software AG

Natural Engineer

Utilities for Windows

Version 9.1

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ADABAS & NATURAL

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ABOUT THIS MANUAL

Purpose of this manual

This manual contains the Utilities for Natural Engineer.

It describes the various utility options available within Natural Engineer, which include:

- Automating the execution of Natural Engineer processes using the Task Scheduler option.

- Examine differences between Natural, Cobol or JCL objects between two or three libraries, differences between object save/stow date and time stamps between two or three Natural libraries, and examine differences between up to three PC files, using the Compare option.

- Convert Natural Reporting mode objects into Natural Structured mode objects using the Mode Conversion option.

- Review maintenance changes within objects using the Change Management Tracking option.

- View the Keywords that have been entered into Natural Engineer using the Keyword Catalogue.

- Apply Global and Application specific Coding Standards to Natural Objects.

- Export Natural Engineer data to ARIS.

- Add Business Terms to DDM fields.

Target Audience

The target audience for this manual is intended to be any User of Natural Engineer at any level of experience.

Typographical Conventions used in this manual

The following conventions are used throughout this manual:

UPPERCASE TIMES	Commands, statements, names of programs and utilities referred to in text paragraphs appear in normal (Times) uppercase.
`UPPERCASE BOLD COURIER`	In illustrations or examples of commands, items in uppercase bold courier must be typed in as they appear.
< >	Items in angled brackets are placeholders for user-supplied information. For example, if asked to enter <file number>, you must type the number of the required file.
<u>Underlined</u>	Underlined parts of text are hyperlinks to other parts within the online source manual. This manual was written in MS-Word 97 using the "hyperlink" feature.

The following symbols are used for instructions:

$\Rightarrow$	Marks the beginning of an instruction set.
□	Indicates that the instruction set consists of a single step.
1.	Indicates the first of a number of steps.

How this manual is organized

This manual is organized to reflect all the Utilities options of Natural Engineer in the following chapters:

Chapter	Contents
1	Describes the Task Scheduler option, which provides the facility to automate the execution of the various Environment, Analysis and Modification options. This provides the facility to execute long-running batch tasks in an unattended mode to minimize the impact on machine and human resources.
2	Describes the Compare option, which provides the facility to review differences between objects across two or three Natural, Cobol or JCL libraries, differences between object save/stow date and time stamps across two or three Natural libraries, differences between up to three PC files. The results are presented on a single screen utilizing customizable color code markings to distinguish between the differences. For Natural object compares, changes can be applied to the Base object from Compare 1 and/or Compare 2 libraries and then saved to create a new Base version.
3	Describes the Mode Conversion option, which provides the facility to convert Natural Reporting mode objects into Natural Structured mode objects.
4	Describes the Change Management Tracking (CMT) option, which provides the facility to review audit trail records of changes applied to individual objects within Natural Engineer.
5	Describes the Keyword Catalogue option, which provides the facility to identify related items within the Natural Engineer Repository by defining keywords..
6	Describes the Architectural Governance option which provides the facility to apply global or application specific coding standards to Natural Objects.
7	Describes the Natural Engineer ARIS Interface *Note: This is an add-on to Natural Engineer and requires a separate license key.*
8	Describes the Business Term Definitions option which allows the specification of Business terms to DDM Fields. *Note: This is an add-on to Natural Engineer and requires a separate license key.*

Terminology

This section offers some of the terms that are specific to the Natural Engineer product.

Note: Familiarity is assumed with the general terminology of Natural, Adabas, Microsoft and Mainframe operating systems.

Analysis

The Analysis process of Natural Engineer searches application data within the Natural Engineer Repository, according to specified Search Criteria and generates reports on the search results.

Application

An Application is a library or group of related libraries, which define a complete Application. In Natural Engineer, the Application can have a one-to-one relationship with a single library of the same name, or a library of a different name, as well as related steplibs. The Application refers to all the source code from these libraries, which Natural Engineer loads into the Repository.

Browser

An Internet Browser such as Microsoft Internet Explorer or Netscape.

Category

Categories in Natural Engineer specify whether and how a Modification is applied to the Natural code. Valid categories are: Automatic change, Manual change, Reject the default Modification, No change to the data item, and the data item is in Generated Code.

A category is further broken down according to type of change (for example: Keyword, Literal, Data Item, Database Access, Definition).

Cobol

Abbreviation of Common Business Orientated Language. A programming language.

Cobol Link

A Cobol Link is the link between the individual Cobol modules and the executable Cobol program referenced in the JCL object.

Consistency

An option in the Analysis process that causes Natural Engineer to trace an Impact through the code, using left and right argument resolution to identify further code impacted by the code found.

Database Access Definition

A collective term used to identify DDMs, SQL Tables or Predict User Views.

Data Item

A collective term used for any data fields within a programming object. These can be user-defined variables, DDM fields or System Variables. It is inter-changeable with the term 'variable'.

Environment

The Environment process is the means by which Natural Engineer generates a structured view of the application code in the Natural Engineer Repository. This provides application analysis reports and inventory information on the application and is used as the basis for Impact Analysis.

Exception

An Exception is an Item identified as impacted that does not require a Modification. Where there are a few similar Exception Items, they can be treated as Exceptions, and rejected in the Modification review process. Where there are many similar (therefore not Exceptions), consideration should be given to changing the Search Criteria so they are not identified as impacted in the first place.

Generated Code

This is code which has been generated by a Natural code generator, such as Construct, and which is not normally modified directly in the Natural editor.

Impact

An Impact is an instance of a Natural code Item; e.g., data item or statement (a "hit" scored by the Analysis process) that matches the defined Search Criteria used in the Analysis process.

Iteration

An Iteration is one examination cycle of a field identified according to the specified Search Criteria. For example, one Iteration is reading the field right to left. Multiple Iterations are performed when the option of 'Consistency' or Multi Search is requested for Analysis, and Natural Engineer performs as many Iterations as necessary to exhaust all possibilities of expressing and tracing the field, and can be limited by a setting in the NATENG.INI file.

JCL

Job Control Language.

JCL object

A JCL object is a collection of Job Control statements in the order which they are to be executed in a mainframe batch environment. Commonly referred to as JCL.

Library

A single library of source code, which exists in the Natural system file.

Modification

A Modification is a change suggested or made to an object or data item resulting in the required compliance of that object or data item. Modifications in Natural Engineer are classified according to Category and Type.

Natural Engineer Utilities

Refactoring

Improving a computer program by reorganizing its internal structure without altering its external behavior.

Soft Link

A Soft Link is where a link between two objects has been defined using an alphanumeric variable rather than a literal constant.

TLM

Text Logic Members are used to contain the code required to support inclusion of common code into the application. An example of this is the code to include into an application before updating a database.

Type

The Type of Modification available, for example: Data Item, Keyword and Literal.

Variable

A collective term used for any data fields within a programming object. These can be user-defined variables, DDM fields or System Variables. It is inter-changeable with the term 'data item'.

Related Literature

The complete set of Natural Engineer manuals consists of:

1   **Natural Engineer Concepts and Facilities (NEE91-006ALL)**

   The Concepts and Facilities manual describes the many application systems problems and solutions offered by Natural Engineer, providing some guidelines and usage that can be applied to Natural applications.

2   **Natural Engineer Release Notes (NEE91-008ALL)**

   The Release Notes describe all the information relating to the new features, upgrades to existing functions and documentation updates that have been applied to Natural Engineer.

3   **Natural Engineer Installation Guide for Windows (NEE91-010WIN)**
   Natural Engineer Installation Guide for Mainframes(NEE91-010MFR)
   Natural Engineer Installation Guide for Unix (NEE91-010UNX)

   The Installation Guide provides information on how to install Natural Engineer on PC, Unix and mainframe platforms.

4   **Natural Engineer Administration Guide (NEE91-040WIN)**
   Natural Engineer Administration Guide (NEE91-040MFR)
   Natural Engineer Administration Guide (NEE91-040UNX)

   The Administration Guide provides information on all the various control settings available to control the usage of the different functions within Natural Engineer.

5   **Natural Engineer Application Management (NEE91-020WIN)**
   Natural Engineer Application Management (NEE91-020MFR)
   Natural Engineer Application Management (NEE91-020UNX)

   The Application Management manual describes all the functions required to add Natural applications into the Repository.

6   **Natural Engineer Application Documentation (NEE91-022WIN)**
   Natural Engineer Application Documentation (NEE91-022MFR)
   Natural Engineer Application Documentation (NEE91-022UNX)

   The Application Documentation manual describes all the available functions to document a Natural application within the Repository. These functions will help enhance / supplement any existing systems documentation such as BSD / CSD / Specifications etc.

