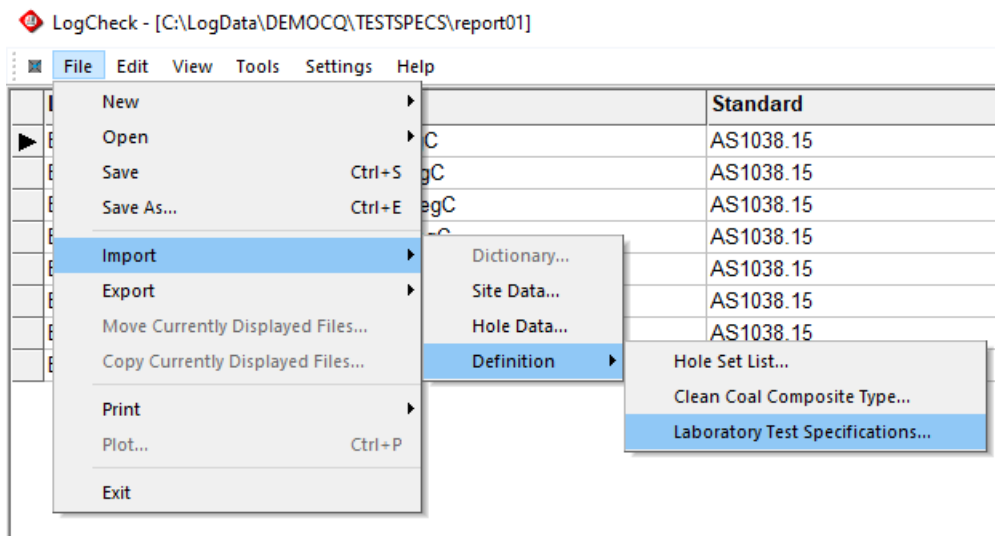
Alert

Clean Coal Composite Type data already exists for CCCType COKEPRIM.
Overwrite ?

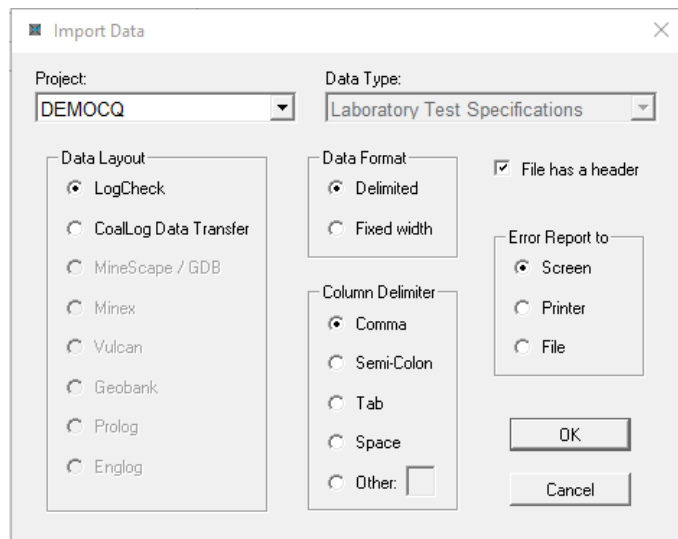
Yes Yes to All No Cancel

14.3.5 Importing Test Specifications in *LogCheck* Layout

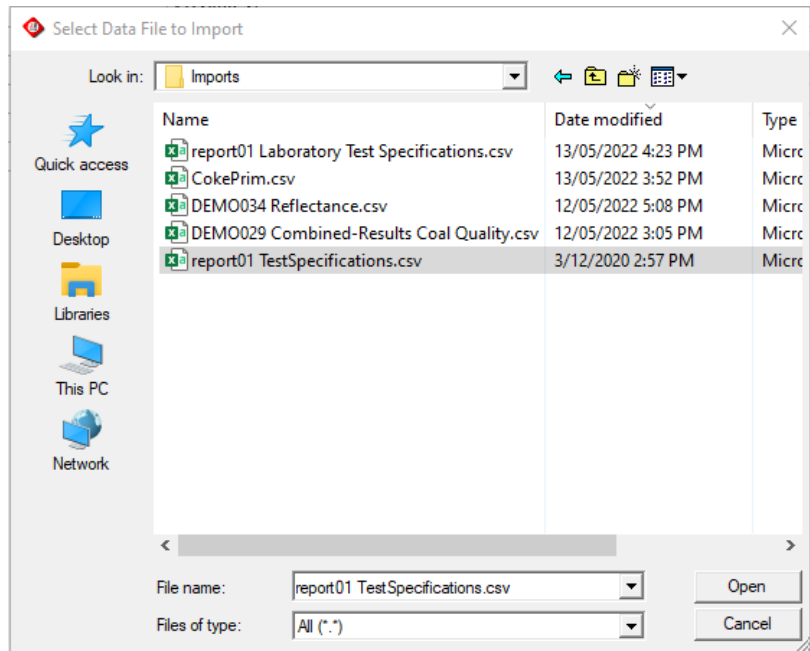
To import Test Specifications in *LogCheck* Layout into *LogCheck*, select:



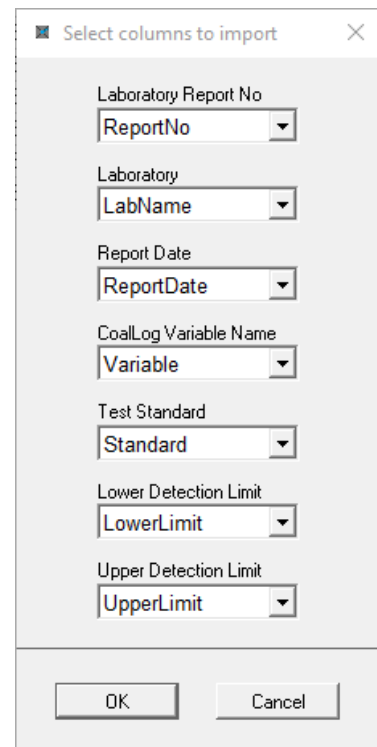
Next select *LogCheck* Data Layout:



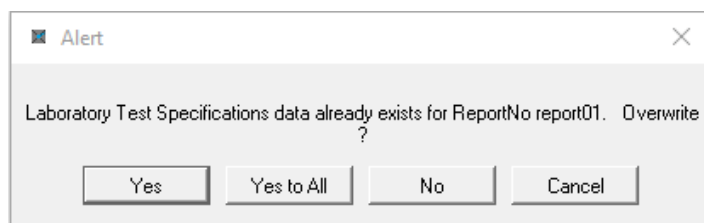
Then enter the location and name of the import file:



Enter the mappings between the *LogCheck* Test Specification columns and the Column Names in the import file into the window:



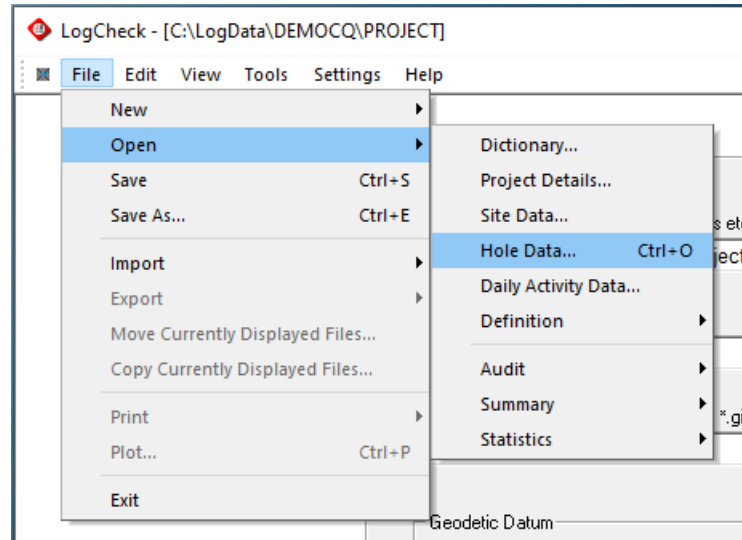
If any Reports in the import file already exist in *LogCheck*, the following warning will be displayed:



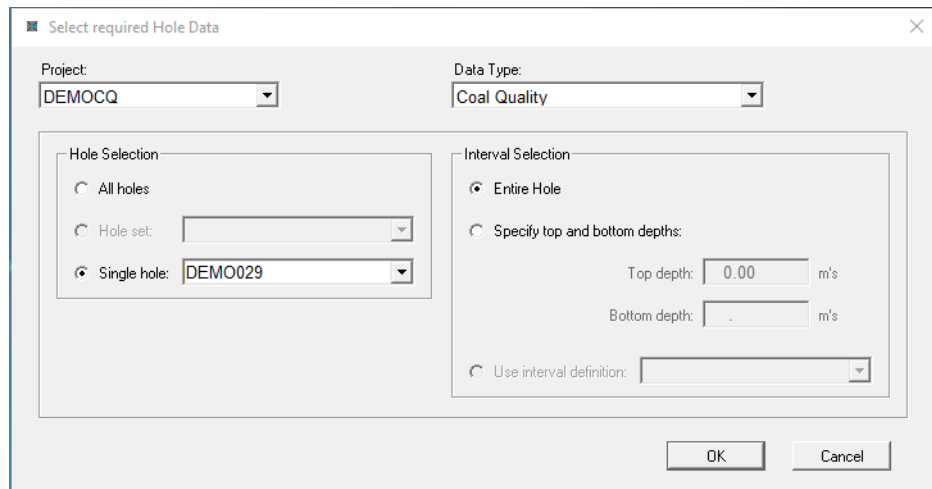
14.4 Opening, Viewing and Editing Coal Quality Data

14.4.1 Opening, Viewing and Editing Coal Quality Results

To open Coal Quality Data select:



Next, select the hole or holes whose Coal Quality data are required:



If All Holes or Hole Set are selected, only the list of Holes with Coal Quality results will be displayed rather than the actual data. The data from these holes though can now be exported or plotted.

Finally, select the required Coal Quality results for the selected holes:

The only options that will be available for selection in the above window will be those for which that type of data exists within the selected holes. For example, if there is only Ply data for the selected holes, the only available options in the Sampling box will be *Ply Sample Results* and *Both Ply and Composite Sample Results*. For Sample Preparation, *Raw* will only be available if the selected holes contain Raw data, *Clean Coal Composites* will only be available if the selected holes contain Clean Coal Composite data and *Specific Preparation* will only be available if the selected holes contain Sized or Washed data.

Similarly, in the Coal Quality Properties box, the drop-down list for Property Groups will contain only Property Groups that exist in the data.

All the data is stored on an As Reported basis, that is on the basis specified in CoalLog for each specific variable but if another basis is selected then any data that are basis dependent are first converted to the required basis before being displayed, exported or plotted.

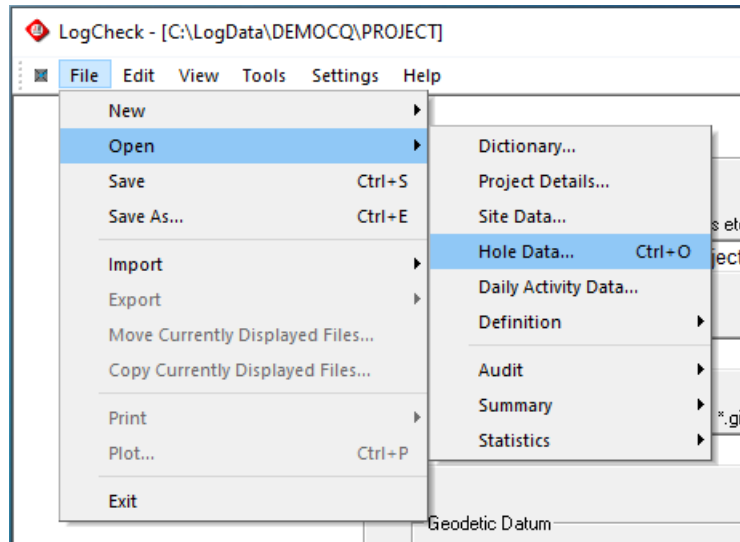
LogCheck does not store samples' from and to depths nor samples' seam and ply names with the Coal Quality results. It does, however, display this information whenever displaying Coal Quality results but obtains it at the time from the current Geology data. This ensures that the from and to depths and seam and ply names always match those currently used for export of the Geology data to modelling packages.

Coal Quality data can always be entered or updated directly from imported .csv files. To ensure data integrity though, results in the database can only be manually edited provided the following all apply:

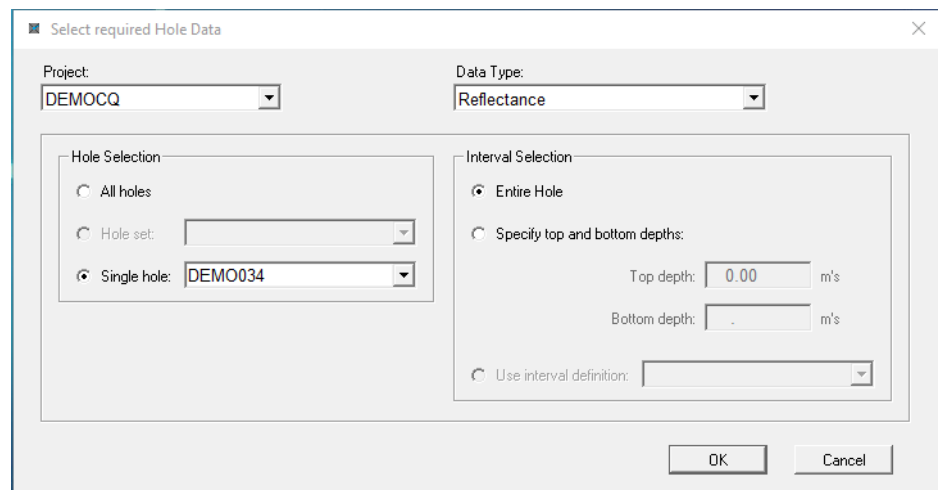
- only the data for a single hole has been selected
- all the Coal Quality data for the hole has been selected, that is the options *Both Ply and Composite Sample Results*, *All Properties* and *All Results* have been selected
- moisture basis of *As Reported* has been selected
- the user has Manager status. To turn on Manager status select **Manager** from the **Settings** drop-down menu and then enter the Manager password

14.4.2 Opening, Viewing and Editing Reflectance Results

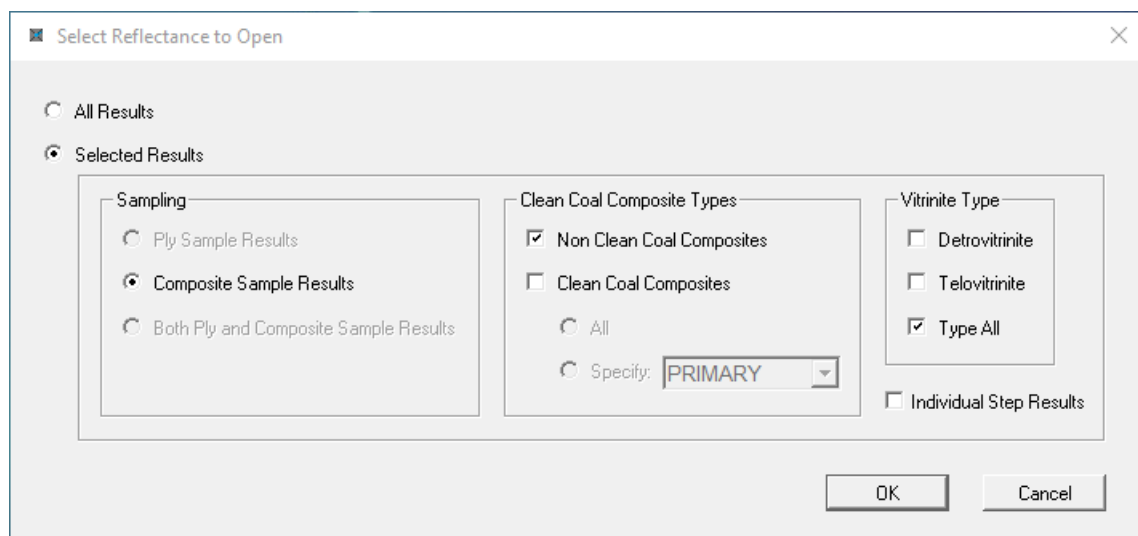
To open Coal Quality Data select:



Next, select the hole or holes whose Reflectance data are required:



Finally, select the required Reflectance results for the selected holes:



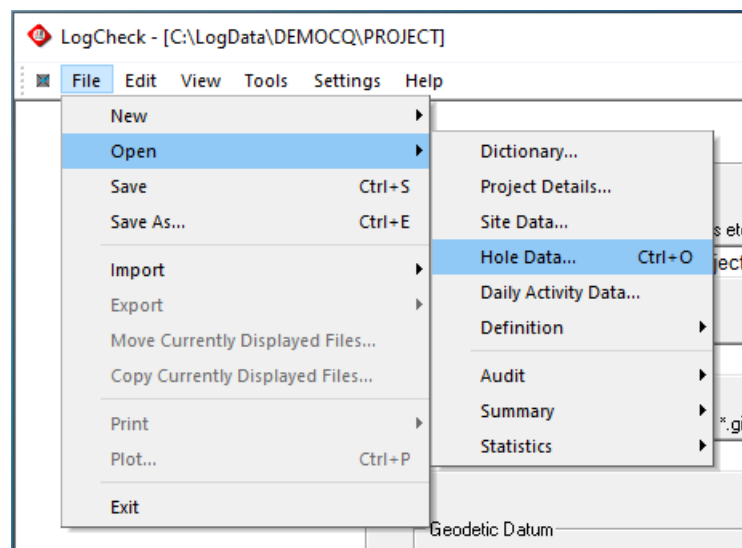
With Sampling, only those options that are available in the Reflectance data for the selected holes can be selected. For example, if there is only Reflectance data on Composites then *Composite Sample Results* will be the only available option in the Sampling box.

Coal Quality data can be always be entered or updated directly from imported.csv files. To ensure data integrity though, results in the database can only be manually edited provided the following all apply:

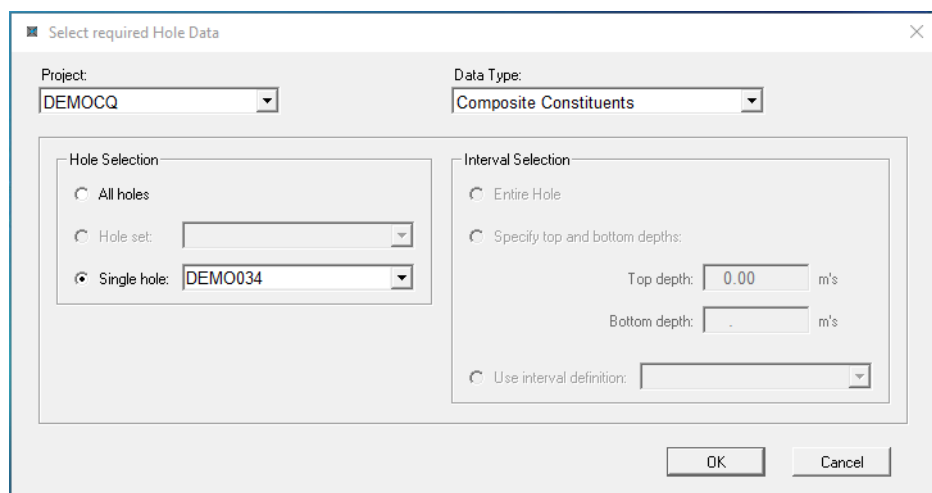
- only the data for a single hole has been selected
- *All Results* has been selected
- the user has Manager status. To turn on Manager status select **Manager** from the **Settings** drop-down menu and then enter the Manager password

14.4.3 Opening, Viewing and Editing Composite Constituents

To open Composite Constituents select:

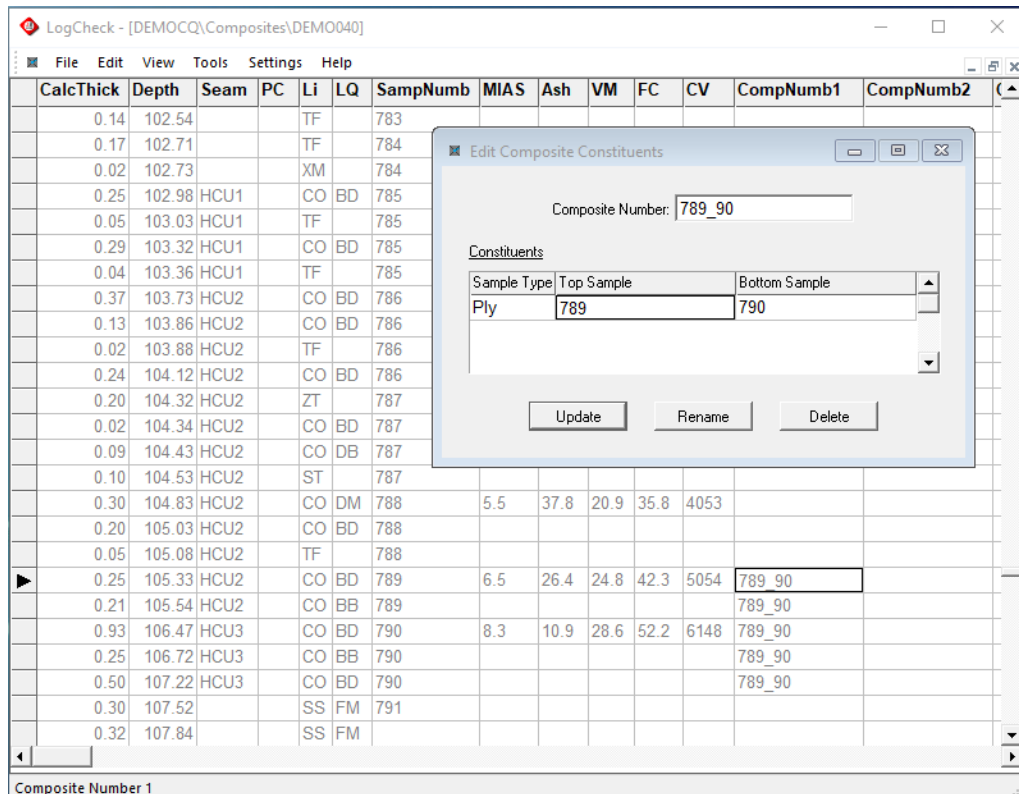


Next, select the hole or holes whose Composite Constituents are required:

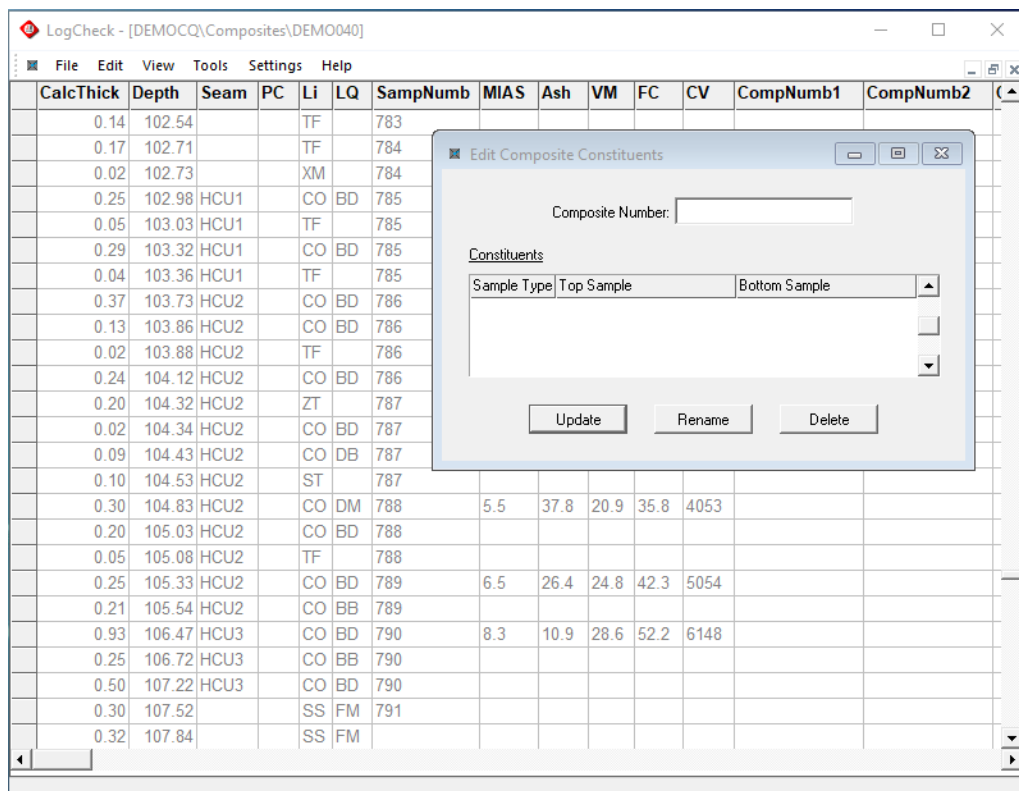


If All Holes or Hole Set are selected, only the list of Holes with Composite Constituents will be displayed rather than the actual data. However, the Composite Constituents from these holes can now be exported.

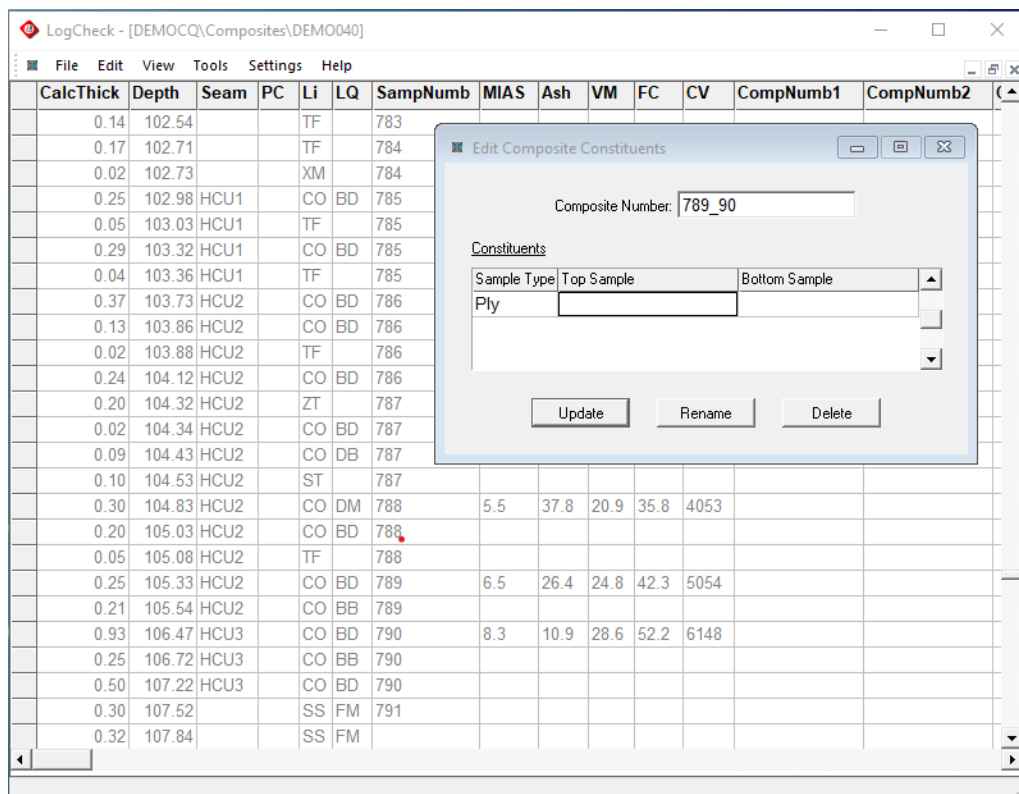
When viewing and editing Composite Constituents, the main table displays the Depths, Seams and/or Plies, Lithologies and Sample Numbers from the Geology data, basic Coal Quality results for the individual Ply samples and any composites that have been entered for the displayed data. The data in the main table are all in grey as they cannot be directly modified, however, there is also a separate window entitled Edit Composite Constituents where composite numbers can be entered, modified or deleted:



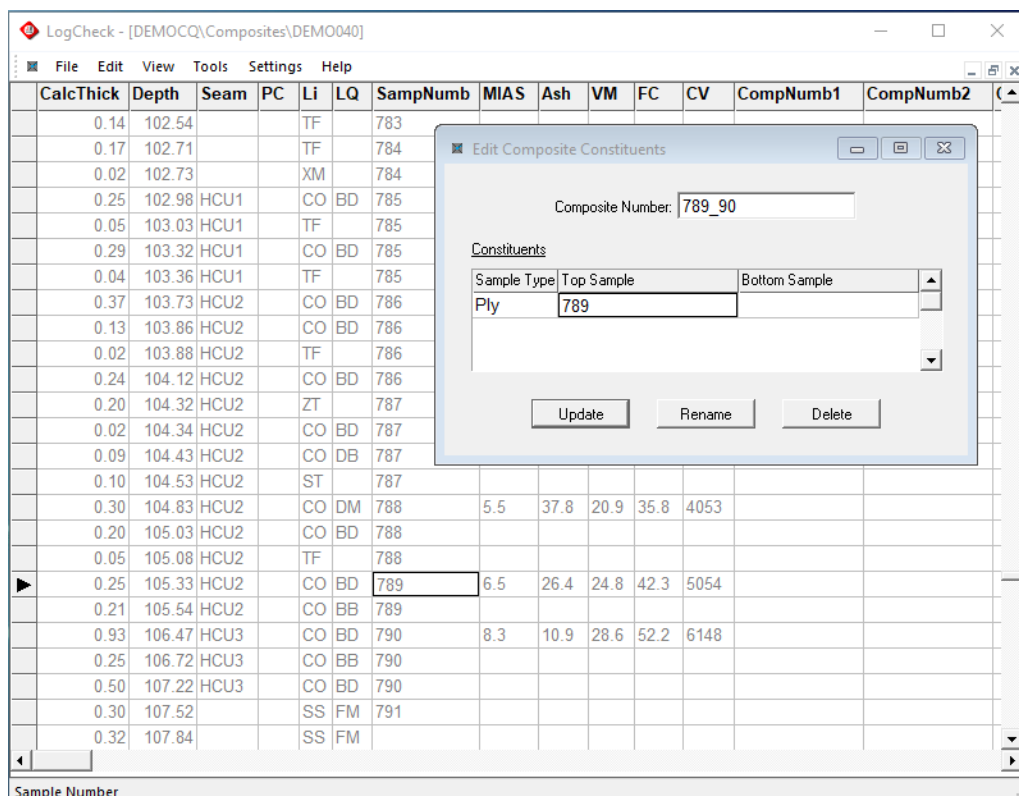
Before entering any composite numbers, the interval displayed above will appear as:



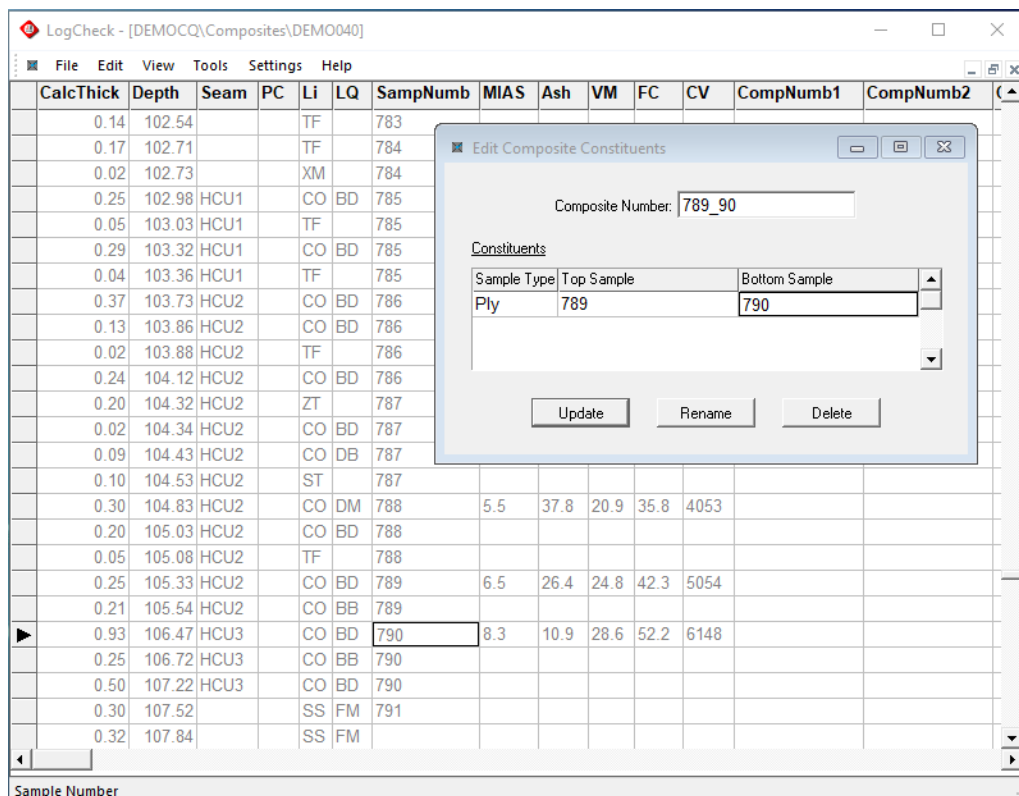
To enter a Composite named 789_90 consisting of the individual plies 789 and 790, click on the Composite Number box in the editing window and enter the new composite number 789_90 and then press Tab:



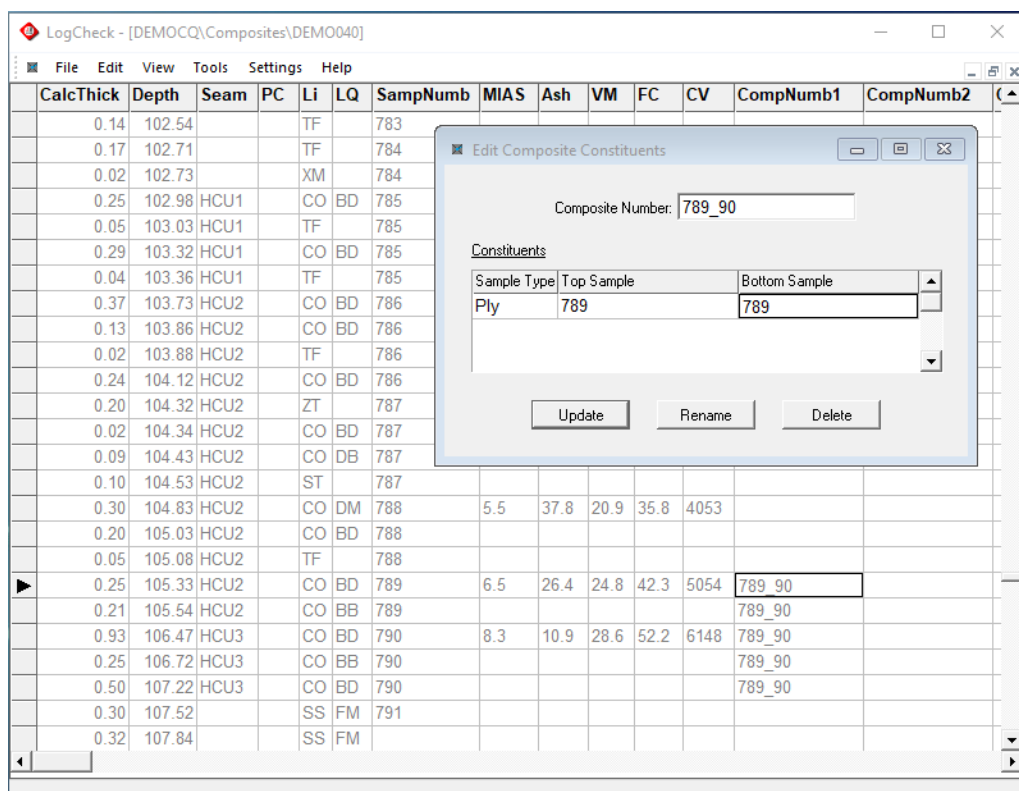
Next click on the Top Sample field and enter the Sample Number 789 for the top sample. This can be either entered by directly typing or by clicking on the sample number in the main table:



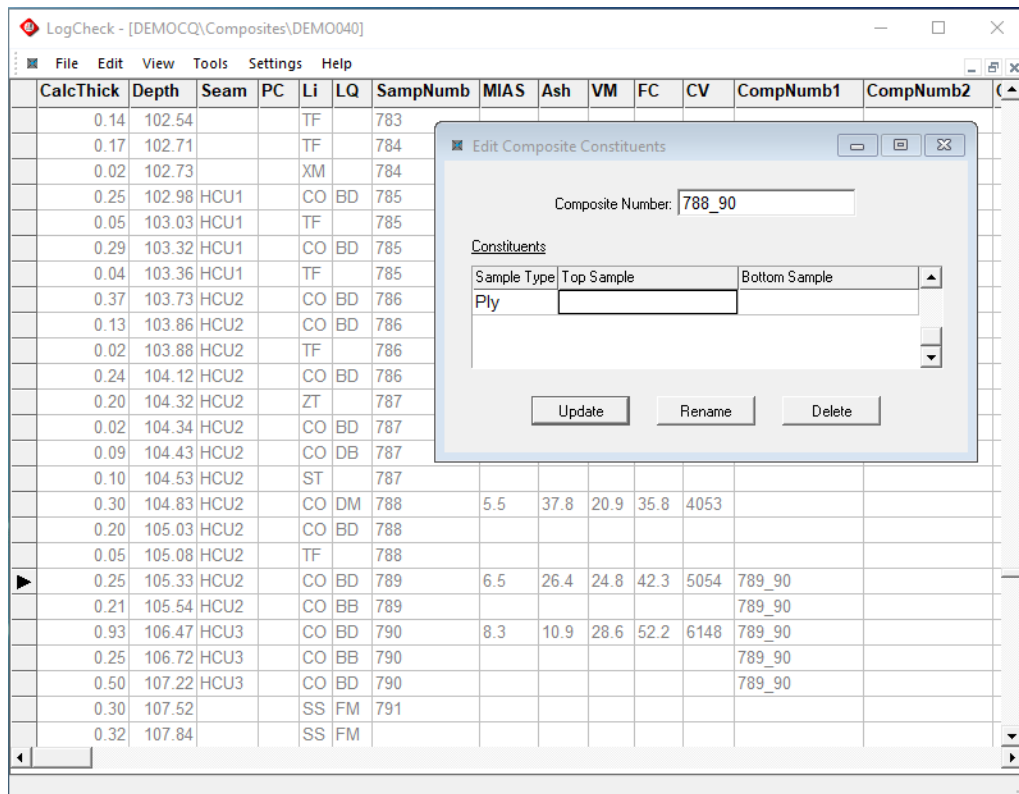
Next click on the Bottom Sample field and enter the Sample Number 790 for the bottom sample. This can be either entered by directly typing or by clicking on the sample number in the main table:



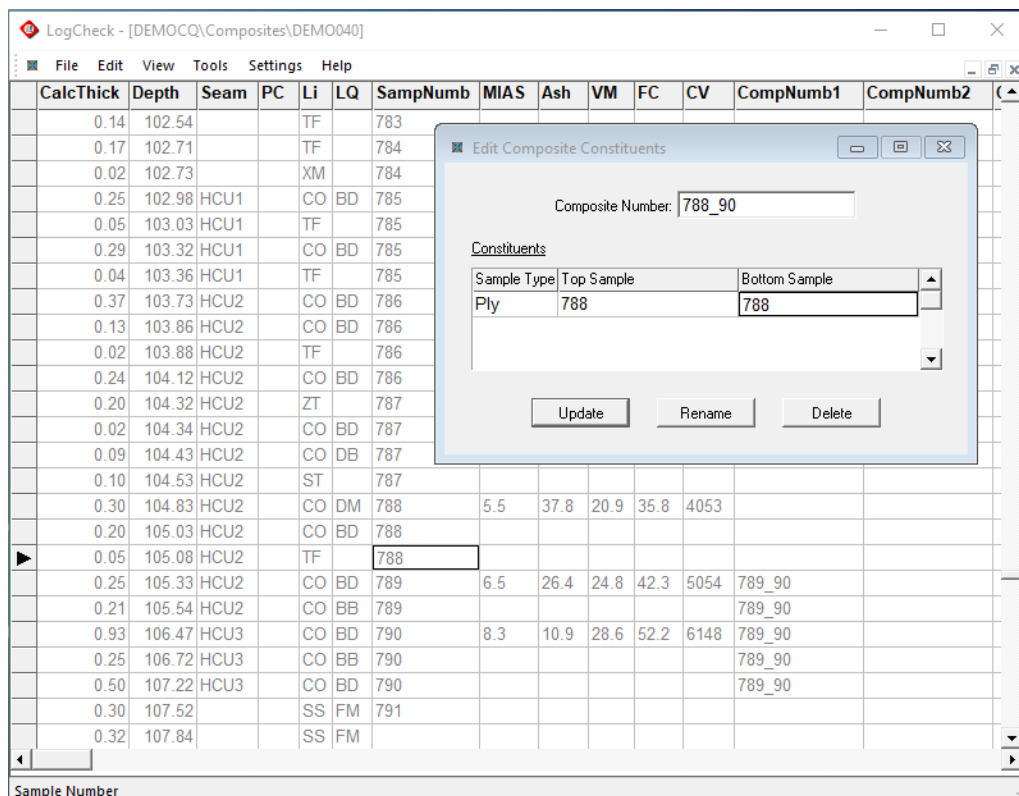
Then lastly, click on the Update button in the editing window and the main table will then display the new Composite:



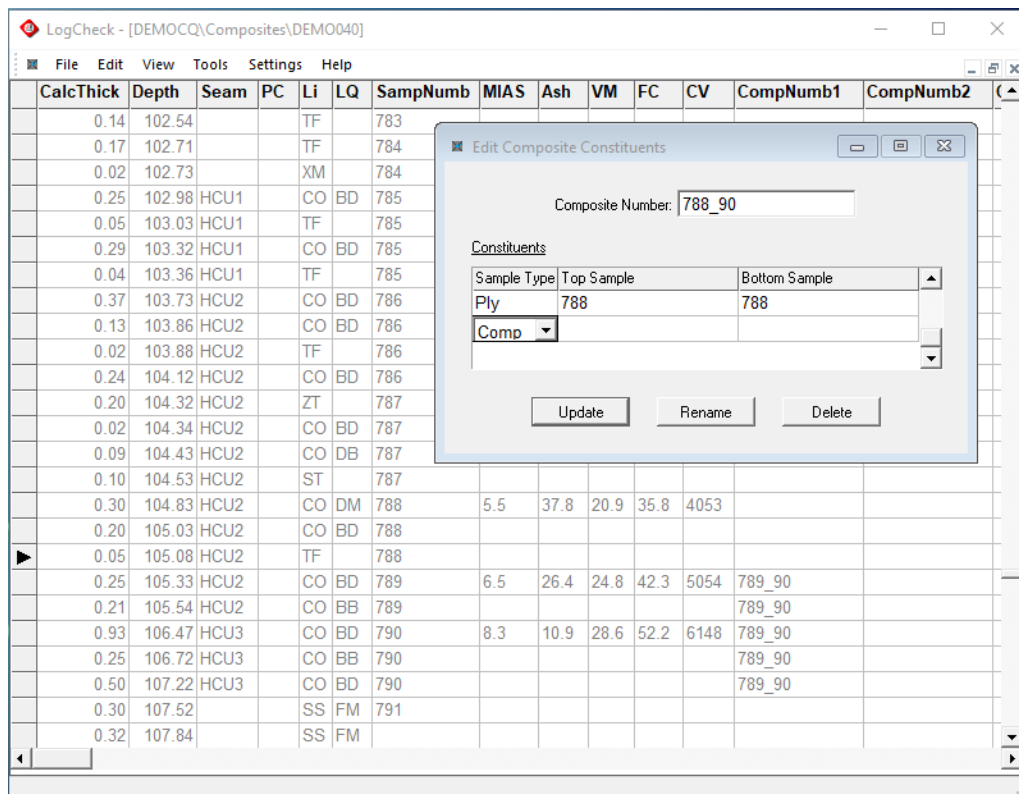
A Composite can consist of individual plies and/or other composites. To create a composite named 788_90 consisting of the individual ply 788 and the composite 789_90, click on the Composite Number box in the editing window and enter the new composite number 788_90 and then press Tab:



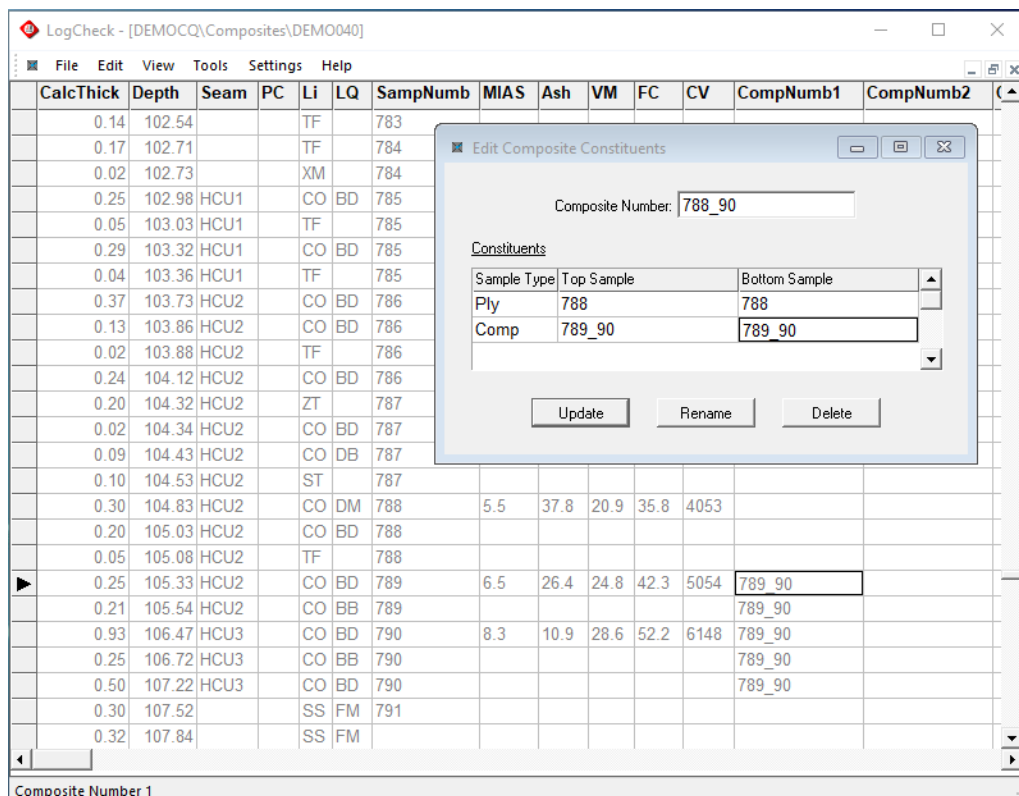
Next click on the Top Sample field and enter the Sample Number 788 for the top sample and then click on the Bottom Sample field and enter 788 again for the bottom sample and then press Tab. Again, these can be either entered by directly typing or by clicking on the individual ply sample numbers in the main table.