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7   **Natural Engineer Application Analysis and Modification (NEE91-023WIN)**
       Natural Engineer Application Analysis and Modification (NEE91-023MFR)
       Natural Engineer Application Analysis and Modification (NEE91-023UNX)

The Application Analysis and Modification manual describes all the available functions to carry out analysis of Natural applications; including basic keyword searches. The modification process is described and detailed to show how it can be applied to modify single selected objects within a Natural application, or the entire Natural application in one single execution.

8   **Natural Engineer Application Restructuring (NEE91-024WIN)**
       Natural Engineer Application Restructuring (NEE91-024MFR)
       Natural Engineer Application Restructuring (NEE91-024UNX)

The Application Restructuring manual describes the analysis and modification functionality required to carryout some of the more sophisticated functions such as Object Builder.

9   **Natural Engineer Utilities (NEE91-080WIN)**
       Natural Engineer Utilities (NEE91-080MFR)
       Natural Engineer Utilities (NEE91-080UNX)

The Utilities manual describes all the available utilities found within Natural Engineer and, when and how they should be used.

10   **Natural Engineer Reporting (NEE91-025ALL)**

The Reporting manual describes each of the reports available in detail, providing report layouts, how to trigger the report and when the report data becomes available. The various report-producing mediums within Natural Engineer are also described.

11   **Natural Engineer Batch Processing [Mainframes] (NEE91-026MFR)**
       Natural Engineer Batch Processing [Unix] (NEE91-026UNX)

The Batch Processing manual describes the various batch jobs (JCL/Scripts) and their functionality.

12   **Natural Engineer Messages and Codes (NEE91-060ALL)**

The Messages and Codes manual describes the various messages and codes produced by Natural Engineer.

13   **Natural Engineer Web Interface Installation and Configuration Guide(NEA84-010ALL)**

The Web Interface Installation and Configuration Guide provides information on how to install and configure the Natural Engineer Web Interface.

14   **Natural Engineer Advanced Services (NEE91-017WIN)**
       Natural Engineer Advanced Services (NEE91-017MFR)
       Natural Engineer Advanced Services (NEE91-017UNX)

The Advanced Services manual describes various advanced options such as the Refactoring of Natural application source code with Natural Engineer, conversion of applications for Natural for Ajax, Business Rule processing and Data Masking.

1

TASK SCHEDULER

Chapter Overview

This chapter describes the Task Scheduler option available from the Utilities menu. The Task Scheduler option is used to manage and execute automatically Natural Engineer Environment, Impact and Modification tasks. These tasks will execute in unattended batch mode.

The topics covered in this chapter are:

1. Task Scheduler overview
2. Task Scheduler Configuration
3. Task Scheduler Summary window
4. Task Details window

Task Scheduler Overview

The Task Scheduler option allows you to specify tasks to be executed at a specified date and time. These tasks may be scheduled to run with a frequency of once, daily, weekly or monthly and may also have dependencies on other defined tasks to allow a series of tasks to run in a controlled sequence.

Once the task or tasks have been specified, they are ready for execution and will be triggered by the Windows Scheduled Tasks process. This must be invoked in order for the tasks to be released for execution (if their individual specifications have been attained).

Each task execution will have a history log entry available showing the execution events for that task. Any tasks that have experienced problems during execution will be highlighted with a status of 'Error' in the Task Scheduler Summary screen.

Using the Task Scheduler

The Task Scheduler allows long executing tasks for individual applications to be scheduled to run overnight or at weekends, in order that the normal working day is less disrupted waiting on these tasks to complete.

For example: If an extract and load of a very large application is required, where the extract and load processes are likely to take several hours each to complete, then a task can be scheduled to start executing at the end of the normal working day (i.e., overnight). The task can then be reviewed the next working day.

Using the Frequency Task option

A frequency can be set for any tasks that are to be repeated many times. This means a task need only be specified the once, but with the appropriate frequency set, it will execute each time it is initiated via the Task Scheduler.

For example: Natural Engineer is being used to maintain an application where various modifications are being applied using the modification options of Natural Engineer. The application has been specified within Natural Engineer to apply all the modifications to the base application library. To maintain integrity of the modified application on the Repository, the Extract Source Code function with Synchronize Source Code option activated requires running once a week. A task would be set up with the correct details specified to run Extract Source Code with a frequency of 'Weekly' set.

Using the Dependency Task option

Task dependencies can be specified, so that tasks are only initiated provided the previous task has completed.

For example: Task 0001 is specified to run an Extract Source Code function for an application. A second task, 0002, is specified to run the Load Repository function for the same application with a dependency of task 0001 set. At run time, task 0002 will not execute until task 0001 has completed.

Task Scheduler Configuration

In order to utilize the Task Scheduler functionality, some basic configuration tasks are required. These should be completed before attempting to use the Task Scheduler.

Natural Parameter File for Task Scheduler

A new Natural parameter file TSKSCHED needs to be added to your Natural runtime environment. This can be done by copying the installed Natural Engineer parameter file: NEEPARM and renaming it.

Update the parameter file TSKSCHED, to remove the startup program used to populate the Natural system variable *STARTUP.

Natural Engineer supplied BAT Files

Natural Engineer comes supplied with several default BAT files that are installed during the Natural Engineer installation process for use with the Task Scheduler. These are located in the BAT directory of the Natural Engineer installation.

- SAMPLE bulkreports.bat
- SAMPLE delapp.bat
- SAMPLE ext-load-imp.bat
- SAMPLE extract.bat
- SAMPLE impact.bat
- SAMPLE impfld.bat
- SAMPLE load.bat
- SAMPLE neelod.bat
- SAMPLE remedyall.bat
- SAMPLE tsksched.bat

Note: Other BAT files also reside in this location e.g., for PDF report generation.

Each BAT file needs to be modified as follows: NB: Examples are for installations under Natural 6.3:

1. Change the location path to point the correct location of the Natural executable in your runtime environment. The default value is:

"c:\program files\software ag\natural\6.3\bin\natural.exe"

2. Change the location path of the information messages from the Task Scheduler. The default value is:

c:\PROGRAMDATA\SOFTWARE AG\NATURAL ENGINEER\DATA

3. Save the changes to a new BAT file removing "SAMPLE" from the name For example:

SAMPLE extract.bat should be changed and saved as **extract.bat**.

Note: Task Scheduler utilizes pre-defined BAT file names.

The user can change the directory where the BAT files are located by modifying the BAT parameter in the [NATENG] section of the NATENG.INI file.

Note: For more information on the NATENG.INI file parameter BAT refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual

Windows Scheduled Tasks

The Task Scheduler tasks are initiated using the Windows Scheduled Tasks function. A task needs to be created to run the "tsksched.bat" file at set intervals, which will check to see if any tasks are available.

Once invoked, the "tsksched.bat" file will interrogate the Repository looking for any tasks that are ready for execution, i.e., any tasks that have a date and time stamp which is less than or equal to the date and time when "tsksched.bat" file is executing.

Create a task to run "tsksched.bat" using the Windows Scheduled Tasks function, with the following key settings:

1. Create a meaningful task name.

For example: NEE Task Scheduler.

2. The run path name for "tsksched.bat"

"X:\Natural Engineer\BAT\tsksched.bat"

where X is the directory where Natural Engineer was installed to.

3. Set up a Schedule for the task to run.

For example:

Start every day at 06:00, ending at 18:00 and repeat the task every 30 minutes.

This will result in the Windows Scheduled task running every 30 minutes between 06:00 and 18:00, when it will check for any Natural Engineer tasks that meet all the various criteria. Any tasks that are not ready to run will have to wait for the next scheduled run of Windows Scheduled task.

Task Scheduler Summary Window

The Task Scheduler option is accessed using the following menu navigation: Utilities➔ Task Scheduler. When this option is selected, the Task Scheduler Summary screen is displayed.

The following Figure 1-1 illustrates the Task Scheduler Summary screen.
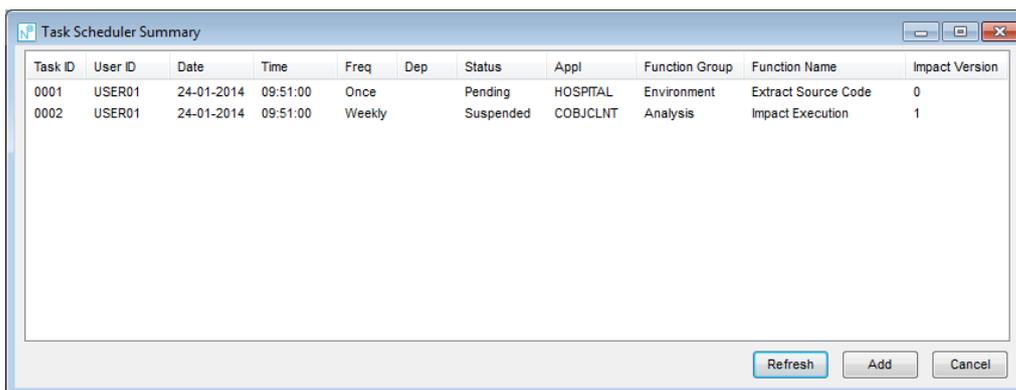
Figure 1-1 Task Scheduler Summary screen

SCREEN ITEMS   DESCRIPTION

Each task is displayed in a single row on the Task Scheduler Summary screen. A task can be selected for update by using the left hand mouse button with a double click. Each task line consists of the following columns:

Task Id   The task id that has been assigned for the task. This is an internally generated sequential number starting from 0001. Deleted task numbers are reused.