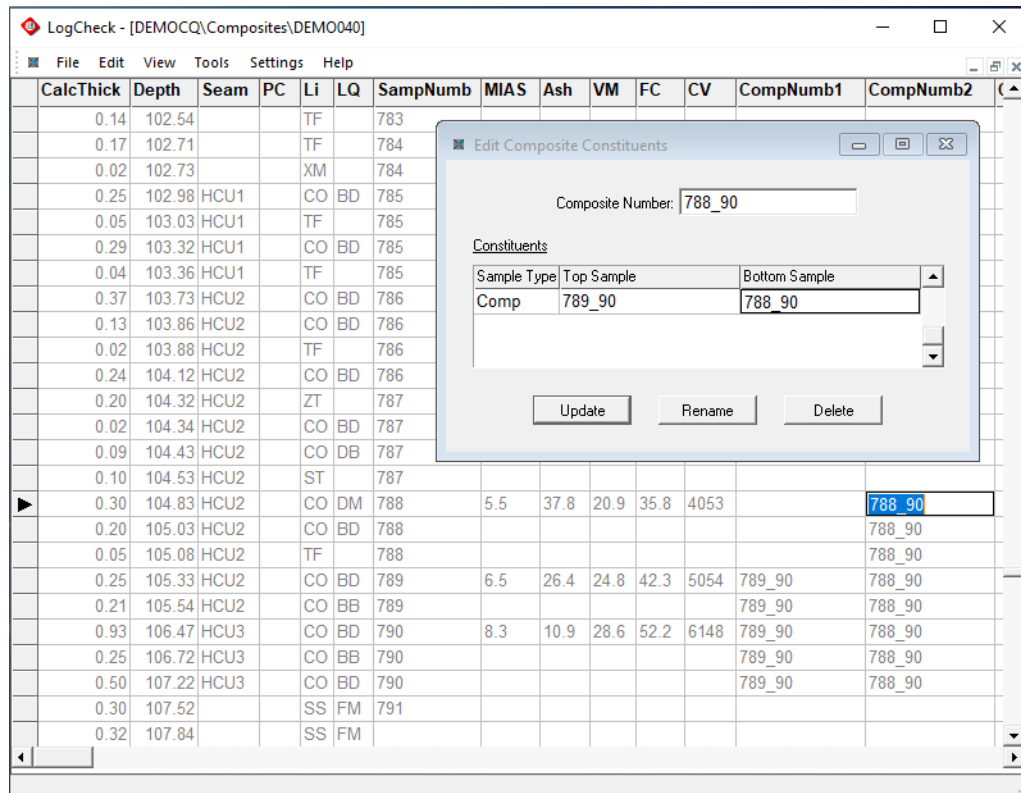
Next choose Comp for Composite Sample in the Sample Type column:



Next click on the Top Sample field and enter the Composite Sample Number 789_90 for the top sample and then click on the Bottom Sample field and enter 789_90 again for the bottom sample and then press Tab. Again, these can be either entered by directly typing or by clicking on the composite sample number in the main table.

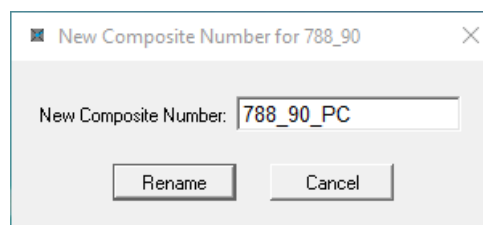


Then lastly, click on the **Update** button in the editing window and the main table will then display the new Composite:



At any time, to go to a particular Composite and see its constituents, enter the number for the required composite in the Composite Number box, either by typing or picking it on the main screen.

To rename a Composite go to the Composite by either entering its number or picking it on the main screen and then press the Rename button in the edit window. For example, to rename composite number 788_90 to 788_90PC, go to 788_790 and then click on **Rename** and the following window will appear where the new number can be entered:



Following renaming, the main table will show the new name:

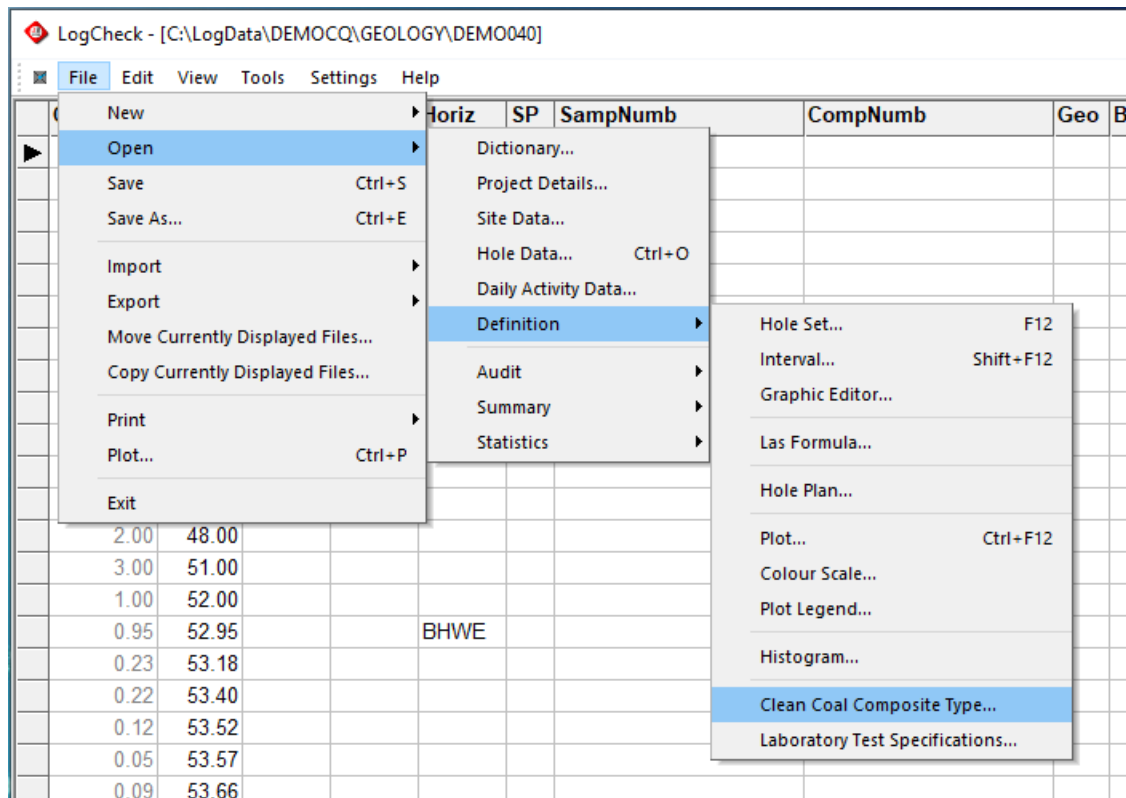
CalcThick	Depth	Seam	PC	Li	LQ	SampNum	MIAS	Ash	VM	FC	CV	CompNum1	CompNum2
0.14	102.54			TF		783							
0.17	102.71			TF		784							
0.02	102.73			XM		784							
0.25	102.98	HCU1		CO	BD	785							
0.05	103.03	HCU1		TF		785							
0.29	103.32	HCU1		CO	BD	785							
0.04	103.36	HCU1		TF		785							
0.37	103.73	HCU2		CO	BD	786							
0.13	103.86	HCU2		CO	BD	786							
0.02	103.88	HCU2		TF		786							
0.24	104.12	HCU2		CO	BD	786							
0.20	104.32	HCU2		ZT		787							
0.02	104.34	HCU2		CO	BD	787							
0.09	104.43	HCU2		CO	DB	787							
0.10	104.53	HCU2		ST		787							
0.30	104.83	HCU2		CO	DM	788	5.5	37.8	20.9	35.8	4053		788_90_PC
0.20	105.03	HCU2		CO	BD	788							788_90_PC
0.05	105.08	HCU2		TF		788							788_90_PC
0.25	105.33	HCU2		CO	BD	789	6.5	26.4	24.8	42.3	5054	789_90	788_90_PC
0.21	105.54	HCU2		CO	BB	789						789_90	788_90_PC
0.93	106.47	HCU3		CO	BD	790	8.3	10.9	28.6	52.2	6148	789_90	788_90_PC
0.25	106.72	HCU3		CO	BB	790						789_90	788_90_PC
0.50	107.22	HCU3		CO	BD	790						789_90	788_90_PC
0.30	107.52			SS	FM	791							
0.32	107.84			SS	FM								

To delete a Composite, goto it by either entering it the Composite Number box or picking it on the screen and then clicking the **Delete** button. Following clicking on the **Delete** button in the edit window on the above screen, and the result is:

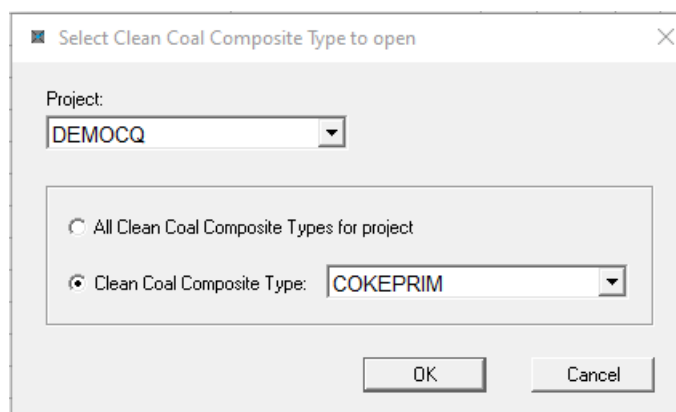
CalcThick	Depth	Seam	PC	Li	LQ	SampNum	MIAS	Ash	VM	FC	CV	CompNum1	CompNum2
0.14	102.54			TF		783							
0.17	102.71			TF		784							
0.02	102.73			XM		784							
0.25	102.98	HCU1		CO	BD	785							
0.05	103.03	HCU1		TF		785							
0.29	103.32	HCU1		CO	BD	785							
0.04	103.36	HCU1		TF		785							
0.37	103.73	HCU2		CO	BD	786							
0.13	103.86	HCU2		CO	BD	786							
0.02	103.88	HCU2		TF		786							
0.24	104.12	HCU2		CO	BD	786							
0.20	104.32	HCU2		ZT		787							
0.02	104.34	HCU2		CO	BD	787							
0.09	104.43	HCU2		CO	DB	787							
0.10	104.53	HCU2		ST		787							
0.30	104.83	HCU2		CO	DM	788	5.5	37.8	20.9	35.8	4053		
0.20	105.03	HCU2		CO	BD	788							
0.05	105.08	HCU2		TF		788							
0.25	105.33	HCU2		CO	BD	789	6.5	26.4	24.8	42.3	5054	789_90	
0.21	105.54	HCU2		CO	BB	789						789_90	
0.93	106.47	HCU3		CO	BD	790	8.3	10.9	28.6	52.2	6148	789_90	
0.25	106.72	HCU3		CO	BB	790						789_90	
0.50	107.22	HCU3		CO	BD	790						789_90	
0.30	107.52			SS	FM	791							
0.32	107.84			SS	FM								

14.4.4 Opening, Viewing and Editing Clean Coal Composite Type Definitions

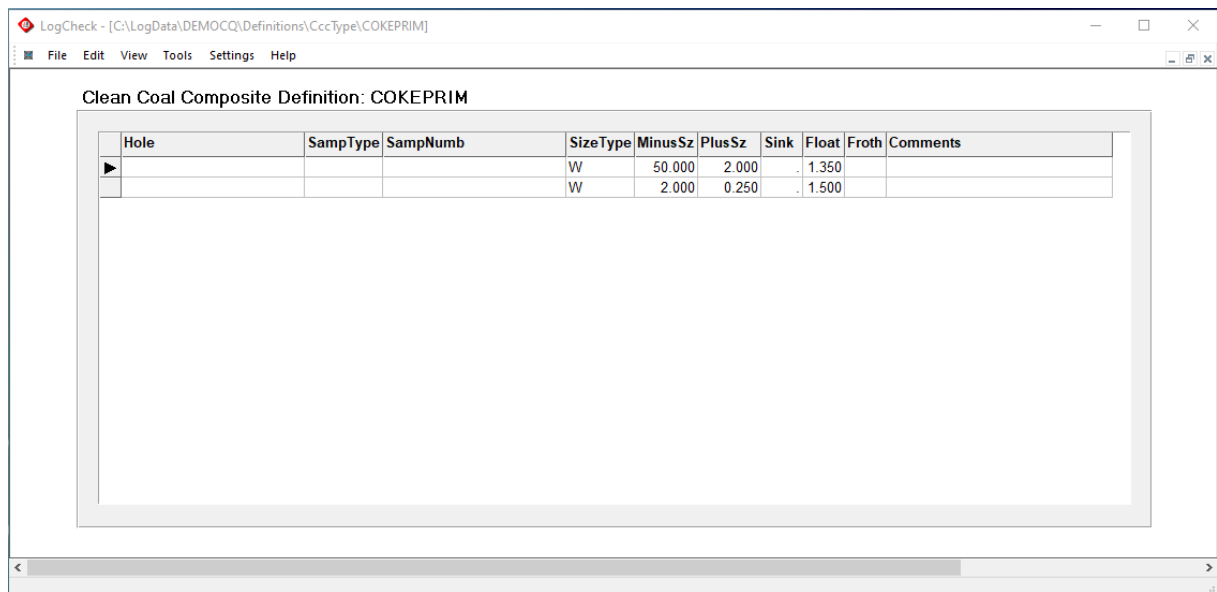
As a particular Clean Coal Composite Definition may be the same for all holes or slightly different for each hole, it is considered to be a Definition rather than Hole Data and so to open a Clean Coal Composite Definition select:



Next select the required Clean Coal Composite Type:



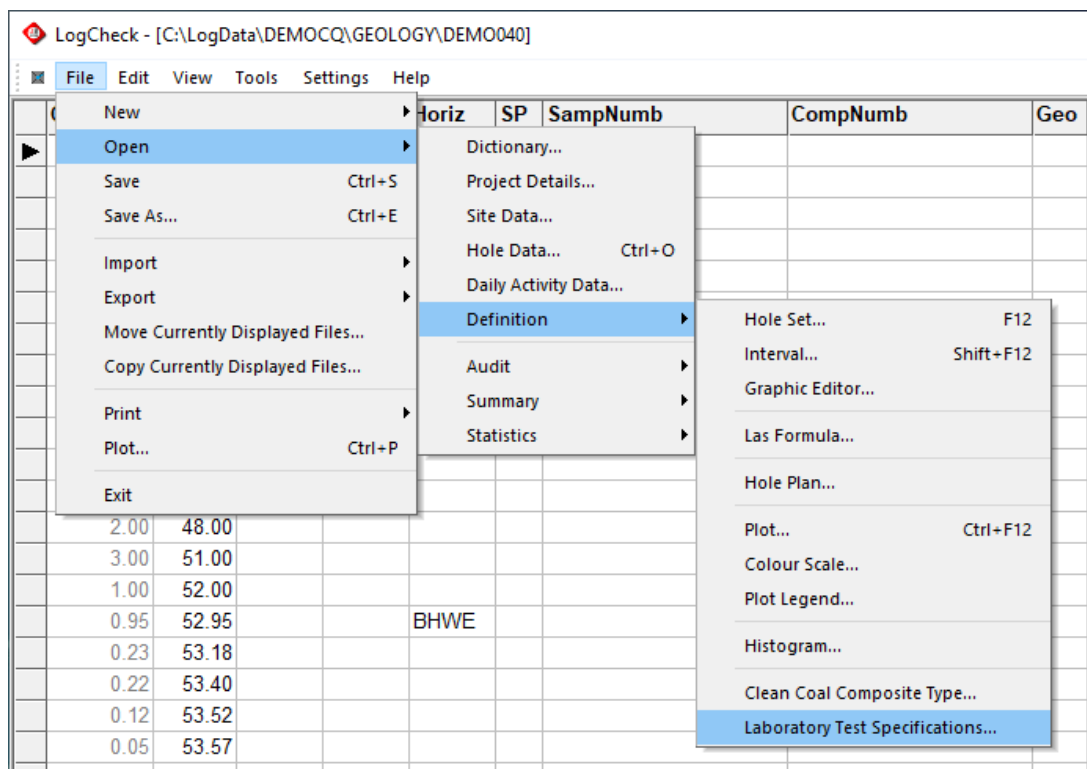
The selected Clean Coal Composite Definition will then be displayed and can be edited:



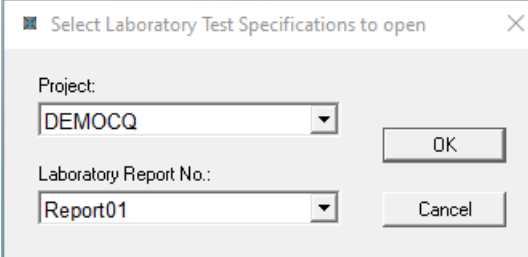
14.4.5 Opening, Viewing and Editing Laboratory Test Specifications

A particular set of Laboratory Test Specifications will apply to a particular Laboratory Report rather than to a particular hole and so it is considered a Definition. To open a particular set of Laboratory Specifications select:

it is necessary it is referred to as a Definition rather than Hole Data and so to open a Laboratory Test Specification select:

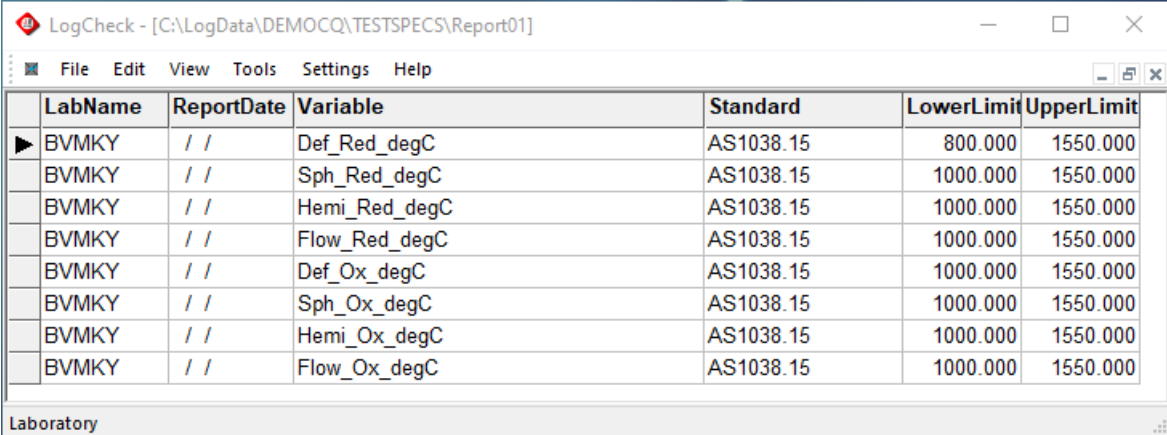


Next select the Report No whose Laboratory Test Specifications are required:



A dialog box titled "Select Laboratory Test Specifications to open" with a close button (X) in the top right corner. It contains two dropdown menus. The first is labeled "Project:" and has "DEMOCQ" selected. The second is labeled "Laboratory Report No.:" and has "Report01" selected. To the right of the "Project:" dropdown is an "OK" button, and to the right of the "Laboratory Report No.:" dropdown is a "Cancel" button.

The selected Laboratory Test Specifications will then be displayed and can be edited:



The screenshot shows the LogCheck application window with the title bar "LogCheck - [C:\LogData\DEMOCQ\TESTSPECS\Report01]". The menu bar includes File, Edit, View, Tools, Settings, and Help. The main area displays a table of test specifications. The table has six columns: LabName, ReportDate, Variable, Standard, LowerLimit, and UpperLimit. There are eight rows of data, all with "BVMKY" in the LabName column and "AS1038.15" in the Standard column. The ReportDate column contains slashes (/ /). The Variable column lists different types of redox measurements. The LowerLimit and UpperLimit columns contain numerical values.

LabName	ReportDate	Variable	Standard	LowerLimit	UpperLimit
BVMKY	/ /	Def_Red_degC	AS1038.15	800.000	1550.000
BVMKY	/ /	Sph_Red_degC	AS1038.15	1000.000	1550.000
BVMKY	/ /	Hemi_Red_degC	AS1038.15	1000.000	1550.000
BVMKY	/ /	Flow_Red_degC	AS1038.15	1000.000	1550.000
BVMKY	/ /	Def_Ox_degC	AS1038.15	1000.000	1550.000
BVMKY	/ /	Sph_Ox_degC	AS1038.15	1000.000	1550.000
BVMKY	/ /	Hemi_Ox_degC	AS1038.15	1000.000	1550.000
BVMKY	/ /	Flow_Ox_degC	AS1038.15	1000.000	1550.000

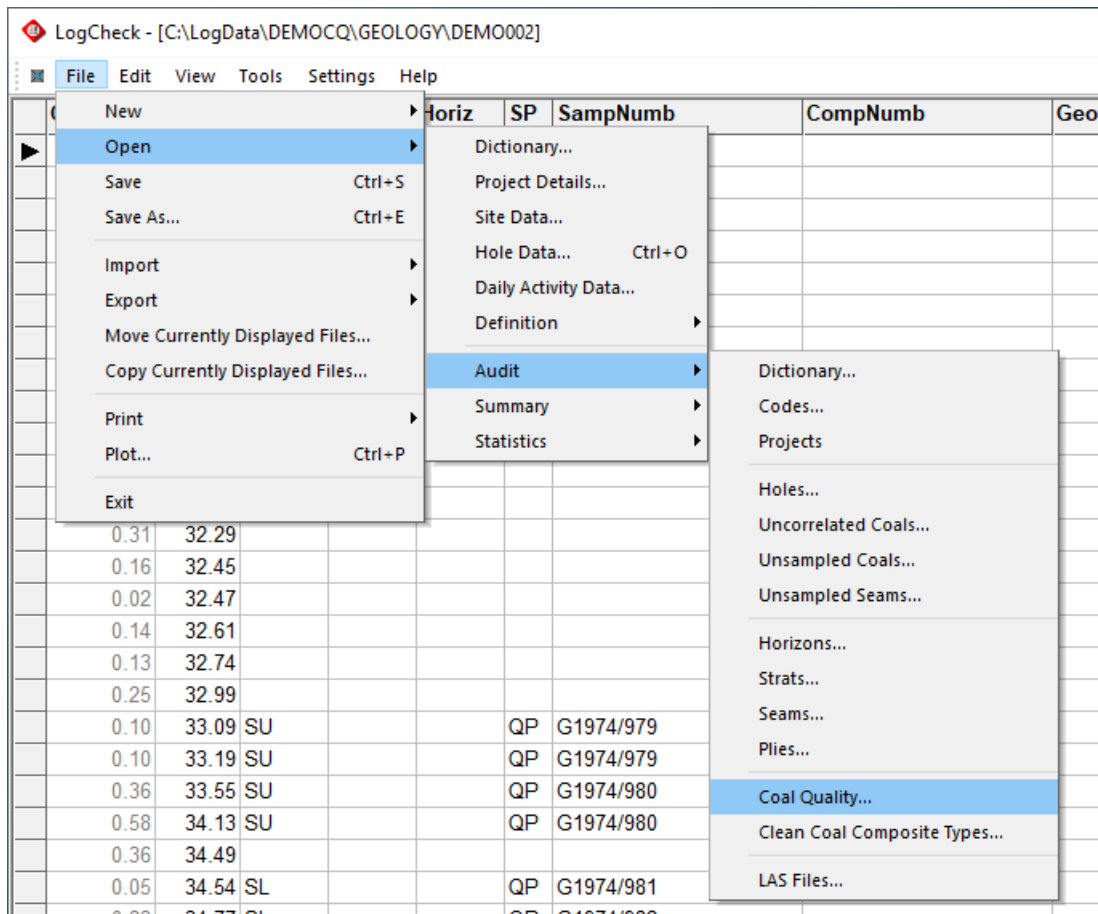
Below the table, there is a section labeled "Laboratory" with a small icon on the right.