User Id   The user id of the person that added the task.

Date   The task execution start date specified in the Task Scheduler Details screen.

SCREEN ITEMS	DESCRIPTION
Time	The task execution start time specified in the Task Scheduler Details screen.
Freq	The task frequency. This controls the amount of executions for the task. Available frequencies are:
	Once Task will execute once only.
	Daily Task will execute daily at the same time based on the original date and time specified.
	Weekly Task will execute weekly at the same time based on the original date and time specified.
	Monthly Task will execute monthly at the same time based on the original date and time specified.
Dep	The task's dependency on other scheduled tasks. This will contain the task id of the task that needs to complete before this task will execute.
Status	The task status.
	Available statuses:
	' ' Task is waiting for the specified start date and time, i.e., a date and time have been set in the future.
	Pending Task has missed the specified date and time and is ready for execution the next time the Initiator is invoked.
	Error Task has experienced an error during execution.
	Complete Task has completed successfully.
	In Progress Task is currently executing.
	Suspended Task has been suspended and will not be released for execution until the Release option is used from the context menu.
Appl	The name of the application being used by the task.
Function Group	The main function area being used by the task.
	Available function groups are:
	▪ **Environment**
	▪ **Analysis**
	▪ **Modification**

SCREEN ITEMS	DESCRIPTION
Function Name	The name of the sub-function within the main function.
	Available sub-functions are:
	For the function group Environment: ▪ **Extract Source Code** ▪ **Load Repository** ▪ **Extract & Load** ▪ **Extract, Load & Impact** ▪ **Environment Bulk Reports**
	For the function group Analysis: ▪ **Impact Execution** ▪ **Impact Bulk Reports**
	For the function group Modification: ▪ **Modify All** ▪ **Modification Bulk Reports**
Impact Version	The impact version number being used by the task. This is only applicable to function names: Impact Execution and Modify All. All other tasks will show '00'.

BUTTON NAME	DESCRIPTION
Refresh	Refreshes the Task Scheduler Summary screen updating the task status values.
Add	Invoke the Task Scheduler Details screen.
Cancel	Cancel the Task Scheduler Summary process and return back to the main Natural Engineer screen.

Task Scheduler Summary Context Menu

Each task line on the Task Scheduler Summary screen can be selected and a context menu of options is available by using the right hand mouse button with a single click.

The following Figure 1-2 illustrates the Task Scheduler Summary screen context menu.
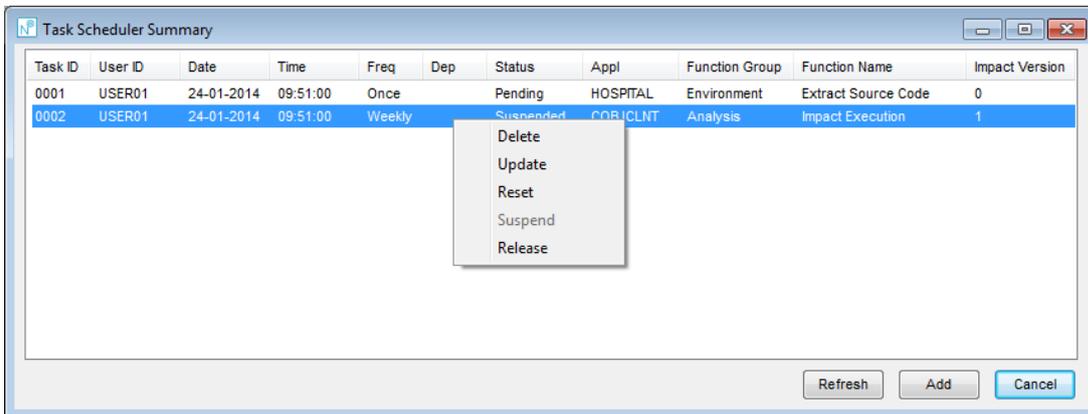

Figure 1-2 Task Scheduler Summary screen context menu

CONTEXT MENU ITEM	DESCRIPTION
Delete	Delete the selected task.
Update	Invoke the Task Scheduler Details screen to update the selected task details.
Reset	Reset the status of the selected task ready for re-execution.
Suspend	Suspend the selected task from any execution.
Release	Release the suspended task.
View Log File	Shows the Task Scheduler Log File.
	Note: This is only available when running in a Remote Development Environment.

Task Scheduler Details Window

The Task Scheduler Details window is where each task can be specified and added to the Task Scheduler. This screen is also used to update the details for a task.

The Task Scheduler Details screen can be invoked by using the '**Add**' button on the Task Scheduler Summary screen, by selecting a task and then using the Task Scheduler Summary context menu update option or by selecting a task and using the left hand mouse button with a double click.

The following Figure 1-3 illustrates the Task Scheduler Details screen.
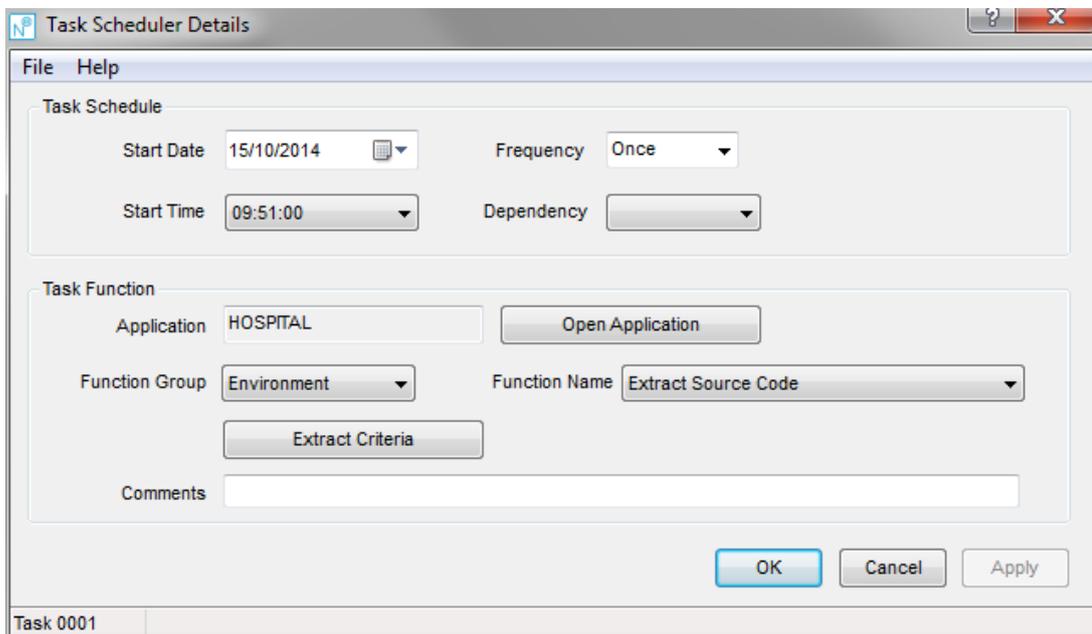
Figure 1-3 Task Scheduler Details screen

MENU ITEMS	OPTIONS	DESCRIPTION
File	**Exit**	Exit the Task Scheduler Details screen and return back to the Task Scheduler Summary screen.
Help		Invoke the Task Scheduler Details help.

SCREEN ITEMS	DESCRIPTION
Task Schedule group:	
Start Date	The date the task is to execute. Use the selection boxes to select a month and year. The days are selected from the calendar. Changing the month and/or year will result in the calendar changing to the new settings. The default date will be the current date when the Task Scheduler Details screen was invoked.
Start Time	The time the task is to execute. Use the selection box to select the time required. The default time will be the current time when the Task Scheduler Details screen was invoked.
Frequency	The frequency that is to be applied to the task. This controls the amount of executions for the task. The following frequencies are available:

	Once	Task will execute once only.
	Daily	Task will execute daily at the same time based on the original date and time specified.
	Weekly	Task will execute weekly at the same time based on the original date and time specified.
	Monthly	Task will execute monthly at the same time based on the original date and time specified.

SCREEN ITEMS	DESCRIPTION
Dependency	Select a task id on which this task is to be dependent. Task ids available will be the current tasks available in the Task Scheduler Summary screen.
Task Function group:	
Application	The name of the application.
Function Group	The main function area being used by the task.