14.5 Coal Quality Audits and Summaries

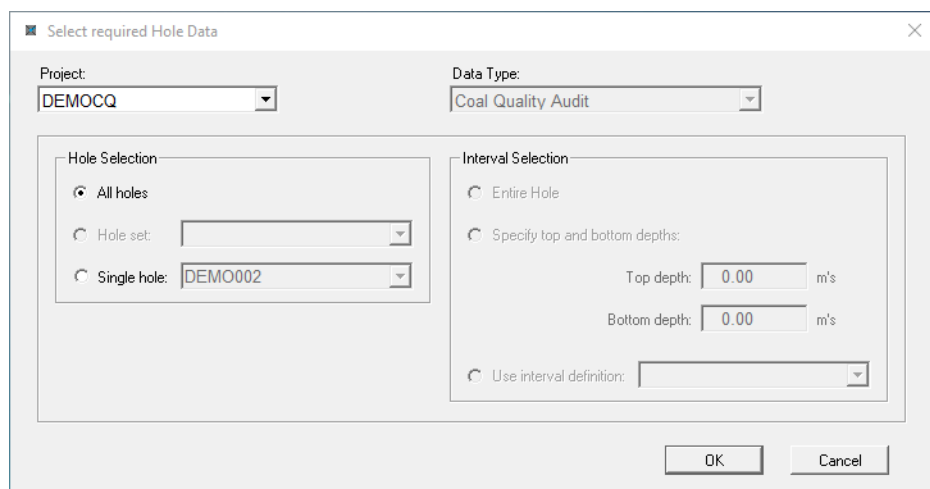
14.5.1 Coal Quality Audit

The Coal Quality Audit displays a list of the Coal Quality Results that are currently stored in *LogCheck*.

An audit of the data currently stored in the *LogCheck* Coal Quality database can be displayed by selecting:



Next select the holes
or holes for which
the audit is required:



An example of the resulting audit:

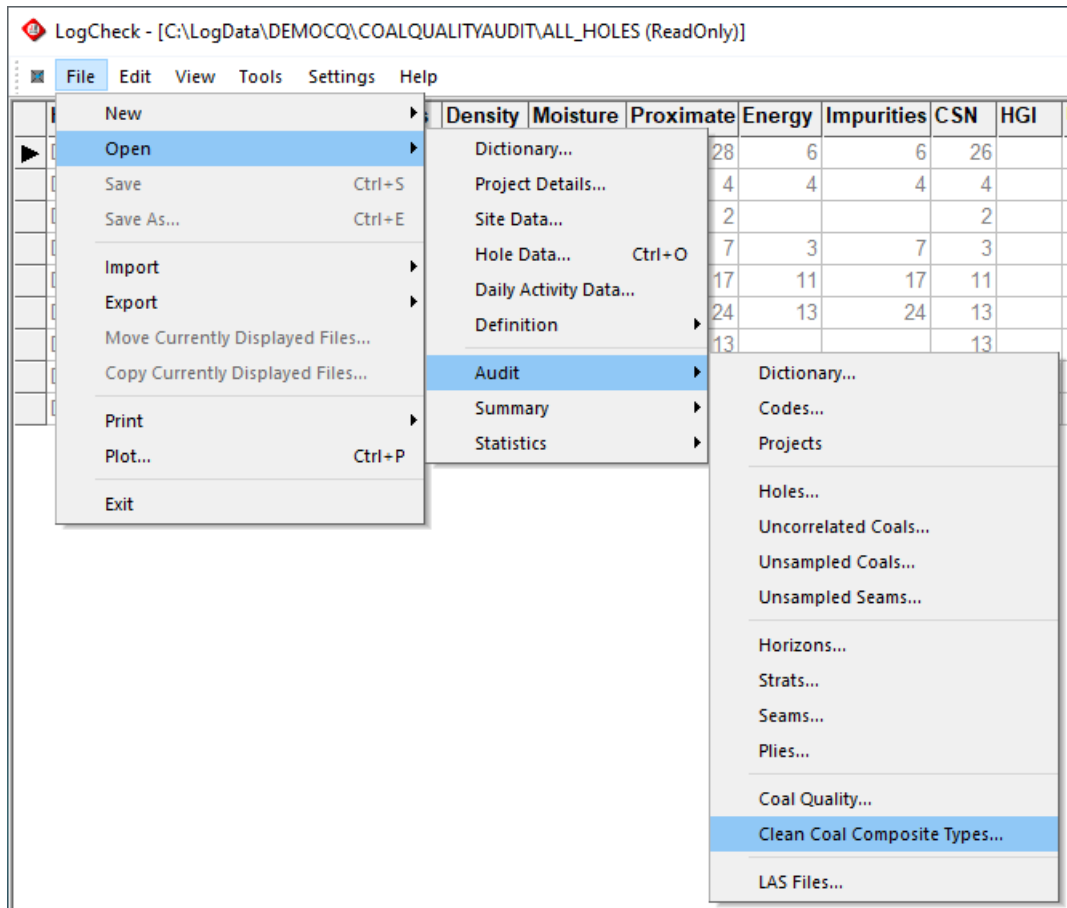
Hole	SampType	Prep	Mass	Density	Moisture	Proximate	Energy	Impurities	CSN	HGI	Ultimates	Sulphurs	AshAnal	AshFusib	Gieseler	Dilatom	GrayKing	TraceElem	Petrograph	Carbon	Reflectance
DEMO002	PLY	Raw		28			28	6	26												
DEMO002	COMP	Raw		4		4	4	4	4												
DEMO002	COMP	SizeWash	2	2		2	2		2												
DEMO029	PLY	Raw	7	7		7	7	3	7	3											
DEMO033	PLY	Raw	17	17		17	11	17	11												
DEMO034	PLY	Raw	24	24		24	13	24	13												
DEMO034	PLY	SizeWash	13	13		13	13		13												
DEMO034	COMP	CCC	11	11		11	11	11	11				11	11	11	11	11	11	11	9	8
DEMO040	PLY	Raw	22	26	10	26	24	24	24												

In this audit, SampType will be PLY for Individual Ply samples and COMP for Composite samples and for Prep will be Raw, SizeWash or CCC (for Clean Coal Composites).

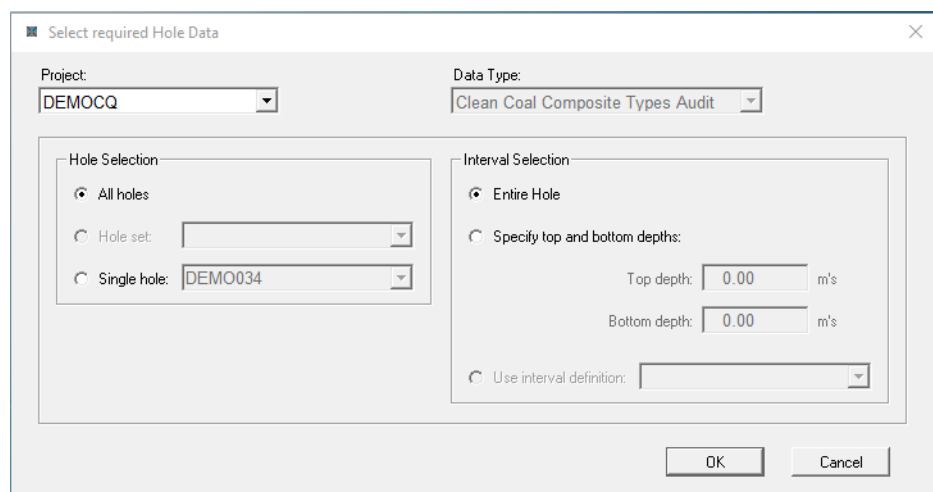
From this example audit, it can be seen that Hole DEMO044 has Mass, Proximate and CSN results on 13 Individual Ply samples that have been Sized and/or Washed, however, it does not show what actual size or float/sink fractions have been included for these 13 samples. It can also be seen that this same hole has Mass, Proximate, Energy, Impurities, CSN, Ash Analysis, Ash Fusibility, Gieseler, Dilatometer, Gray-King and Petrography results on 11 Clean Coal Composite samples and Carbonization and Reflectance results on 9 Clean Coal Composites.

14.5.2 Clean Coal Composite Audit

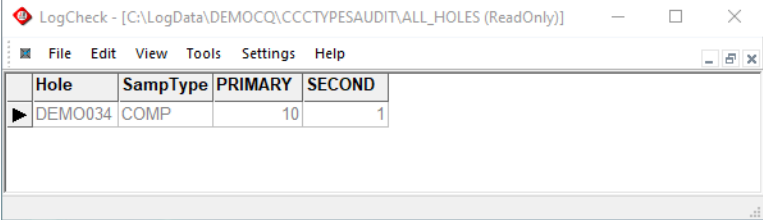
The previous Coal Quality audit showed that results had been stored in *LogCheck* for 11 Clean Coal Composites samples for DEMO034. How many of the results for these 11 samples are for each of the user defined Clean Coal Composites Types can be displayed by selecting:



Next select the holes whose Clean Coal Composite results should be included:



The resulting audit shows that the hole had results on ten Clean Coal Composites samples of types PRIMARY and results on one Clean Coal Composite of type SECOND:



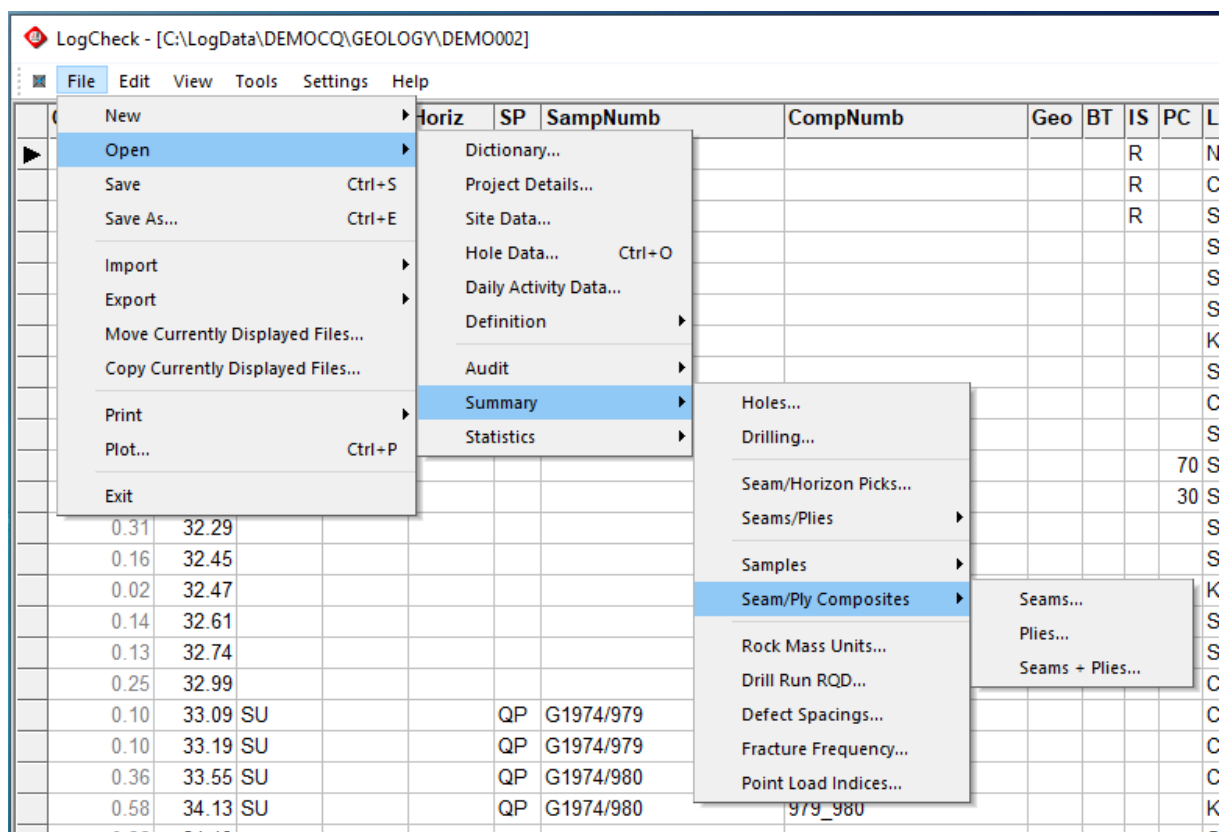
LogCheck - [C:\LogData\DEMOCQ\CCCTYPESAUDIT\ALL_HOLES (ReadOnly)]

Hole	SampType	PRIMARY	SECOND
DEMO034	COMP	10	1

14.5.3 Seam and Ply Composite Summary

LogCheck can generate composite values for Seams and Plies as defined in the Geology data. It can also generate them for concatenated Seam plus Ply names. Composite values are only generated where Individual Ply and/or Composite results exist for the entire Seam or Ply and the top and bottom samples do not extend past the boundaries of the Seam or Ply.

To generate Seam or Ply composite values select:



After selecting whether composites are required for Seams, Plies or Seams + Plies, select the hole or holes for which they are required:

Next select the results (Individual Ply and/or Composite) to be used, the properties to be displayed, the required Moisture Basis, whether to use results are for Raw Coal, a specific Cumulative Float or a specific Clean Coal Composite and whether to use Apparent Relative Density or Relative Density when weighting results to composite together:

If *Ply Sample Results* is chosen, then Seam/Ply composites will be generated for each Seam/Ply by calculating a composite from the results for Individual Ply samples. If a single Individual Ply sample covers the entire Seam/Ply the results for this sample are displayed rather than a calculated value.

If *Composite Sample Results* is chosen, then Seam/Ply composites will be generated for each Seam/Ply by calculating a composite from the results for Composites samples. If a single Composite sample covers the entire Seam/Ply the results for this sample are displayed rather than a calculated value.

If *Composite Sample Results when available otherwise use Ply Sample Results* is chosen, then Seam/Ply composites will be generated for each Seam and/or Ply by calculating a composite from the results for Composite samples and if these do not exist, do not cover the entire Seam/Ply or cover an interval that extends past the boundaries of the Seam/Ply, then Individual Ply sample results are included with any Composite sample results and if the combination of Composites and Individual sample results covers the entire Seam/Ply exactly this is used.

LogCheck - [C:\LogData\DEMOCQ\SEAMCOMPOSITES\DEMO002 (ReadOnly)]

Hole	Unit	From	To	Thickness	Cored	Core_Loss	Recovery	SampNumb	SampNumb2	CompNumb	CompNumb2	Basis	RD	MIAS	Ash	VM	FC	SE	CV	TS	CI
DEMO002	SU	32.99	34.13	1.14	1.140	0.580	49	G1974/979	G1974/980	979_980		ARP	1.34	4.2	6.8	40.9	-	-	-	2.55	-
DEMO002	SL	34.49	35.78	1.29	1.290	1.010	22	G1974/981	G1974/982			ARP	1.28	5.2	3.9	-	-	-	-	-	-
DEMO002	R	63.05	64.77	1.72	1.720	0.630	63	G1974/1092	G1974/1091			ARP	1.30	4.5	6.2	40.6	48.7	-	-	0.27	-
DEMO002	UN1	75.68	76.72	1.04	1.040	0.000	100	G1974/1093				ARP	1.36	5.0	10.9	35.8	48.3	28.90	6901	0.54	-
DEMO002	UN3	116.38	117.86	1.48	1.480	0.000	100			1265_67		ARP	1.33	5.5	8.4	36.0	50.1	29.05	6937	0.38	-
DEMO002	P	151.39	158.40	7.01	7.010	0.460	93			1268_77		ARP	1.35	4.2	10.0	35.2	50.6	28.56	6820	0.43	-
DEMO002	HCU	201.00	201.76	0.76	0.760	0.000	100	G1974/1404				ARP	1.31	3.5	6.4	-	-	-	-	-	-
DEMO002	HCL	201.94	204.47	2.53	2.530	0.000	100	G1974/1405	G1974/1406			ARP	1.32	4.5	2.0	-	-	-	-	-	-
DEMO002	UN4	225.42	227.48	2.06	2.060	0.000	100			1407_08		ARP	1.35	2.6	8.3	35.7	53.4	30.60	7307	0.71	-
DEMO002	DU	279.44	282.62	3.18	3.180	1.920	40					ARP	-	-	-	-	-	-	-	-	-
DEMO002	DL	284.72	286.47	1.75	1.750	0.570	67					ARP	-	-	-	-	-	-	-	-	-
DEMO002	LRN	311.53	312.67	1.14	1.140	0.220	81	G1974/1628				ARP	1.32	5.7	6.0	33.0	55.3	31.50	7522	0.31	-

Hole Name

In the above example, those results derived entirely from Composite sample results are shown in grey.

Those that include results from Individual Ply samples are shown in red.

The column Cored displays the length of the interval that has been cored as derived from the Bit Type in the Drilling data. The column Core_Loss displays the total length of units with LithoTypes that have a code whose entry in the Group column of the Geology Dictionary is set to CORE LOSS. For CoalLog data, this would be KL – Core Loss, NR – Nor Recovery, OW – Old Workings or VD – Void.

The Recovery is the percentage of the interval that was cored and was not core loss.

The sample numbers for the top and bottom Individual Ply samples used in generating composite values are shown in the columns SampNumb and SampNumb2 and the sample numbers for the top and bottom Composite samples used in generating the composite values are shown in the columns CompNumb and CompNumb2.

Appendix A - *LogCheck* Folders and Files

A1 Introduction

This appendix describes the directory (ie. *folder*) structure used by *LogCheck*. It describes the *LogCheck* program and its support files and the location and purpose of the different subfolders that are used by *LogCheck* to store dictionaries, drill hole data and definitions.

LogCheck uses various folders for storing the:

- its program and support files
- its working and temporary files
- its user data

If any of these folders do not exist, the *LogCheck* program automatically creates them.

A2 *LogCheck* Program Folders

The user is able to specify the folder where the *LogCheck* program is stored but generally they select the default of c:\Program Files (x86)\LogCheck. Do **not** delete or alter any of the files in this folder. Some users such as consultants may have multiple versions of *LogCheck* installed on their computer, each running a different data format. In this case, they will have provided different folder names for each of the different copies.

The program folder contains four subfolders:

- Bin containing the *LogCheck* program plus support files that define the installation's data formats
- Dictionaries containing the system dictionaries. For CoalLog versions of *LogCheck* these are the standard CoalLog dictionaries
- Docs containing the User Manual, plus other useful documents such as:
 - A summary of LogCheck's features (*LogCheck* Promo with CQ.pdf),
 - How to change LAS variable and vertical scale in Plot Definition,
 - Procedure for creating a simple section to review geology with LAS
 - Using TrueView to View and Plot *LogCheck* dxf files
- PlotPara containing system Plot Definitions

LogCheck uses another piece of software named the Borland Database Engine to handle its databases. This software is automatically installed whenever *LogCheck* is installed or reinstalled. It sits in a folder named C:\Program Files (x86)\Common Files\Borland\BDE

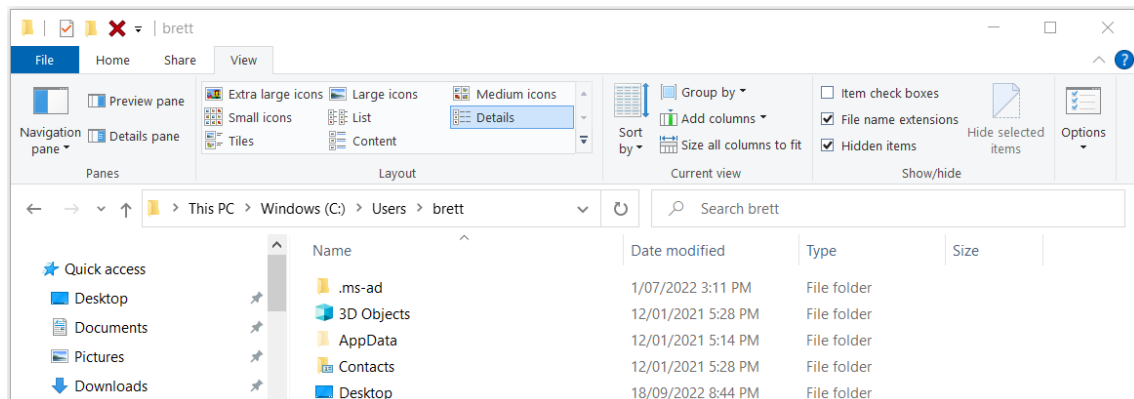
A3 LogCheck Work Folders

LogCheck creates two working folders to store working and temporary files. These are named:

C:\Users\username\AppData\Local\LogCheck\Work
C:\Users\username\AppData\Local\LogCheck\Temp

where *username* is the name the user is logged not the computer with.

The folder AppData is a hidden folder and so can only be seen in Windows Explorer if Hidden files is turned on in the View tab:



Temporary files are those that will be deleted once *LogCheck* terminates. Working files are those that persist between *LogCheck* sessions. The user must have write access to these folders.

If there are more than one user using *LogCheck* on a computer, they will have their own set of Work files and therefore will have their own settings for *LogCheck*.

To return *LogCheck* to its originally shipped settings, delete the folder:

C:\Users\username\AppData\Local\LogCheck

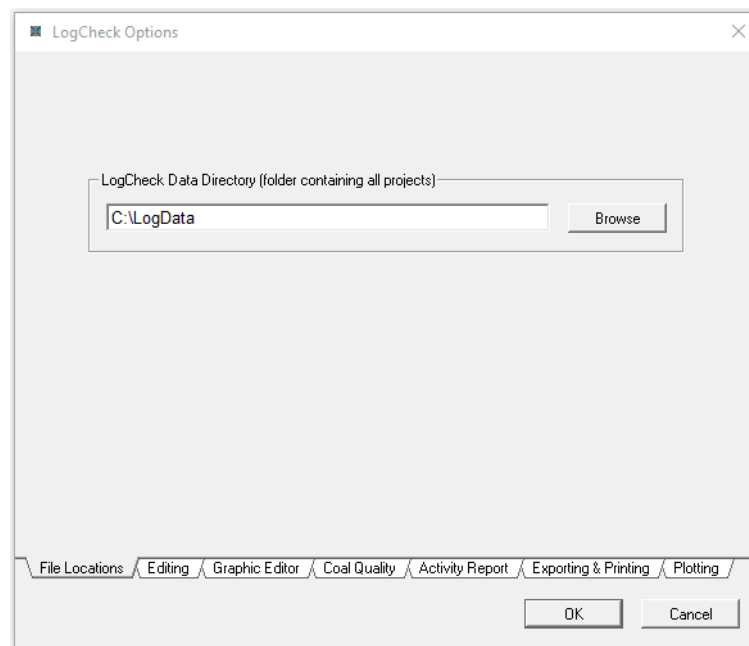
and *LogCheck* will recreate the folder and containing files reflecting the original shipped settings.

A4 LogCheck Data Folders

On running *LogCheck* for the first time the user is prompted for the name of folder where the data will be stored. This can be a folder on your hard drive or anywhere on your connected network. The default is C:\LogData. If the specified folder does not exist, the program creates it.

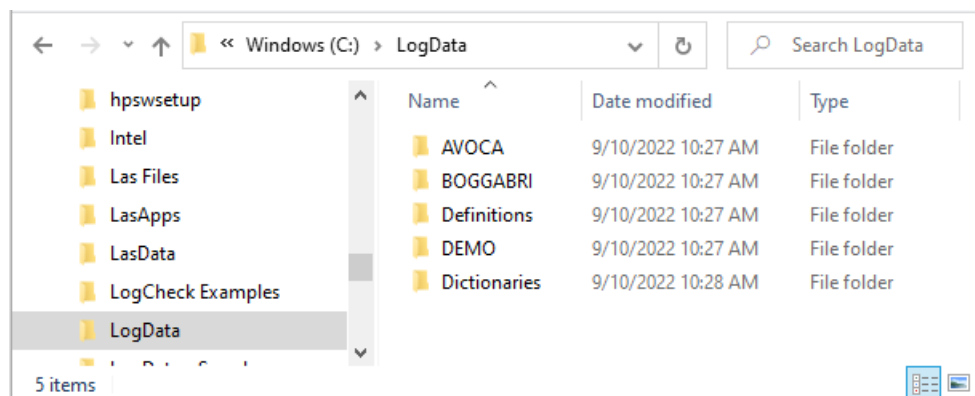
The user can even have a number of *LogCheck* data folders but the program will only access data in the one that is current. For example, one could locate working data on the local hard drive and finalised data on a server.

The user can change the folder from where *LogCheck* accesses its data by selecting Settings > Options from the *LogCheck* menu and then entering another folder name:



The name of the new data folder can either be typed or select the Browse button to choose from a list.

A typical *LogCheck* data folder structure:



This shows three project folders (AVOCA, BOGGABRI and DEMO) and two folders (Definitions and Dictionaries) that are always automatically created by *LogCheck*. They are used to store the user's default dictionaries and definitions, such as Interval, Las Formula or Plot Definitions.

A4.1 Dictionaries Folder

Each dictionary consists of two files with names of the form:

- *Data Type* Dictionary.dbf
- *Data Type* Dictionary.mdx

For example, the dictionary for the geology data consists of two files named *Geology Dictionary.dbf* and *Geology Dictionary.mdx*. The .dbf file contains the actual dictionary and the .mdx file an index to speed lookups in the dictionary. These files can be copied or deleted, but not renamed. Note that if you copy, delete or overwrite these files, you must do it for both of them

When *LogCheck* searches for a dictionary for a particular data type it searches the following folders in the following order:

1. the folder for the particular data type within the current project.
2. the folder called *Dictionaries* sitting in the *LogCheck* data folder
3. the folder called *Dictionaries* sitting in the *LogCheck* program folder

For example, when looking for the geology dictionary for the project AVOCA it would look for:

C:\LogData\AVOCA\Geology\Geology Dictionary.dbf

and if this file does not exist it would look for:

C:\LogData\Dictionaries\Geology Dictionary.dbf.

and if this file does not exist it would look for:

C:\Program Files (x86)\LogCheck\Dictionaries\Geology Dictionary.dbf.

Users working for a single mining company with a number of projects will generally have a single dictionary for all their projects sitting in the *Dictionaries* folder whereas a consultant will often have different dictionaries for different clients and these will be stored in each client's projects.

Unlike other data types, Geology data actually uses two dictionaries a *Geology Dictionary* and *Seams Dictionary*. This is because users will generally have only a single *Geology Dictionary* across all their projects but a specific *Seams Dictionary* for each of their projects.

A4.2 Definitions Folder

The *Definitions* folder contains a series of subfolders, one for each of the *LogCheck* Definition types:

- | | |
|------------------|--|
| • CCCType | Clean Coal Composite Type Definitions |
| • ColourScale | Colour Scale Definitions |
| • GraphEditPara | Graphic Editor Parameters |
| • HistoPara | Histogram Parameters |
| • HoleSet | Hole Set Definitions |
| • Interval | Interval Definitions |
| • LasFormulae | Las Formulae Definitions |
| • PlanPara | Hole Plan Parameters |
| • PlotLegendPara | Plot Legend Parameters |
| • PlotPara | Plot Parameters |
| • TestSpecs | Specifications for each Laboratory Coal Quality Test |

Definition names can be of any length and may contain upper and lower case characters, however, they cannot contain blanks. It is recommended to use an underscore (_) character instead of a blank.

All Definitions may be deleted, copied or renamed by deleting, copying or renaming their files. Note though that where the Definition consists of more than one file (see below), that whatever you do to one file you must also do the other files with the same definition name otherwise they will not work.

A4.2.1 Clean Coal Composite Type Definition Files

A Clean Coal Composite Definition contains a list of the components such as particular mesh sizes and float fractions for each defined Clean Coal Composite. See Section 14.4.4 – Opening, Viewing and Editing Clean Coal Composite Type Definitions in this manual.

For each Clean Coal Composite Type Definition there are two files:

- *DefinitionName.DBF*
- *DefinitionName.DBT*

A4.2.2 Colour Scale Definition Files

A Colour Scale Definition lists colours to be used for particular ranges of values when plotting. See Section 12.9.4 – Display Options Panel in this manual.

For each Colour Scale Definition there are two files:

- *DefinitionName.MEM*
- *DefinitionName.DBF*

A4.2.3 Graphic Editor Definition Files

A Graphic Editor Definition contains the LAS variable names, and values of the left edge, right edge and colour to be plotted in the Graphical Editor. See Section 8.28 – Graphic Editor Definitions.

For each Graphic Editor Definition there is a single file:

- *DefinitionName.DBF*

A4.2.4 Histogram Definition Files

A Histogram Definition specifies what categories to plot in histograms from coded data frequencies results. See Section 9.4.1 – Coded Data Frequencies in this manual.

For each Histogram Definition there is a single file:

- *DefinitionName.MEM*

A4.2.5 Hole Set Definition Files

A Hole Set Definition contains hole list, section definition and/or a query for selecting holes to open. See Section 6.5 – Creating/Editing a Hole Set Definition.

For each Hole Set Definition there are two files:

- *DefinitionName.MEM*
- *DefinitionName.DBF*

A4.2.6 Interval Definition Files

An Interval Definition specifies a query for selecting an interval to open within holes. See Section 6.6 – Creating/Editing Interval Definitions.

For each Interval Definition there is a single file:

- *DefinitionName.MEM*

A4.2.7 Las Formula Definition Files

A Las formula definition specifies a formula for using to calculate an additional new variable when opening LAS data. See Section 6.4.5 – Opening LAS Data.

For each Las Formula Definition there is a single file:

- *DefinitionName.MEM*

A4.2.8 Hole Plan Definition Files

A Hole Plan Definition contains the parameters for drawing hole plans. See Section 11.2 – Creating and Editing a Hole Plan Definition.

For each Hole Plan Definition there is a single file:

- *DefinitionName.MEM*

A4.2.9 Plot Legend Definition Files

A Plot Legend Definition specifies the layout for plotting a legend of patterns to accompany hole plots. See Section 12.10.1 – Creating a Plot Legend Definition.

For each Plot Legend Definition there are two files:

- *DefinitionName.MEM*
- *DefinitionName.DBF*

A4.2.10 Plot Definition Files

A Plot Definitions specifies for a plot items such as scale and variables to be plotted. See Section 12.4 to 12.9 – Plot Definitions.

For each Plot Definition there are four files:

- *PlotDefinitionName.MEM* the scale and sheet definitions
- *PlotDefinitionName_Bars.DBF* the depth and RL bar definitions
- *PlotDefinitionName_Titles.DBF* the definition of text to be added to the plot in the title block or for each hole
- *PlotDefinitionName_Tracks.DBF* the definitions for each of the vertical tracks, including the names of the variables to be plotted and how they are to be plotted

A4.2.11 Laboratory Coal Quality Test Specification Files

A Laboratory Coal Quality Test Specification File contains for a particular laboratory report, the standard each test was performed to and detection limits for each test. See Section 14.2.5 – Test Specification Definitions.

For each Laboratory Coal Quality Test Specification Definition there is a single file:

- *DefinitionName.DBF*

A4.3 Project Folders

Each *LogCheck* project has its own folder in the *LogCheck* data folder. The folder has the name that was specified for the project when it was created. A project can be deleted, copied or renamed by deleting, copying or renaming this folder. Project names can only be a maximum of eight characters and must not contain blanks.

Each project folder contains a file named:

project.mem	Containing Project Details for the project. Do not delete or rename this file. If this file is present, <i>LogCheck</i> recognizes the folder as one of its project folders. If it is deleted, it will no longer be recognized as a <i>LogCheck</i> project folder. You can create other folders in the <i>LogCheck</i> data folder, however, <i>LogCheck</i> will ignore them without this file.
-------------	--

If project.mem is deleted, it can be restored by creating a new project, copying across the data, deleting the old project and renaming the new project.

After a new project is created, *LogCheck* creates the following subfolders:

Definitions	Containing the project specific definitions. The composition of this subfolder is the same as the Definitions subfolder of the <i>LogCheck</i> data folder. See Section A.4 – Definitions Subfolder above.
Exports	The default folder for text and reports produced by <i>LogCheck</i> , the user though can export these to other folders.
Imports	The default folder for dictionaries or data from other systems to be imported into <i>LogCheck</i> , the user though can import these from other folders.
LAS	For downhole geophysical data
Plots	The default folder for plots created by <i>LogCheck</i> , the user though can send these to other folders.
Work	Containing working files created by <i>LogCheck</i> .

Depending on what data is present for the project it may also contain the following subfolders for data:

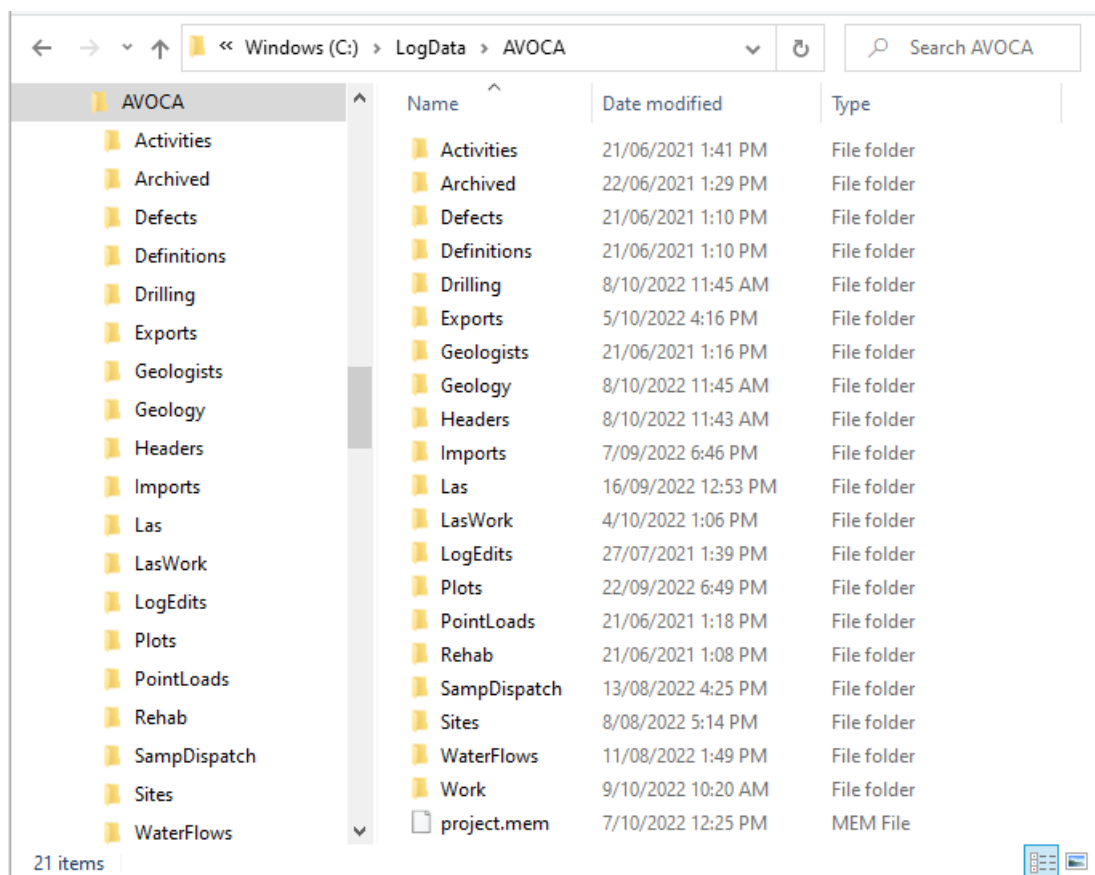
Activities	containing daily activity data such as safety and other comments and planned operations for the following day. See Section 5.13 – Daily Activity Data.
Casing	containing hole casing data. See Section 5.6 – Casing Data.
Cementing	containing details for each hole of any cementing. See Section 5.7 – Cementing Data.
Coal Quality	containing coal quality laboratory results. See Section 14.2.1 – Coal Quality Results.
Composites	containing a list of constituent samples for each composite sample. See Section 14.2.3 – Composite Constituents.
Defects	Containing Rock Mass Unit (RMU) and individual defect data. See Section 13.2.1 – Defect Data.
Drilling	containing drilling data such as drilling company and core size. See Section 5.5 – Drilling Data.
Geologists	containing what intervals were logged by which geologist. See Section 5.4 – Geologists Data.
Geology	containing geological data such as lithology, colour, seam name. See Section 5.8 – Geology Data.
GeotechLabTests	containing results from Geotech laboratory tests such as UCS and ITS. See Section 13.2.4 – Geotechnical Laboratory Test Data.
Headers	containing header data such as survey coordinates. See Section 5.3 – Headers Data.
PointLoads	containing point load data. See Section 13.2.3 – Point Load Test Data.

Reflectance	containing coal quality reflectance laboratory results. See Section 14.2.2 – Coal Reflectance Results.
Rehab	containing the rehabilitation that has been performed. See Section 5.14 – Rehabilitation Data.
SampDispatch	containing sample information such as laboratory name where sent, dispatch mass, date and number. See Section 5.11 – Sample Dispatch Data.
Scanner	containing acoustic scanner analyses data. See Section 13.2.2 – Acoustic Scanner Analysis Data.
Sites	containing drill hole site data. See Section 5.2 – Drill Hole Site Planning Data.
WaterFlows	containing water flow data. See Section 5.9 – Water Flow Data.

A project may also have the following folders generated by *LogCheck* when required:

Archived	containing copies of files that were moved using the Move Displayed Files command. See Section 10.5 – Moving and Copying <i>LogCheck</i> Data Files.
LasWork	containing copies of the user's Las files in dBASE format. See Section 6.4.5 – Opening LAS Data.
LogEdits	contains a text file for each hole that has been modified in the Graphical listing the changes that were made to the data by the Graphical Editor. See Section 8.18 View the Log of Edits.
Raw_Defects	containing copies of any Defect files that have been modified in the Graphical Editor but before any changes have been made to them.
Raw_Geology	containing copies of any Geology files that have been modified in the Graphical Editor but before any changes have been made to them.

An example of the folders in a project subfolder is shown below in the left pane and the contents of the Geology folder in the right pane:



A4.3.1 LAS Subfolder

Downhole geophysical data used by the program must be in LAS format. The folder where these files are stored for a project is specified by the user in the Project Details of the project. If the user does not specify a LAS folder then the program uses the LAS subfolder in the project folder.

When looking for LAS data the program not only searches the specified folder but all levels of subfolders below it. There is a limitation though that the name of the combined subfolders below this folder plus the filename must be less than or equal to 100 characters and must not contain any blanks.

After the user has accessed any LAS data, the project's *LasWork* subfolder will also contain the files:

- *LAS Dictionary.DBF* a dictionary of the variable names used in any of the LAS files;
- *LAS Dictionary.MDX* an index into the dictionary of variable names.
- *LasFileName.DBF* the dBase binary version of the Las file named *LasFileName*
- *LasFileName.DEF* a dBase binary file describing the variables in the Las file named *LasFileName*
- *LasFileName.MEM* a dBase binary file recording the last modified date and time for the Las file named *LasFileName* at the time *LasFileName.DBF* was created. This is used whenever the user accesses *LasFileName* to check if the Las file has been modified since *LasFileName.DBF* was created to determine if it needs to be recreated.

The last three of these files are used by *LogCheck* to speed up opening of LAS data.

A4.3.2 Work Subfolder

The work subfolder contains working files that are created and maintained by *LogCheck*. For example, the files *SEAMS.DBF* and *SEAMS.MDX* contain a summary of the top and bottom of each seam in each hole as well as the file modification time and date for the geology file from which the information was obtained. When the user requests a seam summary the program only updates those holes in these files where the geology data has been modified since the last seam summary. Where there are a large number of holes such as a couple of thousand this can reduce the time taken to generate a seam summary from minutes to seconds.

The user can delete these files if for example they become corrupted. When deleting a file the user should also delete all other files in the folder with the same filename but differing extensions. If these files are not there, *LogCheck* will first need to recreate them, which can be a little time consuming if there are many files in the project.

A4.3.3 Data Subfolders

The activities subfolder contains the following files for each date named:

- *Date.DBF* the coded data for the date *Date* where the date is in the format yyyy-mm-dd, for example 2004-02-27.
- *Date.DBT* the comments for the date *Date*

The sites subfolder contains the following files for each site named:

- *SiteName.DBF* the coded data for the site named *SiteName*
- *SiteName.DBT* the comments for the site named *SiteName*

Each hole data subfolder contains the following files for each hole named:

- *HoleName.DBF* the coded data for the hole named *HoleName*

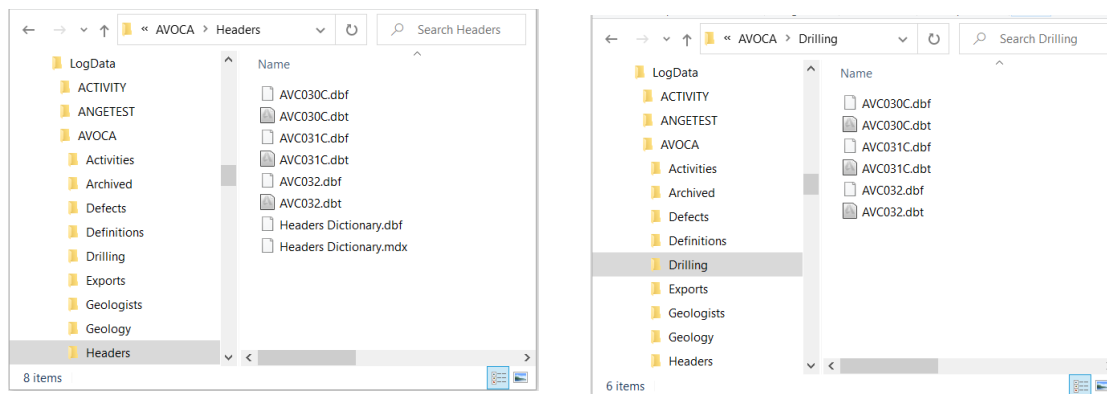
- *HoleName*.DBT the comments for the hole named *HoleName*. The only exception being Composites as these do not have comments.

Data subfolders may also contain the appropriate lookup dictionary files.

Data can be deleted, copied between projects or machines or its date, site or hole name changed by deleting, copying or renaming these files. It is important though that whatever action the user performs on the .DBF file they also perform on the corresponding .DBT file.

Depending on version of *LogCheck*, the maximum size for a hole name is between 8 and 16 characters. It also must not contain blanks. This restriction though, means that the user can take backup copies of the files and give them names such as *HoleName* - copy.DBF and leave them in this subfolder and *LogCheck* will ignore them.

The filenames of all data types for a hole are the same therefore care must be taken when moving files ensuring that they are placed in the folder for that data type in the destination project. For example, for each hole, there can be a file in the Headers, Drilling and Geology folders, each with the same name – their contents being defined by the folder they occur in:



Appendix B – dBASE Query Language

B1 Introduction

Data in *LogCheck* can be selected by using query selection statements. The syntax or rules used to specify a query are those of the DBL (dBASE language) and can be used for selecting records from a database table.

The query selection syntax is used in the following places in *LogCheck*:

- Hole Set Definitions, when selecting the holes by query.
- Interval Definitions.
- Filtering data in *LogCheck* summaries.
- Plot Definitions for specifying a level for aligning the vertical position of holes in a section.

An example of using a query to select a group of holes is shown below (see Section 6.5 Creating/Editing Hole Set Definitions). In this example, *Seam* is the variable name at the heading of the Seam column when editing Geology data. This query will include all holes where seam WK2 has been logged. Note that character strings such as WK2 require the double quotes in queries otherwise dBASE assumes that they are a data column name.

☒ Select using a query

Data Type: Geology

Query, for example: date >= ctod("1/6/2003") and date <= ctod("30/6/2003")
Seam = "WK2"

An example of using a query to select the top of an interval is shown below (see Section 6.6 Creating/Editing Interval Definitions). This example selects intervals whose top is 1.0m above a unit that is a seam (*Seam* <> " ").

Interval Definition: Seams

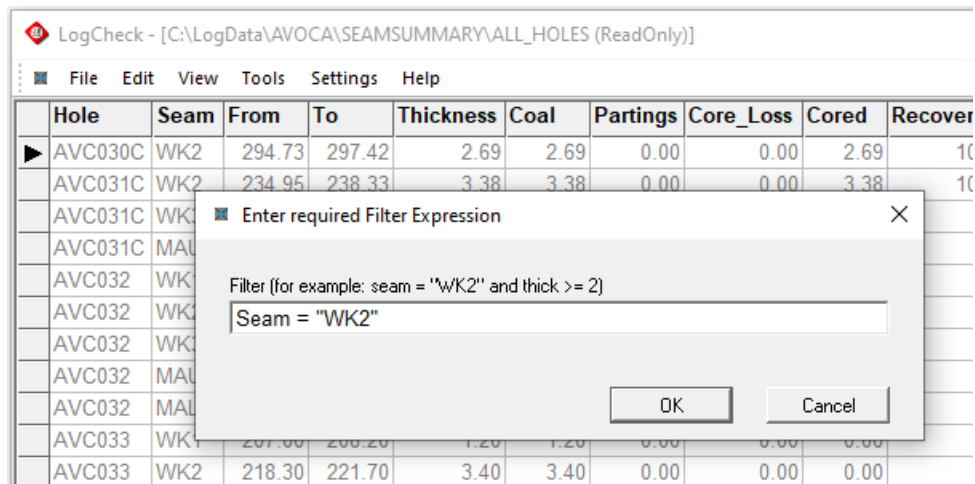
Data Type to use for Selection Criteria
Geology

Interval Top Definition

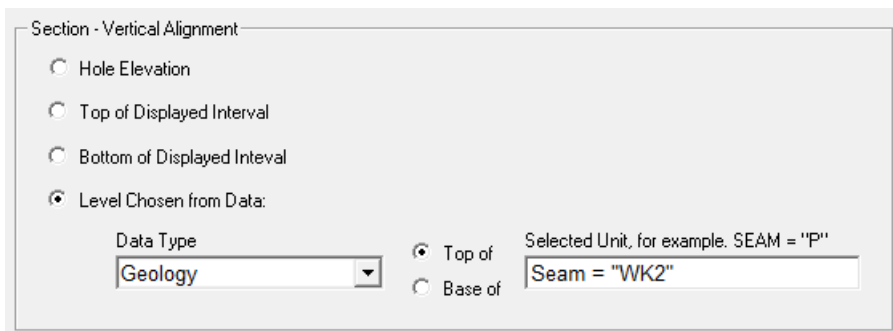
1.00 metres ☒ above ☐ top of unit directly above selected units
☐ below ☒ top of selected units
☐ base of selected units
☐ base of unit directly below selected units

Selected units, for example, SEAM = "P" and DEPTH >= 100, (leave blank for top of hole)
Seam <> " "

An example of using a filter to display only specific rows in a summary is shown below (see Section 7.6.5 Tools Menu – Filter). This example selects just those rows whose seam name starts with WK2.



An example of using a query to specify in a Plot Definition the vertical alignment of each hole on a section is shown below (see Section 12.5.7 – Vertical Layout for Sections). This example is from the Sheet Layout tab of a Plot Definition, aligns the holes on a section so that the top of the WK2 seam is at the same level for each hole on the section.



B2 Writing Selection Queries

Selection queries involve some kind of restriction on the data that is selected. This is done by specifying some kind of restriction on a variable – a variable is one of the columns on a database table, for example the column named *Seam* in Geology data.

Example 1. In a Hole Set Definition, to select only holes that have a seam that starts with "GU0":

```
SEAM = "GU0"
```

The column names and text values are not case sensitive, for example, both *Seam* and *seam* would also work. Also, when specifying values in a comparison:

- Character strings as in *Seam* = "GU0" must have double quotes around them otherwise dBASE assumes string is a data column name
- Numeric values such as in *CalcThick* > 1.0 do not have delimiters around them
- Date values such as in *Date* = ctod("01/01/2020") must be entered as strings surrounded by double quotes and then transformed to a date with the character to date function ctod().
- Logical values, that is *true* or *false*, for example, *Ph* (Photographed) in Header data

Operators that can be used to select data include:

- Comparison operators,
- Logical operators,
- dBASE functions.