Available function groups are:
- **Environment**
- **Analysis**
- **Modification**

SCREEN ITEMS	DESCRIPTION
Function Name	The name of the sub-function within the main function.
	Available sub-functions available are:
	For the function group Environment:
	▪ **Extract Source Code**
	▪ **Load Repository**
	▪ **Extract & Load**
	▪ **Extract, Load & Impact**
	▪ **Environment Bulk Reports**
	For the function group Analysis:
	▪ **Impact Execution**
	▪ **Impact Bulk Reports**
	For the function group Modification:
	▪ **Modify All**
	▪ **Modification Bulk Reports**
Comments	Up to 80 characters of text can be entered to serve as a comment for the task. These are treated as information only.

BUTTON NAME	DESCRIPTION
Task Function group:	
Open Application	Invoke the Open Application process.
	An existing application may be selected. Upon returning to the Task Scheduler Details screen, the selected application will appear in the application output box (left of this button).
Extract Criteria	Invoke the Extract and Load Selection Criteria process.
	Extract and Load selection criteria can be reviewed, updated or added and saved.
	Note: The criteria specified here are only relevant to the task for which they have been defined. The task criteria are independent of the main application extract selection criteria defined using the Environment ➔*Extract and Load Selection Criteria option.*

BUTTON NAME	DESCRIPTION
Impact Version - nn	Invoke the Impact Criteria process.
	From here new Impact Versions can be created or an existing Impact Versions selected. Additionally, Impact Criteria can be reviewed, updated or added and saved.
	After selection, the button text will be updated to show the Impact Version selected.
	This button is only available for the following function names:
	▪ **Extract, Load & Impact**
	▪ **Impact Execution**
	▪ **Impact Bulk Reports**
	▪ **Modify All**
	▪ **Modification Bulk Reports**
	Note: The impact versions available are the same as for the application when using the Analysis ➜Impact Criteria option.

Task Scheduler Details screen:

OK	Save changes and close the current screen.
Cancel	Cancel the Task Scheduler Details process and return back to the Task Scheduler Summary screen.
Apply	Save changes and retain the current screen.
	Note: This button is only enabled if any changes have been made.

STATUS BAR ITEM	DESCRIPTION
The Task Scheduler Details status bar is divided into 2 individual panes.	
Pane 1	The currently selected Task id.
Pane 4	Any Task Scheduler Details processing messages.

2

COMPARE

Chapter Overview

This chapter describes the Compare option available from the Utilities menu. The Compare option provides the facility to:

- Compare Natural, COBOL or JCL objects between either two or three libraries.

- Compare Natural libraries at library level, to review differences in save/stow date and time stamps, between either two or three libraries.

- Compare two or three PC files.

The following topics are covered:

1. Compare Overview

2. Compare Selection window

3. Compare Results window

Compare Overview

The Compare option provides three types of compare functionality:

- Object Compare

- Natural Library Compare

- PC File Compare

It is possible to utilize a third-party compare utility, such as KDIFF, if required. To do this the EXTERNAL= setting in the [GENCOMPARE] group of the initialization file should be set. If a third party compare utility is used then the PC File Compare option is unavailable and only Natural Objects and Libraries may be compared.

Note: To use a third-party compare utility workfiles 22, 23 and 24 need to be defined as UNFORMATTED, UTF-8 in the Natural Parameter Module used to invoke Natural Engineer.

Note: For more information on the NATENG.INI file parameter EXTERNAL refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.

Object Compare

The object compare option provides the facility to compare object source code for programming languages Natural, Cobol and JCL.

The object compare process is initiated by specifying the language type and the libraries and objects to be used. If two libraries are specified then a two-way compare will be initiated. This will compare the objects on the base library against the objects in the Compare 1 library. If three libraries are specified then a three-way compare will be initiated. This will compare the objects on the base library against the objects in the Compare 1 library and the objects in the Compare 2 library.

Note: The three-way compare does not compare the Compare 1 and Compare 2 objects against each other.

The Base library and its objects are used to determine which objects are compared from the Compare 1 and Compare 2 libraries. Object names can be specified using full name, part name with wildcard (for a range of object names with the same prefix) or a wildcard range specified using '*' (asterisk) to compare all objects found in the Base library.

The Compare results are displayed in a single window, with the object code from each library listed side by side for easier reference. Each of the differences are highlighted using fully customizable color schemes. Reviewing all the differences between the objects can be quickly achieved using the scroll buttons, which step through difference by difference.

For Natural object compares, the Base object can be modified from the Compare Results screen, to incorporate any of the code from the Compare 1 and/or Compare 2 objects by using standard copy and paste functionality. Additionally user changes can also be applied to edit existing code lines and/or insert new lines in the Base object. These modifications to the Base object can then be saved to a Natural library.

Note: Modifications to Cobol and JCL objects is not available.

Natural Library Compare

Natural libraries at library level can be compared to review differences between object save/stow date and time stamps. Either two or three libraries can be specified to initiate either a two-way or three-way compARISon.

The Compare results are displayed in a single window with each row showing the object name, save date/time and catalog date/time. Each of the differences are highlighted using fully customizable color schemes. Reviewing all the differences between the libraries can be quickly achieved using the scroll buttons, which step through difference by difference.

Any objects highlighted for a difference in date and time stamp can be selected using a double click with the left hand mouse button to initiate a compare of the object source code. To facilitate easier navigation, this object compare is launched in a new window, retaining the Natural Library compare results window for further review/selection.

PC File Compare

PC files can be compared to review differences between them. Either two or three files can be specified to initiate either a two-way or three-way compARISon.

The Compare results are displayed in a single window with each row showing the records within the specified files. Each of the differences are highlighted using fully customizable color schemes. Reviewing all the differences between the files can be quickly achieved using the scroll buttons, which step through difference by difference.

Compare Selection Window

The Compare Selection screen allows you to specify the various criteria that are to be used for the Compare process. These include the Compare Options and Compare Selection details.

The Compare Selection screen is accessed using the following menu navigation: Utilities➔ Compare.

If Natural Engineer is running on the PC in a SPoD environment against a mainframe server and COBOL or JCL Object compare is selected then a different Compare Selections section will be displayed. See Compare Selections – COBOL and JCL via SPoD.

The following Figure 2-1 illustrates the Compare Selection screen.

Figure 2-1 Compare Selection screen

SCREEN ITEMS	DESCRIPTION

Compare Options group:

Compare Type	The type of compare required. Available options are:
	Object Compare Select this option to compare object source code. If selected then the Language Type options are enabled.
	Natural Library Compare Select this option to compare Natural libraries at library level. Language Type options are not available for this option.
	PC File Compare Select this option to compare PC files. Language Type options are not available for this option.
Language Type	The programming language required for a compare of object source code. Available options are:
	Natural Objects Select this option for Natural programming objects.
	Cobol Objects Select this option for Cobol programming objects.
	JCL Objects Select this option for JCL objects.
Skip Identical Objects	If the source date and time of an object matches between all of the libraries being compared then the object will not be processed in the compare if this option is set on.
	The default for this option is on.
	Note: This option is only available for Natural object compares.
Ignore Referbacks	If any refer backs using line numbers are present within the object code and this option is selected, then any differences are ignored. The Compare will replace any line numbers with '????'.
	The default for this option is off.
	Note: This option is only available for Natural object compares.
Include BOM in CompARISon files	If set on then the UTF-8 Unicode Character BOM (Byte Order Mark) will be passed to the external compare utility.
	Note: This option is only available if a third-party external compare utility is utilized .

SCREEN ITEMS   DESCRIPTION

Compare Selections group:

Note: For COBOL or JCL Object compare running on the PC in a SPoD environment against a mainframe server see [Compare Selections – COBOL and JCL via SPoD](#)*.*

The following selections apply to all Compare Types except PC File Compare.

Base Library	The name of the library you want to compare to.
	The library name can be typed in or selected by using the Base Library Selection button [….].
Compare 1 Library	The name of the first library you are comparing against the Base.
	The library name can be typed in or selected by using the Compare 1 Library Selection button [….].
Compare 2 Library	The name of the second library you are comparing against the Base.
	The library name can be typed in or selected by using the Compare 2 Library Selection button [….].
	If not specified, then a two-way compare will be invoked.
Base Object	The name of the object on the Base library to be compared.
	This can be typed in using full name, part name with wildcard or a wildcard range to include all objects. The wildcard is an '*' (asterisk).
	The object name can be typed in or selected by using the Base Object Selection button [….].
	If part name with wildcard or wildcard range is specified, then there is no requirement to specify either the Compare 1 or Compare 2 object names. Examples based on the HOSPITAL application:

XX001P01	Will compare object XX001P01 only.
XX022*	Will compare any object that matches the prefix specified.
	For the HOSPITAL application this would be XX022M01 and XX022P01 only.
*	Will compare all objects found on the Base library.