B2.1 Comparison Operators

The comparison operators consist of equality and relational operators as follows:

Equality Operators		Relational Operators	
==	Exactly equals	<	Less than
=	Equal to, or begins with	>	Greater than
<> or #	Not equal	<=	Less than or equal
		>=	Greater than or equal

The following examples use the thickness or seam columns in hole seam summaries.

Example 1. Select seam intervals where the thickness equals 0.20:

```
Thickness = 0.20
```

Example 2. Select seam intervals that are exactly the GU0 seam (uses two equal signs):

```
Seam == "GU0"
```

Example 3. Select seam intervals that match anything starting with "GU0" (note that there is only one equal sign here):

```
Seam = "GU0"
```

Example 4. Select seam intervals where the thickness is less than 0.20 (does not include intervals that are 0.20):

Thickness < 0.20

Example 5. Select seam intervals where the thickness is greater than 0.20 (does not include intervals that are 0.20):

Thickness > 0.20

Example 6. Select seam intervals where the thickness is less than or equal to 0.20 (also includes intervals that are 0.20):

Thickness <= 0.20

Example 7. Select seam intervals where the thickness is greater than or equal to 0.20 (also includes intervals that are 0.20):

Thickness >= 0.20

Example 8. Select seam intervals where the thickness does not equal 0.20.

Thickness <> 0.20

B2.2 Logical Operators

The logical operators are AND, OR and NOT. Compound conditions are formed by connecting two or more conditions using the logical operators. The rules of precedence for operators, from highest to lowest are as follows:

1. All comparison operators
2. NOT
3. AND
4. OR

Parentheses not only document your logic but can also create significant differences in a selection.

Example 9. Select all holes with seam GU0, and where this seam is at a depth of greater than 100m:

Seam == "GU0" and Depth > 100

Example 10. Select all holes with seam GU0 or GU1, and this seam is at a depth of greater than 100m:

(Seam == "GU0" or Seam == "GU1") and Depth > 100

Example 11. Select all holes with seam GU0 (no matter the depth), or the seam is GU1 at a depth of greater than 100m:

Seam == "GU0" or Seam == "GU1" and Depth > 100

Note the difference in what will be selected between queries with parentheses and those without.

Example 12. Select all holes with seam GU0, and this seam is at a depth of greater than 100m and less than 120m:

Seam = "GU0" and Depth > 100 and Depth < 120

Example 13. When defining a Hole Set Definition named CORED, select all holes whose drilling has a Bit Type of DW, PC, PW or TC:

☒ Select using a query

Data Type: Drilling

Query, for example: date >= ctod("1/6/2003") and date <= ctod("30/6/2003")
 bt = "DW" or bt = "PC" or bt = "PW" or bt = "TC"

B2.3 dBASE Functions

There are many dBASE functions can also be used in a query to select data. Some of those that are useful in queries are:

- `at(string1, string2)` returns a numerical value being the position of *string1* in *string2*. If not found it returns 0
- `ctod(string1)` returns the date value recorded in *string1*
- `day(date1)` returns the numerical value of the day for *date1*
- `isblank(variable)` returns a logical value of whether the *variable's* value is blank
- `left(string1, number1)` returns a string being the leftmost *number1* of characters in *string1*
- `len(string1)` returns a numerical value the number of characters in *string1*
- `ltrim(string1)` returns a string with any leading blanks trimmed from *string1*
- `lower(string1)` returns a string with all characters in *string1* converted to lower case
- `month(date1)` returns the numerical value of the month for *date1*
- `right(string1, number1)` returns a string being the rightmost *number1* of characters
- `rtrim(string1)` trims the trailing blanks from *string1*
- `substr(string1, number1, number2)` returns the substring within *string1* starting at position *number1* and of length *number2*
- `upper(string1)` converts all characters in the variable to upper case
- `year(date1)` returns the numerical value of the year for *date1*

Example 13. When defining the Hole Set Definition named CORED, select headers for all holes where the hole name ends in a "C":

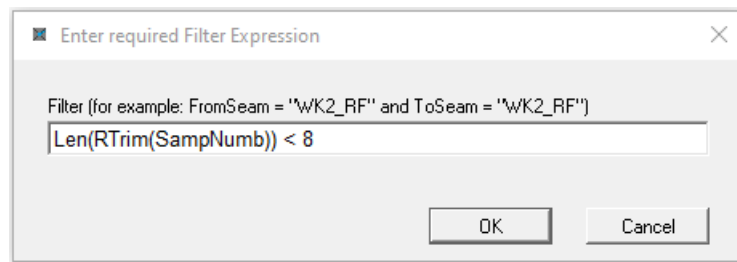
☒ Select using a query

Data Type: Headers

Query, for example: date >= ctod("1/6/2003") and date <= ctod("30/6/2003")
 Right(RTrim(Hole), 1) = "C"

In this case, the RTrim function firstly removes any trailing blanks from the hole name to achieve the match, then the Right function only returns those holes whose last character is "C".

Example 14. When viewing a sample summary, use a filter to only display sample numbers whose length is less than 8 characters. This may be useful to determine where leading blanks have been left off the sample numbers.



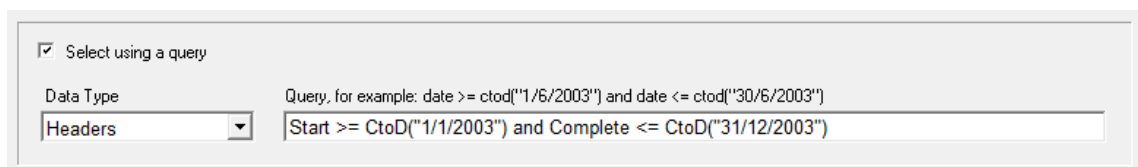
Enter required Filter Expression

Filter (for example: FromSeam = "WK2_RF" and ToSeam = "WK2_RF")

Len(RTrim(SampNumb)) < 8

OK Cancel

Example 15. Expressions where columns have a date data type, one can only enter the date as a string which needs to be converted to a date using the Ctod() function. For example, the Headers data has columns named Start and Complete that are date data types. The following expression filters holes whose start date is on or after 1/1/2003 and were completed on or before the 31/12/2003:



☒ Select using a query

Data Type: Headers

Query, for example: date >= ctod("1/6/2003") and date <= ctod("30/6/2003")

Start >= CtoD("1/1/2003") and Complete <= CtoD("31/12/2003")

Appendix C – Standard Plot Definitions

C1 Introduction

LogCheck comes with a standard set of plot files. These include:

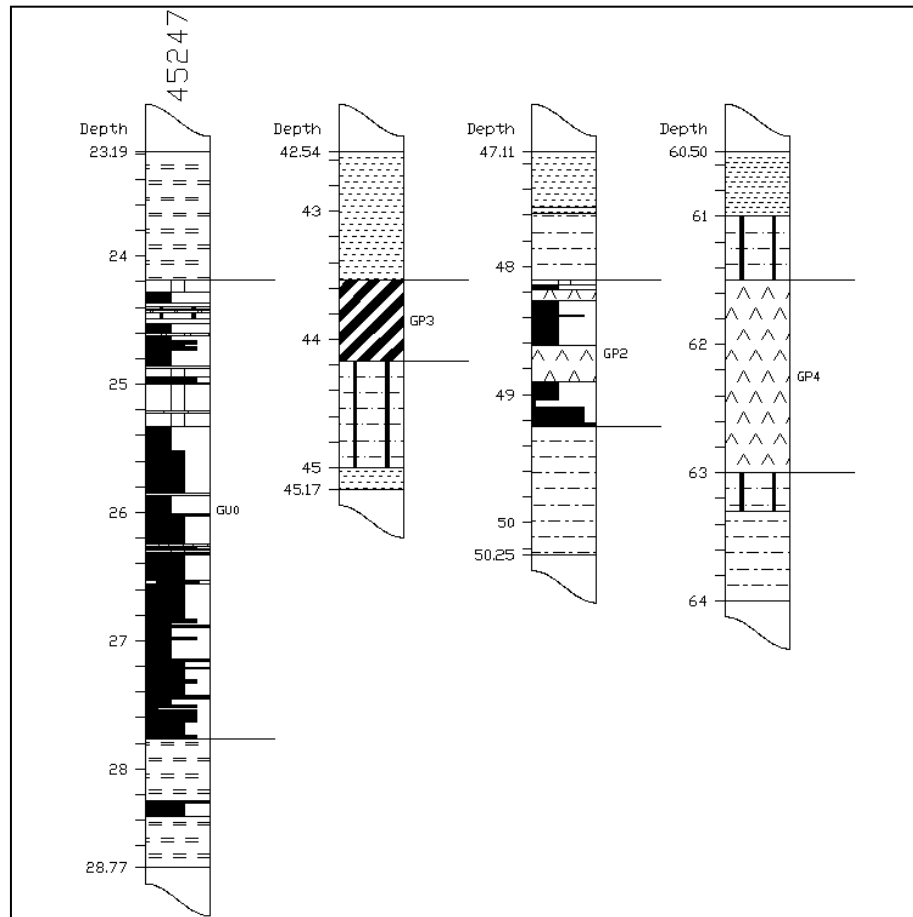
- A seams only plot at 1:20
- Entire hole with Geophysics (Density Gamma and Calliper)
- Stacked plots of individual holes in A4 and A3, at scales of 1:20, 1:100, 1:200.
- Section plots without horizontal scale (ie sit 10mm apart for a fence diagram) on A4 and A3 at 1:100 and 1:200.

The plot definitions for these are:

What	Description	Plot Definition	Vertical Scale	Paper Size
Seams Only	Seams-only plot in one plot file.	LC_SEAM	1:20	–
Geology + LAS	Tracks: Lithology + LAS in one bar and one plot file. Orientation: portrait	LC_GEOLAS	-	-
		LC_GEOLAS_A3_20	1:20	A3
		LC_GEOLAS_A4_200	1:200	A4
Stacked Plot	Single hole, lithology in multiple bars; multiple plot files.	LC_STACK_A4_20 (5m/col)	1:20	A4
		LC_STACK_A3_20 (7m/col)	1:20	A3
	Tracks: Lithology, Seam, SampNumb. Orientation: portrait	LC_STACK_A4_100 (25m/col)	1:100	A4
		LC_STACK_A3_100 (35m/col)	1:100	A3
		LC_STACK_A4_200 (50m/col)	1:200	A4
		LC_STACK_A3_200 (70m/col)	1:200	A3
Section Plot	Stratigraphic fence plot of seams. Requires hole set and interval definitions. Orientation: landscape.	LC_SECTN_A4_100 (25m/col)	1:100	A4
		LC_SECTN_A3_100 (35m/col)	1:100	A3
		LC_SECTN_A4_200 (50m/col)	1:200	A4
		LC_SECTN_A3_200 (70m/col)	1:200	A3

C2 Seams-Only Plot

The Seams Plot Definition (LC_SEAMS) plots the defined seams in a single hole with the top of each interval all displayed at the one level.



To generate this plot:

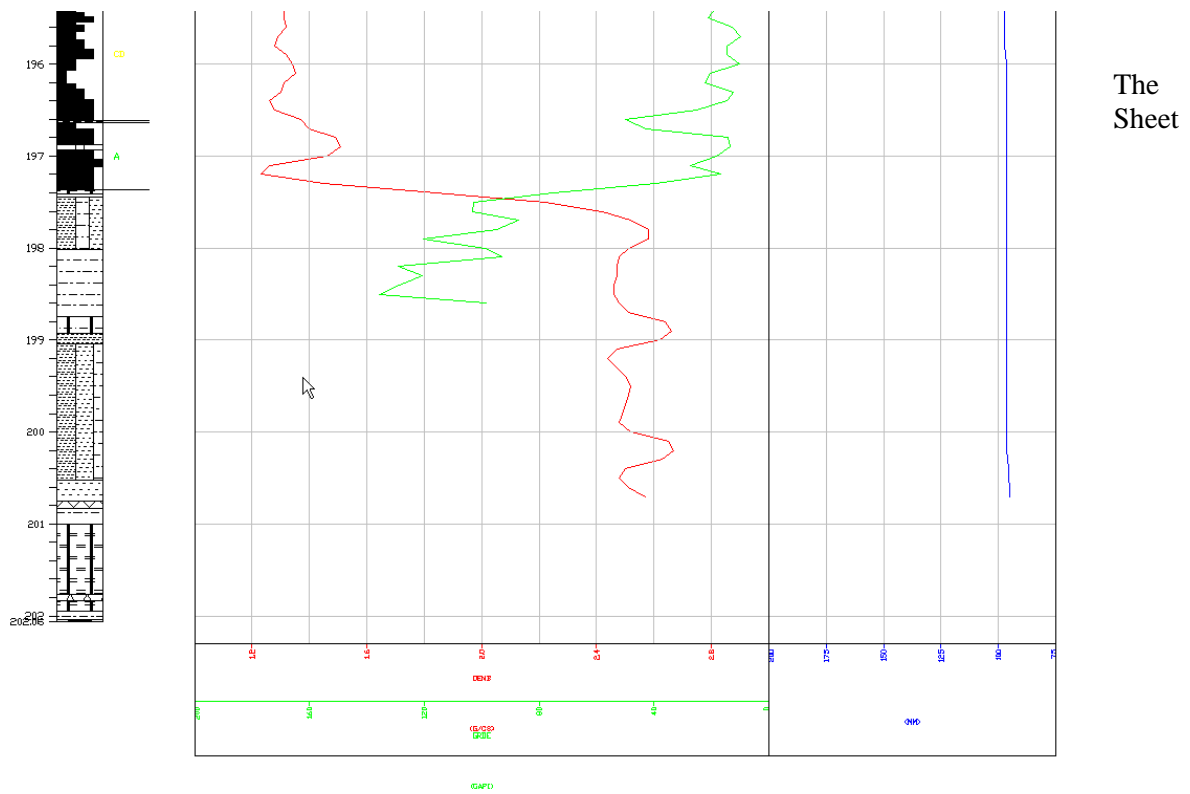
1. Set up a Seams Interval Definition (File > New > Interval Definition) as explained in Section 6.6.2.2 - Selecting Multiple Intervals in a Single Hole.
2. Open the data for the required hole (File > Open > Hole Data) with the Interval Definition Seams set up in step 1.
3. Generate the plot (File > Plot) and select the LC_SEAM plot definition.

C3 Geology with Geophysics

There are three standard Plot Definitions for plotting the Geology with Geophysics:

- LC_GEOLAS plots the entire hole in a single one bar plot, useful for displaying the data on the screen
- LC_GEOLAS_A4_200 plots the hole over a number of A4 pages at 1:200, useful for generating an overview of the hole for reports
- LC_GEOLAS_A3_20 plots the hole over a number of A3 pages at 1:20, useful for generating hole for fine analysis

LC_GEOLAS plots the entire hole as one bar with the LAS data plotted in tracks (DENB, GRDE, CADE). An excerpt from a plot generated using LC_GEOLAS:



Layout page of this Plot Definition includes:

Horizontal Layout

Offset to First Hole on the Left: mm's

Single Hole

Max. No. of Repetitions across Sheet:

Distance between Repetitions: mm's

Vertical Layout

Offset to Shallowest Hole Top: mm's

Vertical Scale: 1 metre = mm's

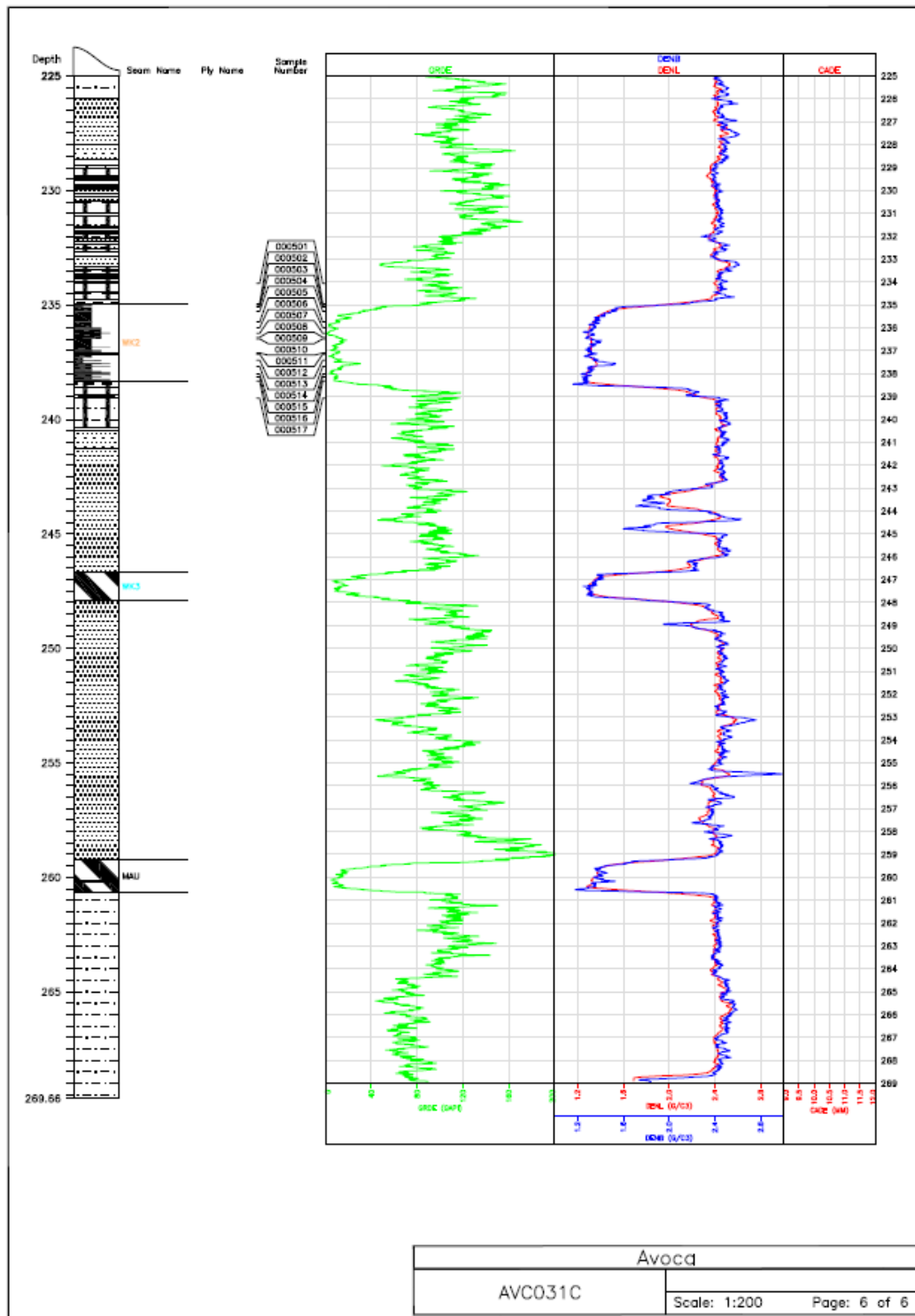
Single Hole

Maximum Track Length: metres

Tracks page of this Plot Definition includes:

	XOrig	Width	Data_Type	Variable	Disp_Type	Layer	Comb_Dupl	Detail_On	Coal_Only	Text_Just	Text_Hgt	Text_Orient	Text_NDec	Colour
▶	0.0	10.0	Geology	LI	Pattern	LI	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>					
	10.0	10.0	Geology	SEAM	Value	LI	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Left	1.25	0.0		SEAM
	30.0	125.0	Las	DENB	Line Trace	LI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					1
	30.0	125.0	Las	GRDE	Line Trace	LI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					3
	155.0	62.5	Las	CADE	Line Trace	LI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					5

LC_GEOLAS_A4_200 plots the geology, seam, plies and sample numbers over a number of A4 pages at 1:200:



The Sheet Layout page of this Plot Definition includes:

Horizontal Layout	
Offset to First Hole on the Left:	19.25 mm/s
<div>Single Hole</div> <div>Max. No. of Repetitions across Sheet: 1</div> <div>Distance between Repetitions: 30.00 mm/s</div>	

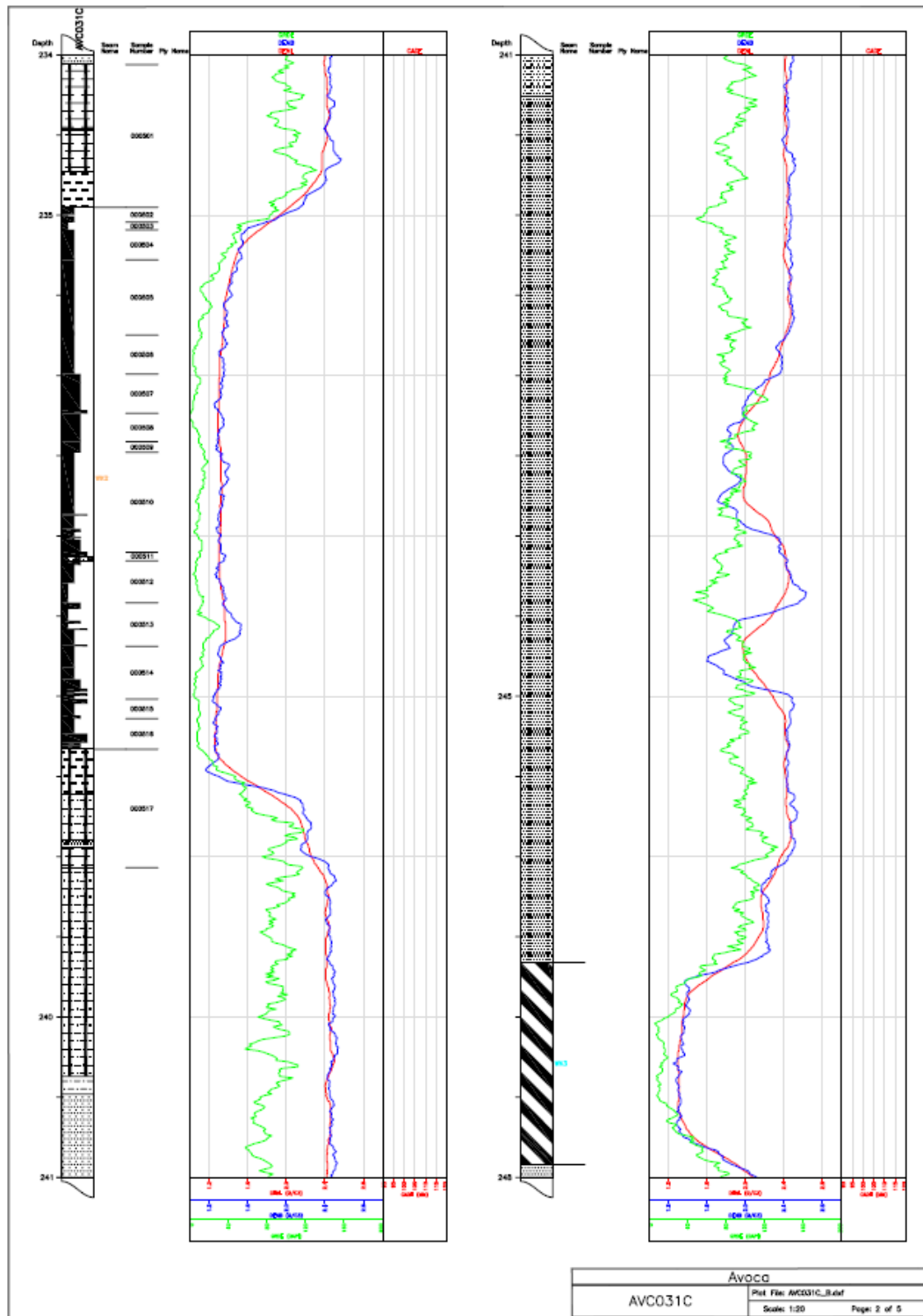
Vertical Layout	
Offset to Shallowest Hole Top:	-20.00 mm/s
Vertical Scale: 1 metre =	5.0000 mm/s
<div>Single Hole</div> <div>Maximum Track Length: 45.000 metres</div>	

The crucial difference in the Sheet Layout compared to the previous is that Vertical Layout - Maximum Track Length is 45 metres instead of 9999 metres.

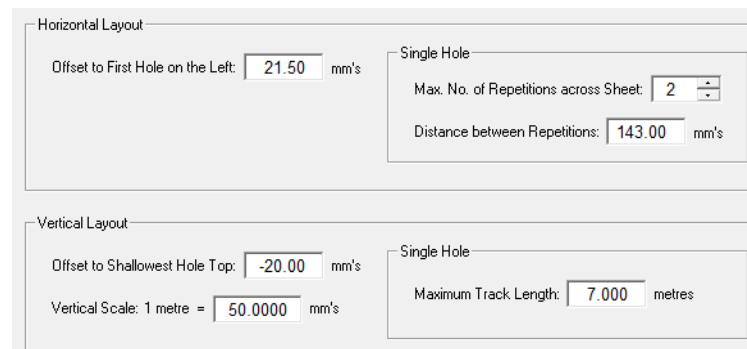
The Tracks page of this Plot Definition includes:

	XOrig	Width	Data_Type	Variable	Disp_Type	Layer	Comb_Dupl	Detail_On	Coal_Only	Text_Just	Text_Hgt	Text_Orient	Text_NDec	Colour
►	0.0	10.0	Geology	LI	Pattern	LI	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		-	-		
	10.0	15.0	Geology	SEAM	Value	LI	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Left	1.25	0.0		SEAM
	40.0	15.0	Geology	SAMPNUMB	Value	LI	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Centre	1.25	0.0		
	25.0	15.0	Geology	PLY	Value	LI	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Left	1.25	0.0		PLY
	105.0	50.0	Las	DENL	Line Trace	LI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		-	-		1
	105.0	50.0	Las	DENB	Line Trace	LI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		-	-		5
	55.0	50.0	Las	GRDE	Line Trace	LI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		-	-		3
	155.0	20.0	Las	CADE	Line Trace	LI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		-	-		1

LC_GEOLAS_A3_20 plots the geology, seam, plies and sample numbers over a number of A3 pages at 1:20:



The Sheet Layout page of this Plot Definition includes:



Horizontal Layout

Offset to First Hole on the Left: 21.50 mm's

Single Hole

Max. No. of Repetitions across Sheet: 2

Distance between Repetitions: 143.00 mm's

Vertical Layout

Offset to Shallowest Hole Top: -20.00 mm's

Vertical Scale: 1 metre = 50.0000 mm's

Single Hole

Maximum Track Length: 7.000 metres

The crucial differences between this Sheet Layout and the previous one are:

- Horizontal Layout – Maximum No. of Repetitions across Sheet is now 2 instead of 1
- Vertical Layout - Vertical Scale of 1 metres = 50mm's instead of 5mm's
- Vertical Layout – Maximum Track Length of 7m instead of 45m

The Tracks page of this Plot Definition includes:

	XOrig	Width	Data_Type	Variable	Disp_Type	Layer	Comb_Dupl	Detail_On	Coal_Only	Text_Just	Text_Hgt	Text_Orient	Text_NDec	Colour
▶	0.0	10.0	Geology	LI	Pattern	LI	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		.	.		
	10.0	10.0	Geology	SEAM	Value	LI	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Left	1.25	0.0		SEAM
	20.0	10.0	Geology	SAMPNUMB	Value	LI	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Centre	1.25	0.0		
	30.0	10.0	Geology	PLY	Value	LI	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Left	1.25	0.0		
	40.0	60.0	Las	DENL	Line Trace	LI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		.	.		1
	40.0	60.0	Las	DENB	Line Trace	LI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		.	.		5
	40.0	60.0	Las	GRDE	Line Trace	LI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		.	.		3
	100.0	20.0	Las	CADE	Line Trace	LI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		.	.		1

This is the same as the previous Plot Definition's Tracks page except for the values of XOrig and Width.

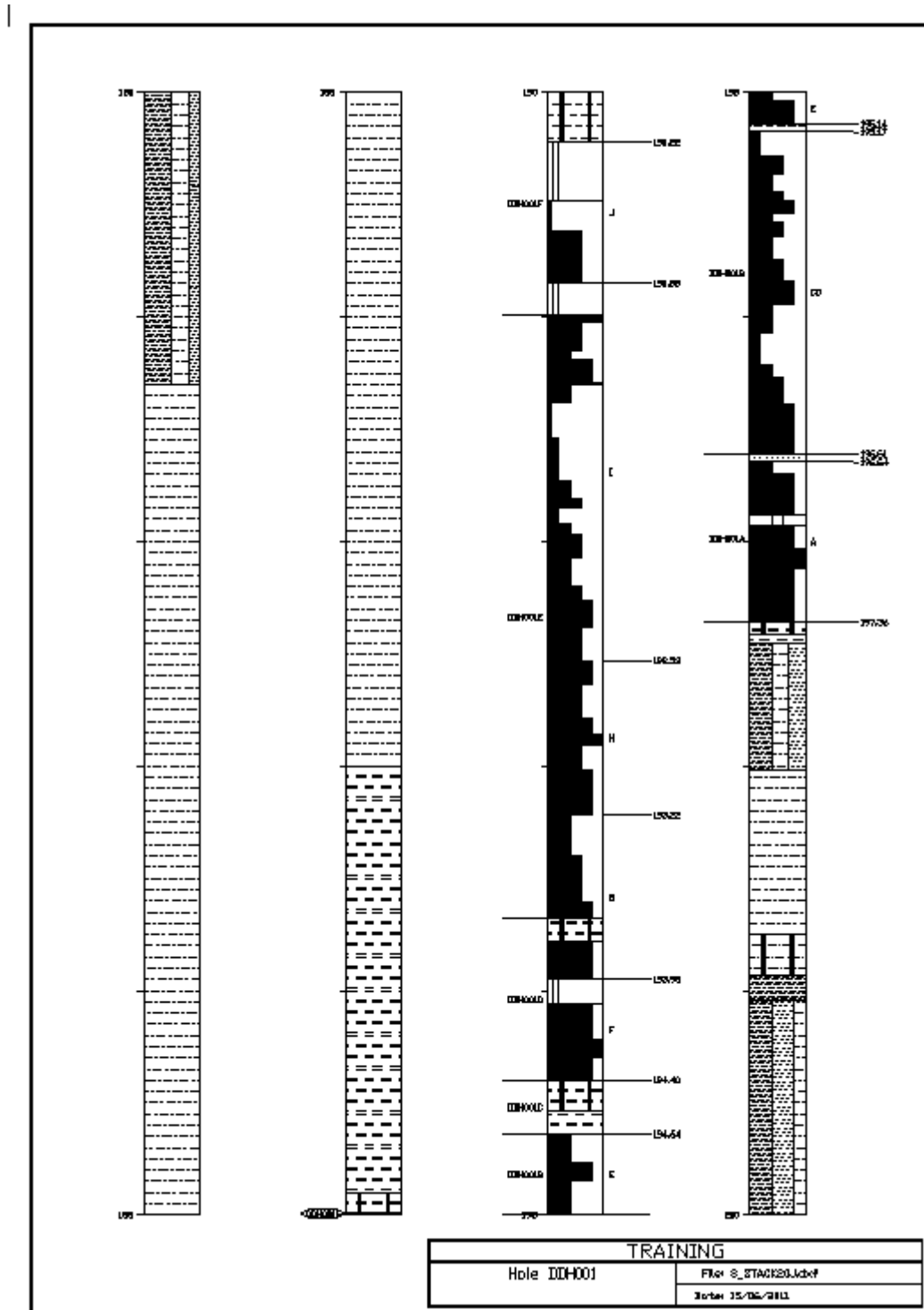
All the system Geology - Geophysics Plot Definitions assume that the geophysical traces have the names CADE, DENB, DENL and CADE. If this is not so, it is first necessary to edit the Plot Definition with the required geophysical trace names and then use File > Save As to save the modified definition to the User Default or Project Plot Definitions. One needs to use Save As instead of Save as it is not possible to modify the system Plot Definitions. Note also that the saved copies cannot begin with LC_ as this prefix is preserved for *LogCheck* system Plot Definitions.

The steps to generate any of these geology and geophysics plots are:

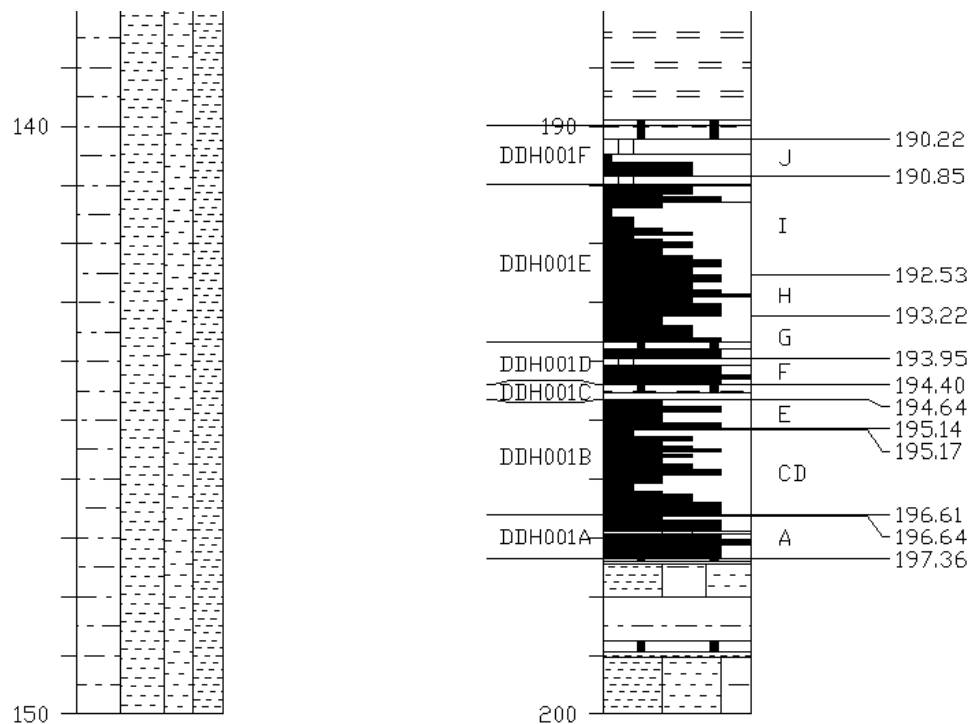
1. Open the Geology data for the required hole (File > Open > Hole Data) and select the required drill hole.
2. Generate the plot (File > Plot), select the LC_SEAM plot definition and save the plot file.
3. Open the LAS data (File > Open > Hole Data and select LAS data from the Data Type drop down box)
4. Select File > Plot, choosing the same plot file name as used in Step 2 and respond Append **not** Overwrite when prompted.

C4 Stacked Plots

The stacked plot definitions plot hole data at scales of 1:20, 1:100 and 1:200 in multiple bars, to as many plot files as are required, on A4 or A3 sheets. The following example using hole DDH001 was produced using LC_STACK_A4_20, plotted on an A4 sheet:



Details from a plot generated using the LC_STACK_200 Plot Definition, with the sample number on the left of the column, and seam on the right:



TRAINING	
Hole DDH001	File: S_STACK200A.dxf
	Date: 15/06/2011

The Tracks page of the stacked Plot Definitions:

	XOrig	Width	Data_Type	Variable	Disp_Type	Layer	Comb_Dupl
▶	0.0	12.5	Geology	LI	Pattern	0	<input checked="" type="checkbox"/>
	12.5	15.0	Geology	SAMPNUMB	Description	0	<input checked="" type="checkbox"/>
	27.5	8.0	Geology	SEAM	Value	0	<input checked="" type="checkbox"/>
	34.0	10.5	Geology	SEAM	Boundary Depths	0	<input type="checkbox"/>

The steps required to generate this plot are:

1. Open the data for the required hole (File > Open > Hole Data), using if required a Hole Set and/or Interval Definition.
2. Generate the plot (File > Plot) and select one of the LC_STACK plot definitions.

C5 Section Plots

A *LogCheck* section plot draws a stratigraphic section displaying the holes specified in a Hole Set Definition and possibly also using an Interval Definition. They also display correlation lines for seams between holes.

There are four standard section plots as detailed in the table in the introduction to this appendix:

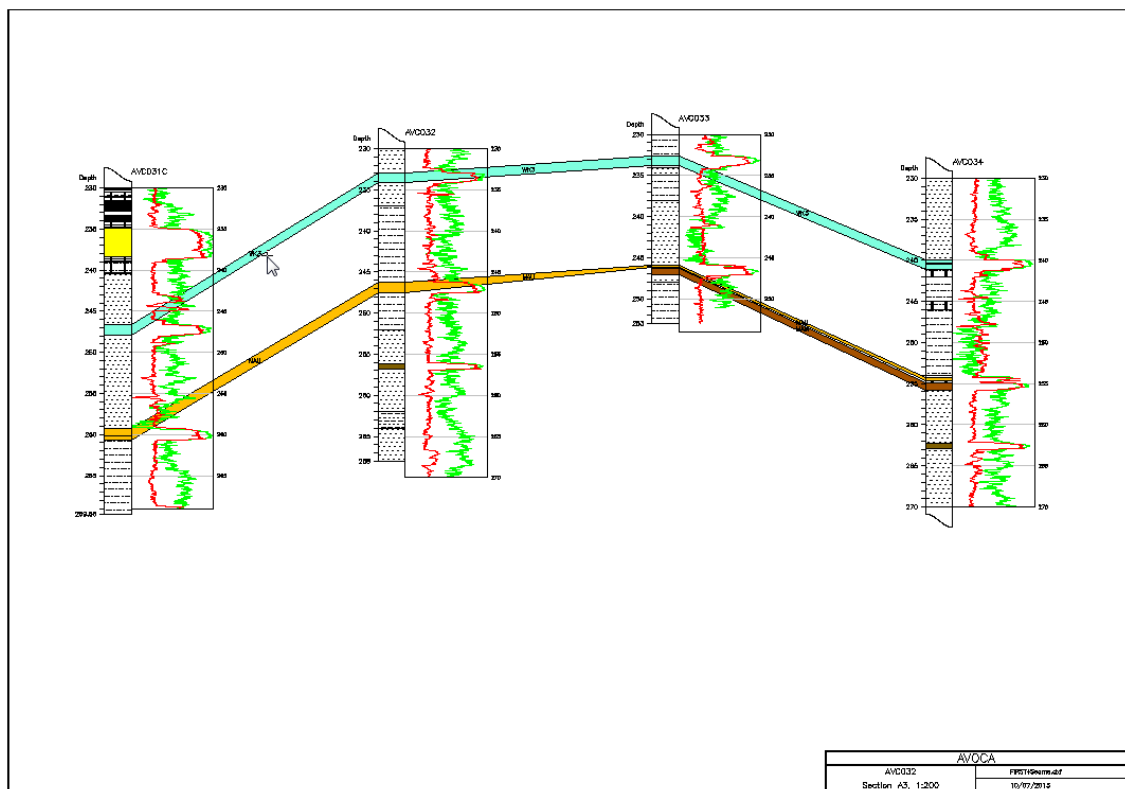
- LC_SECTN_A4_100 (max. 25m/col)
- LC_SECTN_A3_100 (max. 35m/col)
- LC_SECTN_A4_200 (max. 50m/col)
- LC_SECTN_A3_200 (max. 70m/col)

Each of these plot to either an A3 or A4 sheet and use either a vertical scale of 1:100 or 1:200, and plots to an A3 sheet.

On the Sheet Layout page of these Plot Definitions:

- Horizontal Layout is set to Fixed Interval
- Section - Vertical Alignment is set to Hole Elevation.
- Horizontal Offset to First Hole on the Left and Vertical Offset to Shallowest Hole Top may need to be adjusted for all holes to appear within the plot border.

This plot used a Horizontal Offset of 70 mm and Vertical Offset of -70 mm:



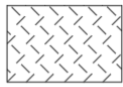
The steps required to generate this plot are:

1. Open the data for the required holes (File > Open > Hole Data) using the required Hole Set Definition and possibly an Interval Definition.
2. Generate the plot (File > Plot) and select one of the LC_SECTION plot definitions.

Appendix D - AutoCAD Colours

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191
192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255

Appendix E - LogCheck Patterns



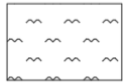
AI —

AL1 — Diatomaceous
Earth/Laterite/Loam/Soil

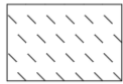
AL2 —



AL3 — Alluvium



AL4 —



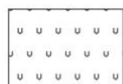
AV —



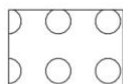
BA1 —



BA2 —



BC —



BO1 — Boulders/Cobbles



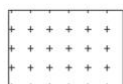
BR1 —



BR2 —



BR3 — Breccia



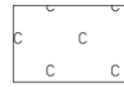
BU —



BU1 — Basement



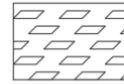
BZ — Broken Zone



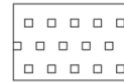
C1 — Calcrete



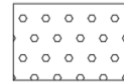
CA1 — Calcite



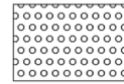
CA2 —



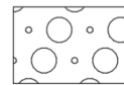
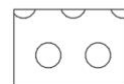
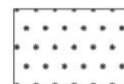
CC —



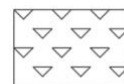
CG —



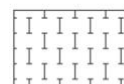
CGGG — Conglomerate, granular

CGGP — Conglomerate, granular to
pebblyCGGU — Conglomerate, granular to
cobble or boulderyCGPP — Conglomerate, no clast size
or pebblyCGPU — Conglomerate, pebbly to
cobble or boulderyCGUU — Conglomerate, cobble or
bouldery

CH —



CH1 — Chert




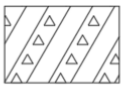

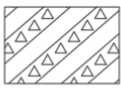

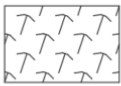



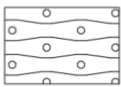
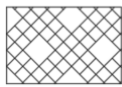
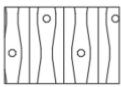
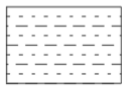
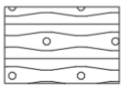

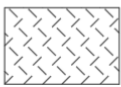
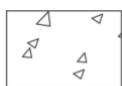

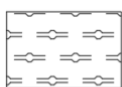



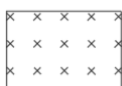
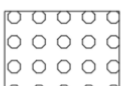


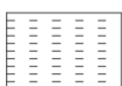


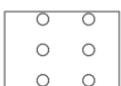


CK1 — Chalk

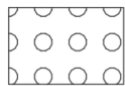


CL —

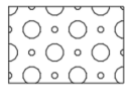


CL1 — Clay

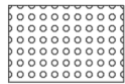
	CL2 - Clayey (for Silt)		FB1 - Fault Breccia
	CL3 - Clayey (for Sand)		FB2 -
	CL4 - Clayey (for Gravel)		FI1 - Fill/Spoil
	CL5 - Clayey (for Cobbles or Boulders)		FR - Fireclay
	CL6 - Fireclay, Kaolinite, Limonite		FW1 - Fossil Wood
	CR1 - Calcrete, Ferricrete, Silcrete		FW2 -
	CS -		FW3 -
	CS1 - Claystone		FZ -
	CV - Colluvium		GC -
	DI - Diatomaceous Earth		GN1 - Gneiss
	DM1 - Dolomite		GV -
	DO -		GV1 -
	DO1 - Dolerite		GV2 - Gravelly (for Clay)
	DT -		GV3 - Gravelly (for Silt)
	F1 - Ferricrete		GV4 - Gravelly (for Sand)
	FB -		GV5 - Gravelly (for Cobbles, Boulders)



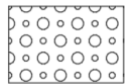
GVCC — Gravel, coarse



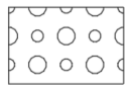
GVFC — Gravel, fine to coarse



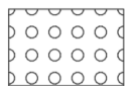
GVFF — Gravel, fine



GVFM — Gravel, fine to medium



GVMC — Gravel, medium to coarse



GVMM — Gravel, no size or medium



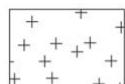
IG —



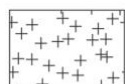
IG1 — Igneous Rock



IG2 —



IN1 — Intrusive Rock



IN1A —



IN2 —



IN3 — Granite/Felsic Intrusive



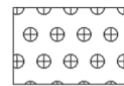
IN4 — Granodiorite/Intermediate Intrusive



IN5 — Gabbro/Mafic Intrusive



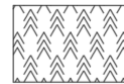
IS —



IS1 — Ironstone



K1 — Kaolinite



KK1 — Cone in Cone Carbonate



KL —



L1 — Limonite



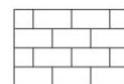
L2 — Laterite



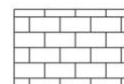
LG —



LS1 —



LS2 —



LS3 — Carbonate/Limestone



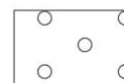
M1GG — Conglomerate, >65% matrix, granular



M1GP — Conglomerate, >65% matrix, granular to pebbly



M1GU — Conglomerate, >65% matrix, granular to bouldery



M1PP — Conglomerate, >65% matrix, no clast size or pebbly

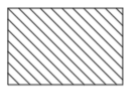


M1PU — Conglomerate, >65% matrix, pebbly to bouldery

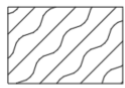


M1SA — Conglomerate, >65% matrix, included sand grains

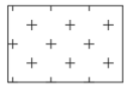
	M1UU – Conglomerate, >65% matrix, cobbly or bouldery		MM1 – Basement/Metamorphic Rock/Quartzite
	M2GG – Conglomerate, 35–65% matrix, granular		MM2 –
	M2GP – Conglomerate, 35–65% matrix, granular to pebbly		MM3 –
	M2GU – Conglomerate, 35–65% matrix, granular to bouldery		MS1 –
	M2PP – Conglomerate, 35–65% matrix, no clast size or pebbly		MS2 –
	M2PU – Conglomerate, 35–65% matrix, pebbly to bouldery		MS3 –
	M2SA – Conglomerate, 35–65% matrix, included sand grains		MS4 –
	M2UU – Conglomerate, 35–65% matrix, cobbly or bouldery		MS5 – Mudstone
	M3GG – Conglomerate, <35% matrix, granular		MU – Mud
	M3GP – Conglomerate, <35% matrix, granular to pebbly		MY1 – Mylonite
	M3GU – Conglomerate, <35% matrix, granular to bouldery		OB1 –
	M3PP – Conglomerate, <35% matrix, no clast size or pebbly		OI1 – Oil Shale
	M3PU – Conglomerate, <35% matrix, pebbly to bouldery		PC –
	M3SA – Conglomerate, <35% matrix, include sand grains		PC1 – Pellet Claystone
	M3UU – Conglomerate, <35% matrix, cobbly or bouldery		PE1 – Peat
	MM –		PE2 –



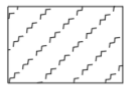
PH –



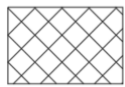
PH1 – Phyllite



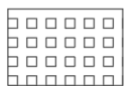
PR –



PU –



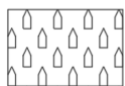
PY –



PY1 – Pyrite



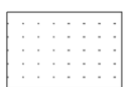
QT1 – Quartzite



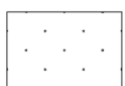
QZ1 – Quartz



S1 – Silcrete



SA –



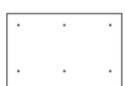
SA1 – Tar Sand



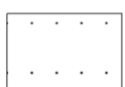
SA2 – Sandy (for Clay)



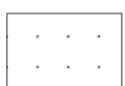
SA3 – Sandy (for Silt)



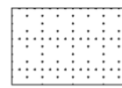
SA4 – Sandy (for Gravel)



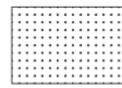
SA5 – Sandy (for Cobbles or Boulders)