SCREEN ITEMS	DESCRIPTION
Compare 1 Object	The name of the object on the Compare 1 library to be compared against the Base object.
	This can be typed in using full name only. If omitted, then the object name specified in the Base object will be used.
	The object name can be typed in or selected by using the Compare 1 Object Selection button [….].
Compare 2 Object	The name of the object on the Compare 2 library to be compared against the Base object.
	This can be typed in using full name only. If omitted, then the object name specified in the Base object will be used.
	The object name can be typed in or selected by using the Compare 2 Object Selection button [….].

Note: No object selections are available for the Natural Library compare.

Base Sys. File Alias	The alias for the particular database number/file number combination where Natural System File for the Base library is located.
Base Dbid	The database number for the Natural System File where the Base library is located.
Base Fnr	The file number for the Natural System File where the Base library is located.
Compare 1 Sys. File Alias	The alias for the particular database number/file number combination where Natural System File for the Compare 1 library is located.
Compare 1 Dbid	The database number for the Natural System File where the Compare 1 library is located.
Compare 1 Fnr	The file number for the Natural System File where the Compare 1 library is located.
Compare 2 Sys. File Alias	The alias for the particular database number/file number combination where Natural System File for the Compare 2 library is located.
Compare 2 Dbid	The database number for the Natural System File where the Compare 2 library is located.
Compare 2 Fnr	The file number for the Natural System File where the Compare 2 library is located.

SCREEN ITEMS   DESCRIPTION

Note: The default values for all the Dbid and Fnr will be based on the run time environment being used. Dbid and Fnr selections are only available for Natural Object and Natural Library compares. If a System File Alias is chosen the Dbid and Fnr will be set to whatever settings the alias has. If a user wants to specify a different Dbid or Fnr then the settings may be overwritten manually.

Please see the Global Properties section of the Natural Engineer Administration Manual for further information on setting System File aliases.

The following selections apply to the Compare Type PC File Compare only.

Base	The name of the PC file you want to compare to. The PC file name can be typed in or selected by using the Browse button.
Compare 1	The name of the first PC file you are comparing against the Base. The PC file name can be typed in or selected by using the Browse button..
Compare 2	The name of the second PC file you are comparing against the Base. The PC file name can be typed in or selected by using the Browse button. If not specified, then a two-way compare will be invoked.

BUTTON NAME	DESCRIPTION

Compare Selections group:

Note: For COBOL or JCL Object compare running on the PC in a SPoD environment against a mainframe server see <u>Compare Selections – COBOL and JCL via SPoD</u>.

Note: The following selections apply to all Compare Types except PC File Compare.

Base Library Selection [….]	Invokes the General Selection screen, listing all the libraries available for the selected Base Dbid and Fnr.
Compare 1 Library Selection [….]	Invokes the General Selection screen, listing all the libraries available for the selected Compare 1 Dbid and Fnr.
Compare 2 Library Selection [….]	Invokes the General Selection screen, listing all the libraries available for the selected Compare 2 Dbid and Fnr.
Base Object Selection [….]	Invokes the General Selection screen, listing all the objects available for the selected library.
Compare 1 Object Selection [….]	Invokes the General Selection screen, listing all the objects available for the selected library.
Compare 2 Object Selection [….]	Invokes the General Selection screen, listing all the objects available for the selected library.

The following selections apply to the Compare Type PC File Compare only.

Base Browse	Invokes the standard Windows 'Open File' dialog, where the required PC file can be selected.
Compare 1 Browse	Invokes the standard Windows 'Open File' dialog, where the required PC file can be selected.
Compare 2 Browse	Invokes the standard Windows 'Open File' dialog, where the required PC file can be selected.

Compare Selection screen:

OK	Validates the input and then if no errors, invokes the Compare Results screen.
Cancel	Cancel the Compare Selection process and close the current screen.

Note: For more information on the General Selection screen refer to Chapter 2 in the Concepts and Facilities manual.

Compare Selections - COBOL or JCL via SPoD

When running on the PC in a SPoD environment against a mainframe server (z/OS only) a different Compare Selections screen is displayed to allow the selection of the mainframe COBOL or JCL datasets and objects and to build lists of the dataset contents if required.

The following Figure 2-1-1 illustrates the Compare Selection screen when running an Object Compare for COBOL or JCL objects using a remote development environment.
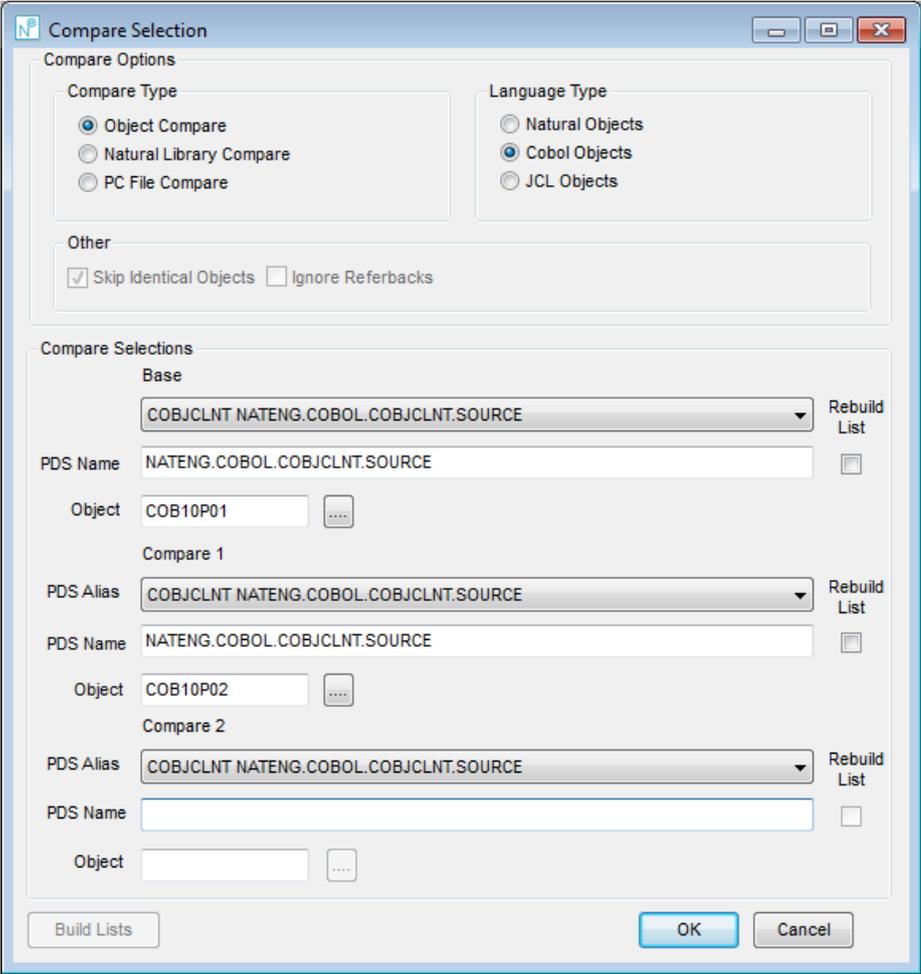
Figure 2-1-1 Compare Selection screen for COBOL/JCL using remote environment

SCREEN ITEMS   **DESCRIPTION**

Compare Selections group:

Note: The following selections apply to all COBOL and JCL Object Compares when using a remote development environment.

Base PDS Alias	The list of aliases/datasets that have been pre-defined in the Global Properties PDS Aliases screen.
Compare 1 PDS Alias	The list of aliases/datasets that have been pre-defined in the Global Properties PDS Aliases screen.
Compare 2 PDS Alias	The list of aliases/datasets that have been pre-defined in the Global Properties PDS Aliases screen.

Please see the Global Properties section of the Natural Engineer Administration Manual for further information on setting PDS aliases.

Base PDS Name	The name of the dataset you want to compare to.
	The dataset name can be typed in or selected from the Base PDS Alias list.
Compare 1 PDS Name	The name of the first dataset you are comparing against the Base.
	The dataset name can be typed in or selected from the Compare 1 PDS Alias list.
Compare 2 PDS Name	The name of the second dataset you are comparing against the Base.
	The dataset name can be typed in or selected from the Compare 2 PDS Alias list.
	If not specified, then a two-way compare will be invoked.
Base Object	The name of the object on the Base dataset to be compared.
	This can be typed in using full name, part name with wildcard or a wildcard range to include all objects. The wildcard is an '*' (asterisk).
	Wildcards are only valid if a Build List of Object Names has been generated for the Base PDS Name dataset.
	The object name can be typed in or selected by using the Base Object Selection button [….] if a Build List of Object Names has been generated for the Base PDS Name dataset.
	If part name with wildcard or wildcard range is specified, then there is no requirement to specify either the Compare 1 or Compare 2 object names.

SCREEN ITEMS	DESCRIPTION
Compare 1 Object	The name of the object on the Compare 1 dataset to be compared against the Base object.
	The object name can be typed in using full name only or selected by using the Compare 1 Object Selection button [….] if a Build List of Object Names has been generated for the Compare 1 PDS Name dataset.
	If omitted, then the object name specified in the Base object will be used if a Compare 1 PDS name is specified.
Compare 2 Object	The name of the object on the Compare 2 dataset to be compared against the Base object.
	The object name can be typed in using full name only or selected by using the Compare 2 Selection button [….] if a Build List of Object Names has been generated for the Compare 2 PDS Name dataset.
	If omitted, then the object name specified in the Base object will be used if a Compare 2 PDS name is specified.
Base Build/Rebuild List	If selected then the list of object names on the Base dataset will be built/rebuilt once the batch Build Lists job has been executed.
Compare 1 Build/Rebuild List	If selected then the list of object names on the Compare 1 dataset will be built/rebuilt once the batch Build Lists job has been executed.
Compare 2 Build/Rebuild List	If selected then the list of object names on the Compare 2 dataset will be built/rebuilt once the batch Build Lists job has been executed.

BUTTON NAME	DESCRIPTION

Compare Selections group:

Note: The following selections apply to all COBOL and JCL Object Compares when using a remote development environment.

Base Object Name Selection [….]	Invokes the General Selection screen, listing all the object names available for the selected Base dataset. *Note: This is only available if the list of object names has been built for the selected Base dataset.*
Compare 1 Object Name Selection [….]	Invokes the General Selection screen, listing all the libraries available for the selected Compare 1 dataset. *Note: This is only available if the list of object names has been built for the selected Compare 1 dataset.*
Compare 2 Object Name Selection [….]	Invokes the General Selection screen, listing all the libraries available for the selected Compare 2 dataset. *Note: This is only available if the list of object names has been built for the selected Compare 2 dataset.*

Compare Selection screen:

Build Lists	Will submit the batch Build Lists process for the selected datasets.
OK	Validates the input and then if no errors, invokes the Compare Results screen.
Cancel	Cancel the Compare Selection process and close the current screen.

Compare Selection Examples

The following table illustrates the various Compare Selections that can be made and the type of Compare that will be invoked. All objects are based on the sample application HOSPITAL.

	Base	**Compare 1**	**Compare 2**	**Results**
Library	HOSPITAL	HOSPITAX		Two-way compare for all objects found in Base library HOSPITAL.
Object	*			
Library	HOSPITAL	HOSPITAX		Two-way compare for all objects prefixed by 'XX001'.
Object	XX001*			
Library	HOSPITAL	HOSPITAX		Two-way compare for object XX021P01 only.
Object	XX021P01			
Library	HOSPITAL	HOSPITAX		Two-way compare for object XX021P01 only.
Object	XX021P01	XX021P01		
Library	HOSPITAL	HOSPITAX	HOSPITAZ	Three-way compare for all objects found in Base library HOSPITAL.
Object	*			
Library	HOSPITAL	HOSPITAX	HOSPITAZ	Three-way compare for all objects prefixed by 'XX001'.
Object	XX001*			
Library	HOSPITAL	HOSPITAX	HOSPITAZ	Three-way compare for object XX021P01 only.
Object	XX021P01			
Library	HOSPITAL	HOSPITAX	HOSPITAZ	Three-way compare for object XX021P01 only.
Object	XX021P01	XX021P01	XX021P01	

Compare Results Window

The Compare Results screen displays the differences for the compare selection made from the Compare Selection screen. The differences are marked using customizable color schemes.

The display can show any of the following:

- The differences between two or three Natural, Cobol or JCL object source codes. Line numbers are included, for Natural this will be the same numbers seen in the Natural editor, for Cobol and JCL this will be a 8-byte sequential number starting from 1.

- The differences between two or three Natural libraries at library level. Line numbers are included, using a sequential number starting from 1.

- The differences between two or three PC files. Line numbers are included, using a sequential number starting from 1.

For Natural object compares, the Base object can have the differences from either or both of the compared objects applied to it, by using copy and paste functionality. It is also possible to make user changes to the Base object using basic edit, insert and delete functions. These changes can then be saved to a Natural library.

The differences can be reviewed using the available scroll buttons, or by using the up/down arrow keys. The listed details that are not visible can be scrolled left and right by using the left/right arrow keys.

The Compare Results makes use of the executable: GenCompare, which is invoked from the Compare Selection screen.

The following Figure 2-2 illustrates the Compare Results screen for a three-way compare for a Natural object.
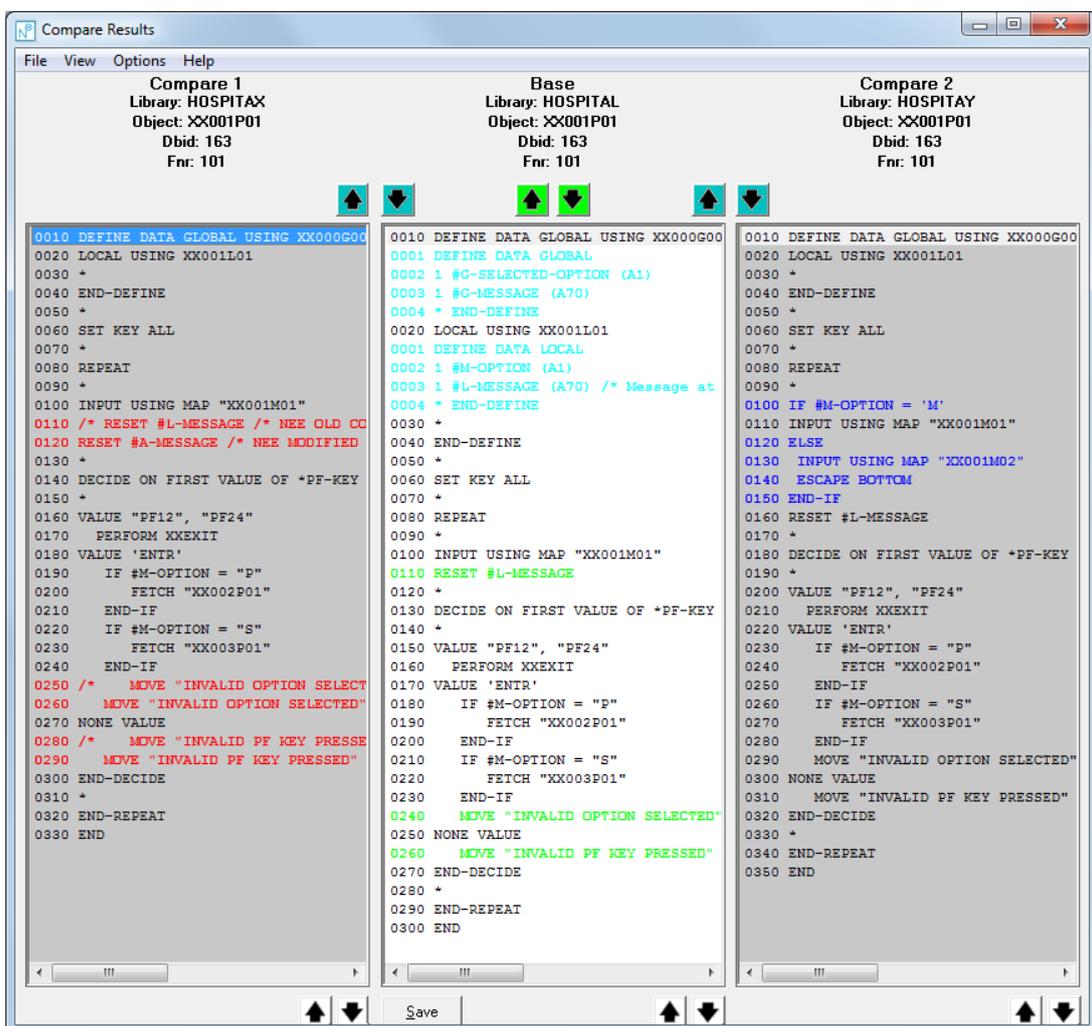
Figure 2-2 Compare Results screen for a three-way compare for a Natural object