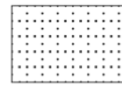
SACC – Sand, coarse grained



SAFC – Sand, fine to coarse grained



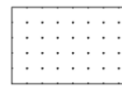
SAFF – Sand, fine grained



SAFM – Sand, fine to medium grained



SAMC – Sand, medium to coarse grained



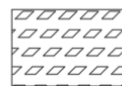
SAMM – Sand, no grain size or medium grained



SC1 –



SC2 –



SD1 – Siderite



SH –



SH1 – Oil Shale/Shale



SI1 – Silt



SI2 – Silty (for Clay)



SI3 – Silty (for Sand)



SI4 – Silty (for Gravel)



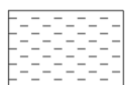
SI5 – Silty (for Cobbles or Boulders)



SL –



SL1 – Slate



SLA –



S0 –



SS01 –



SS02 –



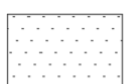
SS03 –



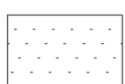
SS04 –



SS05 –



SS06 –



SS07 –



SS08 –



SS09 –



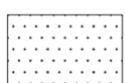
SS10 –



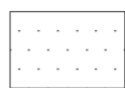
SS11 –



SS12 –



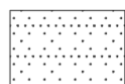
SS13 – Sandstone/Coal Stony



SS14 –



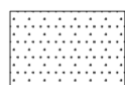
SS0C – Sandstone, coarse grained



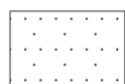
SSFC – Sandstone, fine to coarse grained



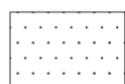
SSFF – Sandstone, fine grained



SSFM – Sandstone, fine to medium grained



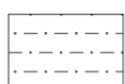
SSMC – Sandstone, medium to coarse grained



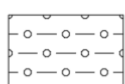
SSMM – Sandstone, medium grained



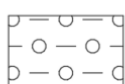
ST –



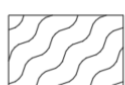
ST1 – Siltstone



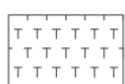
SU1 –



SU2 – Sedimentary Rock



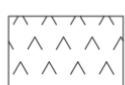
SZ1 – Schist



T1 – Tonstein



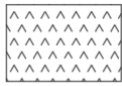
TA1 – Talc



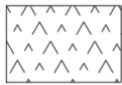
TF1 –



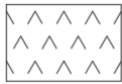
TF2 –



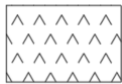
TFCS – Tuff, clay sized



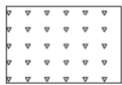
TFMS – Tuff, mud sized



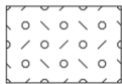
TFSS – Tuff, sand sized



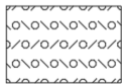
TFTS – Tuff, no size or silt sized



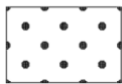
TI –



TI1 – Diamictite/Tillite



TI2 –



TR1 – Tar Sand



TS1 –



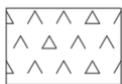
TTCS – Tuffite, clay sized



TTM1 –



TTMS – Tuffite, sand sized



TTSS – Tuffite, sand sized



TTTS – Tuffite, no size or silt sized



VB –



VB1 – Volcanic Breccia



VR1 – Volcanic Rock



VR2 – Rhyolite/Felsic Volcanic



VR3 – Andesite/Intermediate Volcanic



VR4 – Basalt/Mafic Volcanic



VR5 –

Appendix F - *LogCheck* Fills



BC – Lignite/Brown Coal



C1 –



C2 – Coal, bright with dull bands (60–90%)



C3 – Coal, interbanded dull and bright (40–60%)



C4 – Coal, dull with frequent bright bands (10–40%)



C5 – Coal, dull with minor bright bands (1–10%)



C6 –



C7 –



CB –



CD1 –



CD2 –



CF – Coal, dull (<1%)



CH1 –



CH2 –



CH3 –



CH4 –



CI – Coal, weathered



CN1 –



CN2 –



CO – Coal/Coal, bright (>90% bright coal)



COAN – Coal, anthracite



COCI – Coal, cindered



CODC – Coal, dull conchoidal



COEW – Coal, extremely weathered



COFU – Coal, fusainous



COHA – Coal, heat affected



COKC – Coal, coked



COSP – Coal, sapropelic



COSY – Coal, stony



CU – Coal, undifferentiated



FU –



FU1 –



KC —



KL —



LL —



MR1 — Missing Record



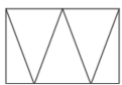
NL — Core Loss/No Recovery



NL1 — Not Logged



NLCO — Lost Coal



OW — Old Workings



VD — Void



X1 — Carbonaceous



XX —



ZZ — Coaly

Appendix G - Coal Quality Property Groups

G1 Sample Descriptions in All Property Groups

Description	Basis	LogCheck Field Name	CoalLog Variable Name
Sample Base Depth		Depth	To_Depth
Sample Type (Ply/Comp)		SampType	Sample_Type
Sample Number		SampNumb	Sample_No
From Depth		From	From_Depth
To Depth		To	To_Depth
Sample Thickness		Thickness	Thickness
From Seam		FromSeam	NC_FromSeam
To Seam		ToSeam	NC_ToSeam
From Ply		FromPly	NC_FromPly
To Ply		ToPly	NC_ToPly
Linear Recovery		LR	Linear_Recovery
Volume Recovery		VR	Volume_Recovery
Sample Drilling Date		DrillDate	NC_DrillDate
Litho Category		SampLith	Sample_Lith
Dispatch Number		DispNumb	Dispatch_No
Previous Test		PrevTest	Previous_Test
Comments		Comments	Comments
Laboratory		LabName	Lab_Name
Laboratory Report No.		ReportNo	Report_No
Laboratory Report Date		ReportDate	Report_Date
Laboratory Sample No.		LabSampNo	Lab_Sample_No
Clean Coal Composite Type		CCCType	CCC_Type
Treatment before Testing		PreTreat	Pre_Treatment
No of Drops		DropCount	Drop_Count
Size Type (Dry/Wet)		SizeType	Size_Type
Upper Sizing		MinusSz	Minus_Size
Lower Sizing		PlusSz	Plus_Size
Sink Density		Sink	Sink
Float Density		Float	Float
Froth Fraction		Froth	Froth
Mass Percent aka Yield (ad, %)	Air Dried	MassPct	Mass_ar_kg
Mass (ar, kg)	As Received	MassAR	Mass_ad_kg
Mass (ad, kg)	Air Dried	MassAD	Mass_pct

G2 General Properties

Description	Basis	LogCheck Field Name	CoalLog Variable Name
Apparent Relative Density (g/cm ³)		ARD	ARD_gpcm3
Relative Density (ad, g/cm ³)	Air Dried	RD	RD_ad_gpcm3
Free Moisture (ar, %)	As Received	FM	Free_Moist_ar_pct
Residual Moisture (ad, %)	Air Dried	RM	Resid_Moist_ad_pct
Total Moisture (ar, %)	As Received	TM	Total_Moist_ar_pct
Moisture Holding Capacity (%)		MHC	MHC_pct
Calculated In-situ Moisture (%)		ISM	NC_ISM
Moisture in Analysis Sample (ad, %)	Air Dried	MIAS	MIAS_ad_pct
Ash (ad, %)	Air Dried	Ash	Ash_ad_pct
Volatile Matter (ad, %)	Air Dried	VM	VM_ad_pct
Fixed Carbon (ad, %)	Air Dried	FC	FC_ad_pct
Specific Energy (ad, MJ/kg)	Air Dried	SE	NC_SE_ad_MJpKg
Gross Calorific Value (ad, kcal/kg)	Air Dried	CV	CV_ad_kcalpKg
Total Sulphur (ad, %)	Air Dried	TS	TS_ad_pct
Chlorine (ad, %)	Air Dried	Cl	Cl_ad_pct
Phosphorus (ad, %)	Air Dried	P	P_ad_pct
Fluorine (ad, ppm)	Air Dried	F	F_ad_ppm
Crucible Swell No		CSN	CSN
Hardgrove Grindability Index		HGI	HGI
Carbon (daf, %)	Dry Ash Free	C	C_daf_pct
Hydrogen (daf, %)	Dry Ash Free	H	H_daf_pct
Nitrogen (daf, %)	Dry Ash Free	N	N_daf_pct
Sulphur (daf, %)	Dry Ash Free	S	S_daf_pct
Oxygen (daf, %)	Dry Ash Free	O	O_daf_pct
Carbonate (ad, %)	Air Dried	CO3	CO3_ad_pct
Carbon Dioxide (ad, %)	Air Dried	CO2	CO2_ad_pct
Pyritic Sulphur (ad, %)	Air Dried	PS	PS_ad_pct
Sulphates (ad, %)	Air Dried	SO4	SO4_ad_pct
Organic Sulphur (ad, %)	Air Dried	OS	OS_ad_pct

G3 Thermal Properties

Description	Basis	LogCheck Field Name	CoalLog Variable Name
Silica Dioxide (domf, %)	Dry Organic Matter Free	SiO2	SiO2_domf_pct
Aluminium Oxide (domf, %)	Dry Organic Matter Free	Al2O3	Al2O3_domf_pct
Ferric Oxide (domf, %)	Dry Organic Matter Free	Fe2O3	Fe2O3_domf_pct
Calcium Oxide (domf, %)	Dry Organic Matter Free	CaO	CaO_domf_pct
Magnesium Oxide (domf, %)	Dry Organic Matter Free	MgO	MgO_domf_pct
Sodium Oxide (domf, %)	Dry Organic Matter Free	Na2O	Na2O_domf_pct
Potassium Oxide (domf, %)	Dry Organic Matter Free	K2O	K2O_domf_pct
Titanium Dioxide (domf, %)	Dry Organic Matter Free	TiO2	TiO2_domf_pct
Manganese Oxide (domf, %)	Dry Organic Matter Free	Mn3O4	Mn3O4_domf_pct
Phosphorus Oxide (domf, %)	Dry Organic Matter Free	P2O5	P2O5_domf_pct
Sulfur Trioxide (domf, %)	Dry Organic Matter Free	SO3	SO3_domf_pct
Barium Oxide (domf, %)	Dry Organic Matter Free	BaO	BaO_domf_pct
Strontium Oxide (domf, %)	Dry Organic Matter Free	SrO	SrO_domf_pct
Zinc Oxide (domf, %)	Dry Organic Matter Free	ZnO	ZnO_domf_pct
Vanadium Pentoxide (domf, %)	Dry Organic Matter Free	V2O5	V2O5_domf_pct
Chromium Oxide (domf, %)	Dry Organic Matter Free	Cr2O3	Cr2O3_domf_pct
Nickel Oxide (domf, %)	Dry Organic Matter Free	NiO	NiO_domf_pct
Loss On Fusion (domf, %)	Dry Organic Matter Free	Loss	Loss_domf_pct
Undetermined (domf, %)	Dry Organic Matter Free	AAUnd	AA_Und_domf_pct
Total oxides (domf, %)	Dry Organic Matter Free	TotOx	Tot_Ox_domf_pct
Base - Acid Ratio		BAR	NC_BAR
<u>Reducing Atmosphere (°C)</u>			
Deformation Temperature		DefRed	Def_Red_degC
Sphere Temperature		SphRed	Sph_Red_degC
Hemisphere Temperature		HemiRed	Hemi_Red_degC
Flow Temperature		FlowRed	Flow_Red_degC
<u>Oxidising Atmosphere (°C)</u>			
Deformation Temperature		DefOx	Def_Ox_degC
Sphere Temperature		SphOx	Sph_Ox_degC
Hemisphere Temperature		HemiOx	Hemi_Ox_degC
Flow Temperature		FlowOx	Flow_Ox_degC
Abrasion Index (mgFe/kg)		Aindex	Abr_Index_mgFepKg
Hardgrove Grindability Index		HGI	HGI
Durham Cone handleability (s/kg)		DCH	DCH_spkg

G4 Coking Properties

Description	Basis	Logcheck Field Name	CoalLog Variable Name
<u>Gieseler</u>			
Test Date		GiesDate	Gies_Date
Maximum Fluidity (dd/min)		GiesMF	Gies_MF_ddpm
Log10 Maximum Fluidity		GiesLog	Gies_Log
Initial Softening Temp (°C)		GiesIST	Gies_IST_degC
Maximum Fluidity Temp (°C)		GiesMFT	Gies_MFT_degC
Resolidification Temp (°C)		GiesRST	Gies_RST_degC
Plastic Range (°C)		GiesPR	Gies_PR_degC
Fusion Temp (°C)		GiesFusTmp	Gies_Fusion_degC
Temp Fluidity 5ddpm (°C)		GiesFldTmp	Gies_5F_degC
Prop Final Fluid 1ddpm (dd/min)		GiesFF	Gies_FF_ddpm
<u>Dilatometer</u>			
Test Date		DilaDate	Dila_Date
Initial Softening Temp (°C)		DilaIST	Dila_IST_degC
Maximum Contraction Temp (°C)		DilaMCT	Dila_MCT_degC
Maximum Dilatation Temp (°C)		DilaMDT	Dila_MDT_degC
Maximum Contraction (%)		DilaMC	Dila_MC_pct
Maximum Dilatation (%)		DilaMD	Dila_MD_pct
Crucible Swell No		CSN	CSN
Gray-King: Test Date		GKTypeDate	GK_Type_Date
Gray-King: Coke Type		GKType	GK_Type
-			
<u>Sapozhnikov Plastometer</u>			
Test Date		SapozDate	Sapoz_Date
X (%)		SapozX	Sapoz_X_pct
Y (mm)		SapozY	Sapoz_Y_mm
<u>Rheology</u>			
Roga Index - Test Date		RogaDate	Roga_Date
Roga Index - Test Value		Roga	Roga
Caking (G) Index Test Date		GindexDate	G_Index_Date
Caking (G) Index		Gindex	G_Index
Dilatation - Coking Capacity (G-factor)		DilataCC	Dila_Coke_Capacity
Dilatation - Pencil weight (wet)		DilataPW	Dila_Pencil_Wgt_w_g
Dilatation - SD 2.5 (%)		DilataSD25	Dila_SD2_5
Sole Heated Oven - Expansion/Contraction (%)		SHOExpCon	SHO_Exp_Con_pct

G5 Trace Element Properties

Description	Basis	LogCheck Field Name	CoalLog Variable Name
Arsenic (ad, ppm)	Air Dried	As	As_ad_ppm
Silver (ad, ppm)	Air Dried	Ag	Ag_ad_ppm
Boron (ad, ppm)	Air Dried	B	B_ad_ppm
Barium (ad, ppm)	Air Dried	Ba	Ba_ad_ppm
Beryllium (ad, ppm)	Air Dried	Be	Be_ad_ppm
Bismuth (ad, ppm)	Air Dried	Bi	Bi_ad_ppm
Bromine (ad, ppm)	Air Dried	Br	Br_ad_ppm
Cadmium (ad, ppm)	Air Dried	Cd	Cd_ad_ppm
Cobalt (ad, ppm)	Air Dried	Co	Co_ad_ppm
Chromium (ad, ppm)	Air Dried	Cr	Cr_ad_ppm
Copper (ad, ppm)	Air Dried	Cu	Cu_ad_ppm
Gallium (ad, ppm)	Air Dried	Ga	Ga_ad_ppm
Germanium (ad, ppm)	Air Dried	Ge	Ge_ad_ppm
Mercury (ad, ppm)	Air Dried	Hg	Hg_ad_ppm
Potassium (ad, ppm)	Air Dried	K	K_ad_ppm
Lithium (ad, ppm)	Air Dried	Li	Li_ad_ppm
Manganese (ad, ppm)	Air Dried	Mn	Mn_ad_ppm
Molybdenum (ad, ppm)	Air Dried	Mo	Mo_ad_ppm
Sodium (ad, ppm)	Air Dried	Na	Na_ad_ppm
Nickel (ad, ppm)	Air Dried	Ni	Ni_ad_ppm
Lead (ad, ppm)	Air Dried	Pb	Pb_ad_ppm
Rubidium (ad, ppm)	Air Dried	Rb	Rb_ad_ppm
Antimony (ad, ppm)	Air Dried	Sb	Sb_ad_ppm
Selenium (ad, ppm)	Air Dried	Selen	Se_ad_ppm
Tin (ad, ppm)	Air Dried	Sn	Sn_ad_ppm
Strontium (ad, ppm)	Air Dried	Sr	Sr_ad_ppm
Tellurium (ad, ppm)	Air Dried	Te	Te_ad_ppm
Thorium (ad, ppm)	Air Dried	Th	Th_ad_ppm
Titanium (ad, ppm)	Air Dried	Ti	Ti_ad_ppm
Thallium (ad, ppm)	Air Dried	Tl	Tl_ad_ppm
Uranium (ad, ppm)	Air Dried	U	U_ad_ppm
Vanadium (ad, ppm)	Air Dried	V	V_ad_ppm
Zinc (ad, ppm)	Air Dried	Zn	Zn_ad_ppm
Zirconium (ad, ppm)	Air Dried	Zr	Zr_ad_ppm
Total Minerals (ad, %)	Air Dried	TrElMin	TrEl_Minerals_ad_pct

G6 Petrography Properties

Description	Basis	LogCheck Field Name	CoalLog Variable Name
Petrography Test Date		PetroDate	Petro_Date
Light Transmittance (%)		LightTrans	Light_Trans_pct
Coke (%)		Coke	Coke_pct
Minerals (%)		PetroMin	Petro_Minerals_pct
Oxidized Coal (%)		CoalOx	Coal_Ox_pct
Contaminants (%)		Contam	Contam_pct
Mesophase (%)		Mesophase	Mesophase_pct
Counted Points		Count	Maceral_No
Vitrinite Group (%)		Vitr	Vitrinite_pct
Telovitrinite SubGroup (%)		Telovitr	Telovitrinite_pct
Textinite (%)		Text	Textinite_pct
Texto-ulminite (%)		TextoUlm	Texto_Ulminite_pct
Eu-ulminite (%)		EuUlm	Eu_Ulminite_pct
Telocollinite (%)		Telocoll	Telocollinite_pct
Detrovitrinite SubGroup (%)		Detrovitr	Detrovitrinite_pct
Attrinite (%)		Attr	Attrinite_pct
Densinite (%)		Dens	Densinite_pct
Desmocollinite (%)		Desmocoll	Desmocollinite_pct
Gelovitrinite SubGroup (%)		Gelovitr	Gelovitrinite_pct
Corpogelinite (%)		Corpogel	Corpogelinite_pct
Porigelinite (%)		Porigel	Porigelinite_pct
Eugelinite (%)		Eugel	Eugelinite_pct
Liptinite Group (%)		Lipt	Liptinite_pct
Sporinite (%)		Spor	Sporinite_pct
Cutinite (%)		Cut	Cutinite_pct
Resinite (%)		Res	Resinite_pct
Liptodetrinite (%)		Liptodetr	Liptodetrinite_pct
Alginite (%)		Alg	Alginite_pct
Suberinite (%)		Suber	Suberinite_pct
Fluorinite (%)		Fluor	Fluorinite_pct
Exsudatinite (%)		Exsudat	Exsudatinite_pct
Bituminite (%)		Bitum	Bituminite_pct
Inertinite Group (%)		Inert	Inertinite_pct
Telo-inertinite SubGroup (%)		Teloinert	Teloinertinite_pct
Fusinite (%)		Fus	Fusinite_pct
Semifusinite (%)		Semifus	Semifusinite_pct

Description	Basis	LogCheck Field Name	CoalLog Variable Name
Semifusinite Reactive (%)		Semifus_Re	Semifusinite_Re_pct
Funginite (%)		Fung	Funginite_pct
Detro-inertinite SubGroup (%)		Detroinert	Detroinertinite_pct
Inertodetrinite (%)		Inertodetr	Inertodetrinite_pct
Micrinite (%)		Micr	Micrinite_pct
Gelo-inertinite SubGroup (%)		Geloinert	Geloinertinite_pct
Macrinite (%)		Macr	Macrinite_pct

G7 Carbonisation Testing Properties

Description	Basis	LogCheck Field Name	CoalLog Variable Name
<u>Coke Strength after Reaction</u>			
Test Date		CSRDate	CSR_Date
Test Value		CSR	CSR
<u>Coke Reactivity Index</u>			
Test Date		CRIDate	CRI_Date
Test Value		CRI	CRI
<u>Small Scale Coke Oven Test</u>			
Coke Yield Test Date		SSCOYldDt	SSCO_Yld_Date
Coke Yield (%)	DRY	SSCOYld	SSCO_Yld_d_pct
Coke Yield 7kg (%)	DRY	SSCOYld7kg	SSCO_Yld_7kg_d_pct
Coke Final Temp (°C)		SSCOFnITmp	SSCO_Final_Temp_degC
<u>ASTM Tumbler Test</u>			
Hardness - +6.3mm square-hole - 1400 revs (%)		CokeHard	Coke_Hardness_pct
Stability - +25mm square-hole - 1400 revs (%)		CokeStb	Coke_Stability_pct
<u>Drum Test</u>			
IRSID Index 10 - +20mm round-hole - 500 revs (%)		IRSID20	IRSID_20_pct
IRSID Index 10 - +40mm round-hole - 500 revs (%)		IRSID40	IRSID_40_pct
Micum Index 10 - +10mm round-hole - 100 revs (%)		Micum10	Micum_10mm_pct
Micum Index 30 - +30mm round-hole - 100 revs (%)		Micum30	Micum_30mm_pct
Micum Index 40 - +40mm round-hole - 100 revs (%)		Micum40	Micum_40mm_pct
<u>JIS</u>			
Index 150 - +15mm square-hole - 150 revs (%)		JISDrum150	JIS_Drum_150r_pct
Index 30 - +15mm square-hole - 30 revs (%)		JISDrum30	JIS_Drum_30r_pct
<u>JIS Coke Tumbler Test</u>			
+15mm - 150 revs (%)		JIS150r15	JIS_CTT_150r15mm_pct
+25mm - 150 revs (%)		JIS150r25	JIS_CTT_150r25mm_pct
+50mm - 150 revs (%)		JIS150r50	JIS_CTT_150r50mm_pct
+15mm - 30 revs (%)		JIS30r15	JIS_CTT_30r15mm_pct
+25mm - 30 revs (%)		JIS30r25	JIS_CTT_30r25mm_pct
+50mm - 30 revs (%)		JIS30r50	JIS_CTT_30r50mm_pct
<u>Shatter Index 10mm</u>			
+10mm square-hole (%)		SI10	Shatter_10mm_pct
+40mm square-hole (%)		SI40	Shatter_40mm_pct
<u>Carbonization</u>			
Test Date		CbDate	Carb_Date
Conditions - Moisture in Charge (%)		CbMoist	Carb_Moist_pct

Description	Basis	LogCheck Field Name	CoalLog Variable Name
Conditions - < 3.35 mm (%)	DRY	Cb335	Carb_3_35mm_pct
Conditions - ASTM Bulk Density (kg/m ³)		CbBD	Carb_ASTM_BD_kgpm3
Conditions - Charge Width (mm)		CbCW	Carb_Chg_Wdth_mm
Results - Coke Yield (%)		CbCkYld	Carb_Coke_Yield_pct
Results - Coking rate to 900°C (mm/h)		CbRate900	Carb_Rate_900_mmph
Results - Coking rate to Push (mm/h)		CbRatePush	Carb_Rate_Push_mmph
Results - Final Centre Temp (°C)		CbFCT	Carb_FC_Temp_degC
Conditions - Initial Wall Temp (°C)		CbIWT	Carb_IW_Temp_degC
Results - Max wall pressure (kPa)		CbMWP	Carb_MW_Press_kPa
Results - Shoulder Pressure (kPa)		CbSP	Carb_Shldr_Press_kPa
Results - Max gas pressure (kPa)		CbMGP	Carb_MG_Press_kPa
Conditions - Net Wet Charge Density (g/cm ³)		CbNWCD	Carb_NWC_Dens_gpcm3
Conditions - Oven Dry Bulk Density (g/cm ³)		CbODBD	Carb_ODB_Dens_gpcm3
Coke Apparent Relative Density (g/cm ³)		ARDCoke	ARD_Coke_gpcm3