The following Figure 2-3 illustrates the Compare Results screen for a two-way compare for a Natural object.
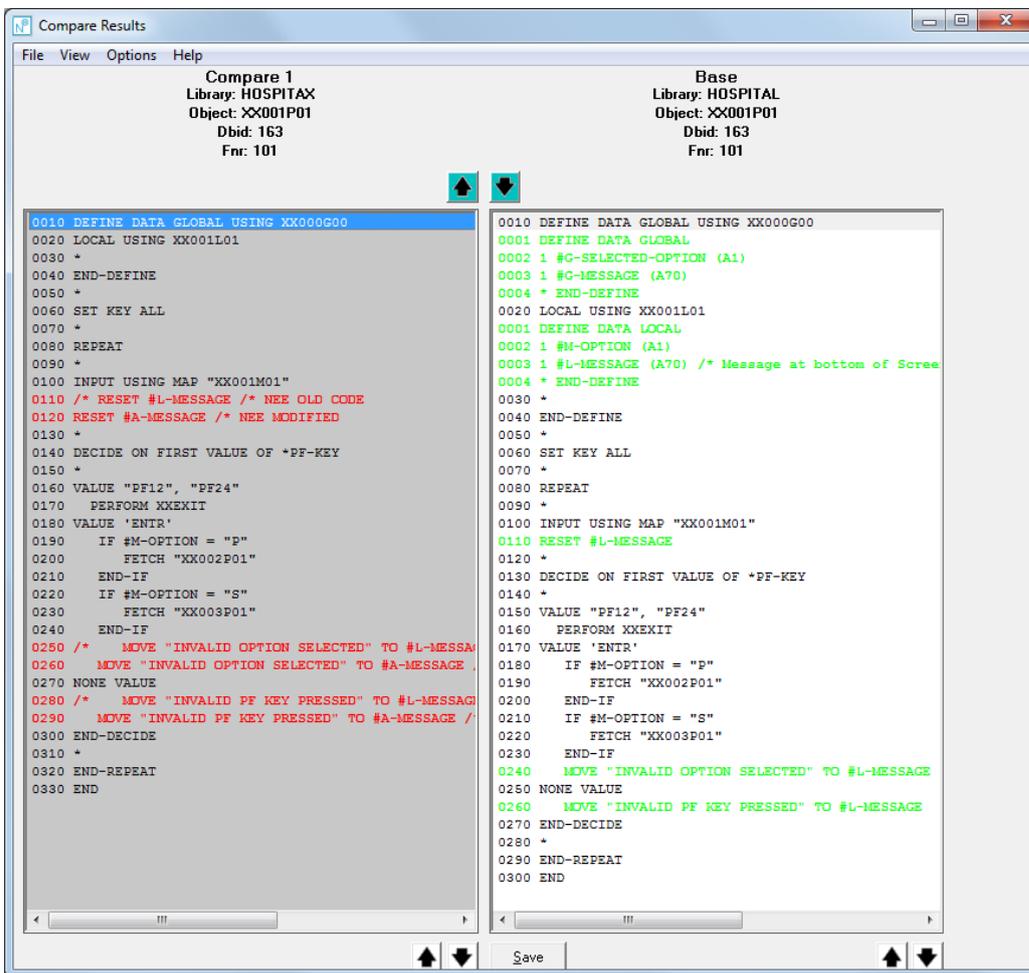
Figure 2-3 Compare Results screen for a two-way compare for a Natural object

The following Figure 2-4 illustrates the Compare Results screen for a two-way compare for a Natural library compare.
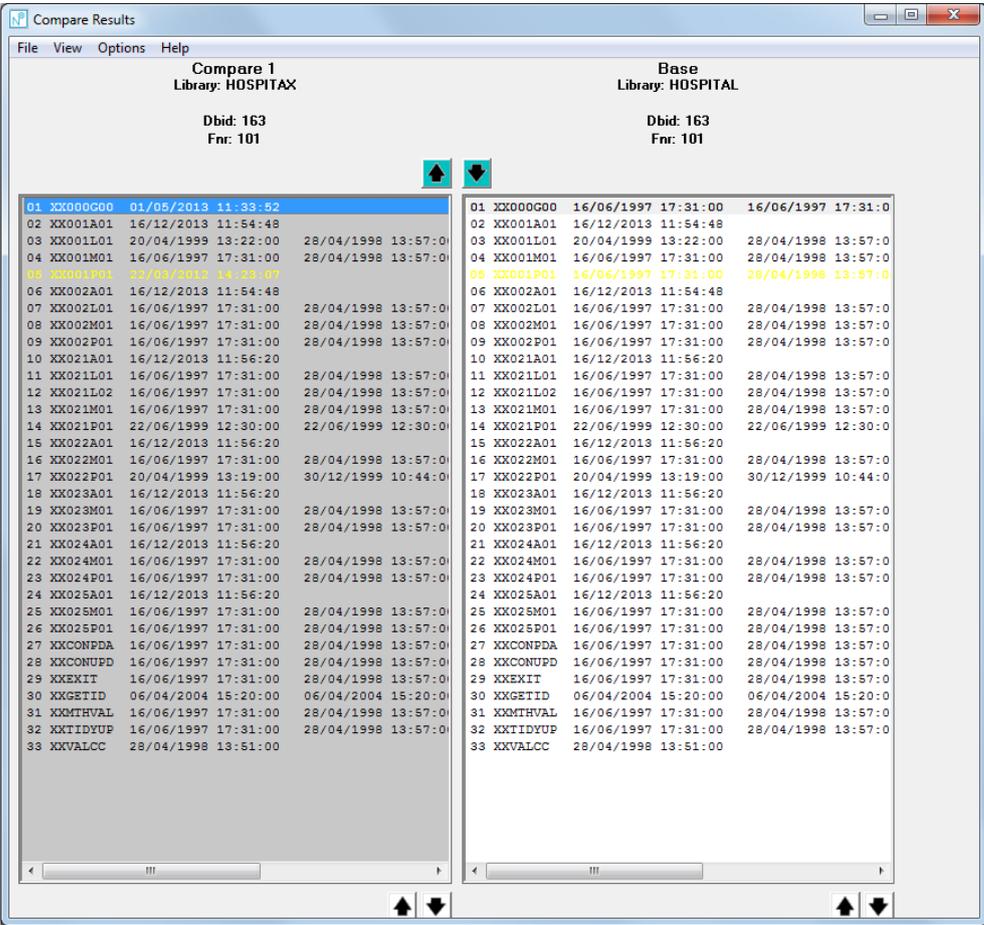
Figure 2-4 Compare Results screen for a two-way compare for a Natural library compare

The following Figure 2-5 illustrates the Compare Results screen for a two-way compare for a PC file compare.
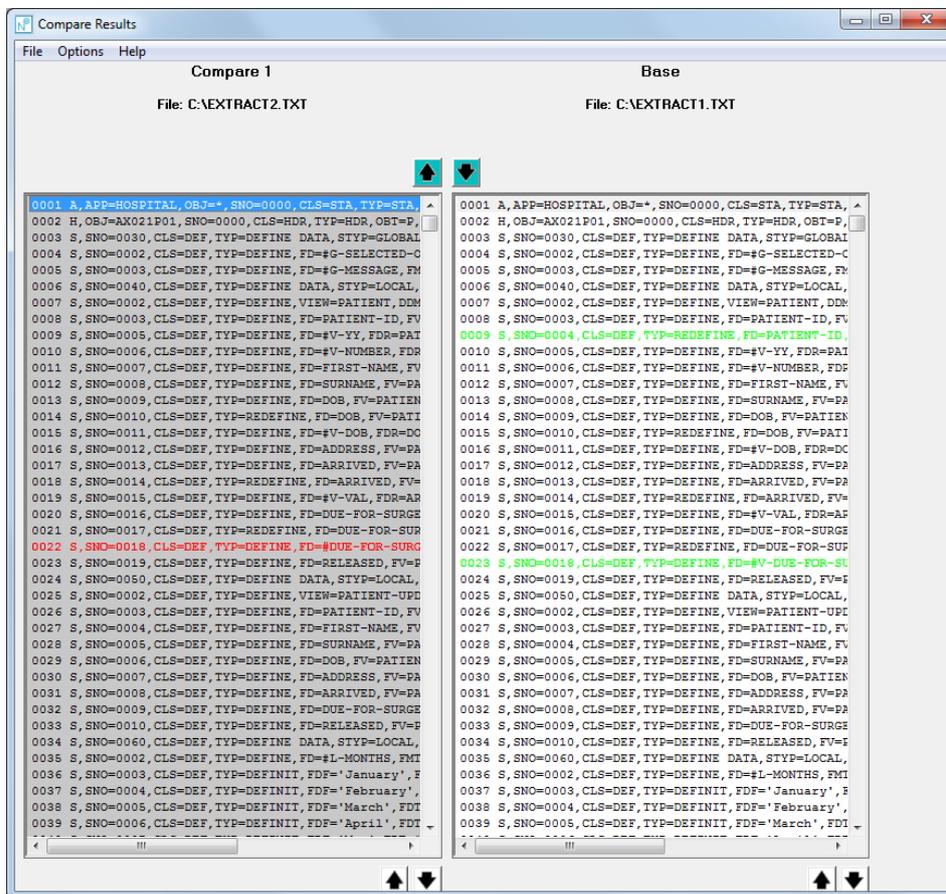

Figure 2-5 Compare Results screen for a two-way compare for a PC file compare

MENU ITEMS	OPTIONS	DESCRIPTION
File	Exit	Exit the Compare Results screen.
View	Next Object	Select the next object from the Base library and display the compare results.
		This option is only available if a part name with wildcard or wildcard range has been specified on the Compare Selection screen.
		Note: This option is disabled when the last object in a range has been compared.
	Select Object…	Invoke the Compare Object Selection screen showing the list of objects available for selection.
		This option is only available if a part name with wildcard or wildcard range has been specified on the Compare Selection screen.
	Refresh	Refresh the current object compare details on the Compare Results screen.
		Note: This will re-run the Compare process.
	Ignore Referbacks	Used to select or de-select the compARISon of refer backs.
		If selected a tick appears to the left of the text.
		If any refer backs using line numbers are present within the object code and this option is selected, then any differences are ignored. The Compare will replace any line numbers with '????'.
		After a selection has been made, a confirmation message is displayed. If the 'Yes' button is used then the current object compare will be refreshed. If the 'No' button is used then the selection will be ignored and the previous compare details will be retained.
		Note: This option is only available for Natural Object compares.
Options	Color Schemes…	Invoke the Compare Color Schemes screen.
Help	Compare Results Help	Invoke the Compare Results help.
	About GenCompare	Display the GenCompare version information.

SCREEN ITEMS	DESCRIPTION
Compare 1 Library	The name of the Compare 1 library being used.
Compare 1 Object	The name of the object currently being compared.
	Note: Not available for Natural Library or PC File compares.
Compare 1 File	The name of the PC file currently being compared.
	Note: Only available for PC File compares.
Compare 1 Dbid	The database number for the Natural System File where the Compare 1 library is located.
Compare 1 Fnr	The file number for the Natural System File where the Compare 1 library is located.
Compare 1 Object details	The Compare 1 object source code is listed with any differences between Compare 1 and Base color coded to highlight any differences. The color code is controlled by the Color Schemes option.
	If the Compare 1 object is not found on the Compare 1 library, then a single message line will be displayed: "Compare 1 Object not found.
	If the Compare 1 object is identical to the Base version, i.e., there are no differences, then a single message line will be displayed: "Compare 1 Object and Base Object match.
	Line numbers are shown for each entry in the details list as follows: **Natural object compares -** as seen in the Natural editor. **Cobol/JCL object compares -**8-byte sequential number starting from 1. **Natural Library/PC File compares -** sequential number starting from 1.
Base Library	The name of the Base library being used.
Base Object	The name of the object currently being compared.
	Note: Not available for Natural Library or PC File compares.
Base File	The name of the PC file currently being compared.
	Note: Only available for PC File compares.
Base Dbid	The database number for the Natural System File where the Base library is located.
Base Fnr	The file number for the Natural System File where the Base library is located.

SCREEN ITEMS	DESCRIPTION
Base Object details	The Base object source code is listed with any differences between Base and Compare 1 and/or Base and Compare 2, color coded to highlight any differences. The color code is controlled by the Color Schemes option.
	For Natural object compares, the object details can be modified using copy, paste, edit, insert and delete functionality. These are highlighted as User Changes.
	Note: For more information on modifying the Base object refer to section <ins>*Object Details Context Menus*</ins>*.*
	<ins>Line numbers are shown for each entry in the details list as follows:</ins> **Natural object compares -** as seen in the Natural editor. **Cobol/JCL object compares -**8-byte sequential number starting from 1. **Natural Library/PC File compares -** sequential number starting from 1.
Compare 2 Library	The name of the Compare 2 library being used.
Compare 2 Object	The name of the object currently being compared.
	Note: Not available for Natural Library or PC File compares.
Compare 2 File	The name of the PC file currently being compared.
	Note: Only available for PC File compares.
Compare 2 Dbid	The database number for the Natural System File where the Compare 2 library is located.
Compare 2 Fnr	The file number for the Natural System File where the Compare 2 library is located.
Compare 2 Object details	The Compare 2 object source code is listed with any differences between Compare 2 and Base color coded to highlight any differences. The color code is controlled by the Color Schemes option.
	If the Compare 2 object is not found on the Compare 2 library, then a single message line will be displayed: "Compare 2 Object not found.
	If the Compare 2 object is identical to the Base version, i.e., there are no differences, then a single message line will be displayed: "Compare 2 Object and Base Object match.
	<ins>Line numbers are shown for each entry in the details list as follows:</ins> **Natural object compares -** as seen in the Natural editor. **Cobol/JCL object compares -**8-byte sequential number starting from 1. **Natural Library/PC File compares -** sequential number starting from 1.

Note: Dbid and Fnr selections are only available for Natural Object and Natural Library compares.

BUTTON NAME	DESCRIPTION
Scroll Buttons	There are three sets of scroll buttons available. Each set of buttons allows you to scroll through the differences within the objects being displayed.
	The scroll button sets are color coded to help distinguish each set. The color code is controlled by the Color Schemes option.
	Scroll through all differences between Compare 1 and Base or Compare 2 and Base.
	The default color is blue/green.
	Scroll through all differences in Base, Compare 1 and Compare 2.
	The default color is bright green.
	Note: This button set is not available when running a two-way compare.
	Scroll through all differences within an individual object.
	The default color is white.
Save	Save the Base object to a Natural library.
	This button is disabled for the following object types:
	• **Global Data Areas** • **Local Data Areas** • **Parameter Data Areas** • **Maps**
	It will also be disabled if the Ignore Referbacks option is set on and an object contains refer backs.
	Note: This button is only available for Natural Object compares.
Next	Select the next object from the Base library and display the compare results.
	This button is only available if a part name with wildcard or wildcard range has been specified on the Compare Selection screen.
	Note: This button is disabled when the last object in a range has been compared.

BUTTON NAME	DESCRIPTION
Keyboard Arrow Keys	The keyboard arrow keys can be used to aid navigation through the compare differences being displayed. **Up/Down arrow keys** Scroll through all differences in Base, Compare 1 and Compare 2. **Right/Left arrow keys** Scroll right or left in the object details lists. This will scroll all visible object details lists at the same time.

Compare Object Selection Window

The Compare Object Selection screen provides a list of objects based on the object name specified on the Compare Selection screen. It is only available if a part name with wildcard or wildcard range have been specified.

The Compare Object Selection screen is invoked by selecting the menu option View➔ Select Object… from the Compare Results screen.

The following Figure 2-6 illustrates the Compare Object Selection screen.
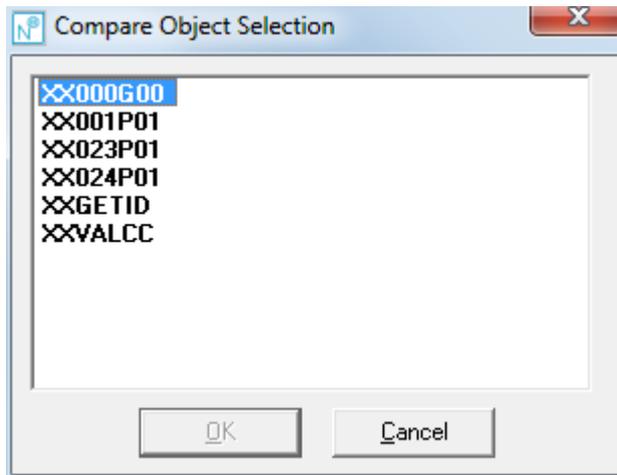
Figure 2-6 Compare Object Selection screen

SCREEN ITEMS	DESCRIPTION
Object List	List of object names based on the part name with wildcard or wildcard range specified on the Compare Selection screen.
	Objects are selected by placing the cursor on the object name and then using the '**OK**' button.

BUTTON NAME	DESCRIPTION
OK	Accept the selection made and refresh the Compare Results screen with the new selected object details.
Cancel	Cancel the Compare Object Selection process ignoring any object selection that may have been made and return to the Compare Results screen. The Compare Results screen will remain unchanged.

Compare Color Schemes Window

The Compare Color Schemes screen controls the color codes for the Scroll buttons and Compare differences. All the color codes are customizable.

To change a color code, use the left hand mouse button with a single click on the colored square of the option you wish to change. This will invoke the Color palette screen where colors can be selected. After selecting a new color, both the Color Schemes screen and the Compare Results screen are refreshed to reflect the new color selection.

The Compare Color Schemes screen is invoked by selecting the menu option Options➔Color Schemes from the Compare Results screen.

The following Figure 2-7 illustrates the Compare Color Schemes screen for three-way compare.
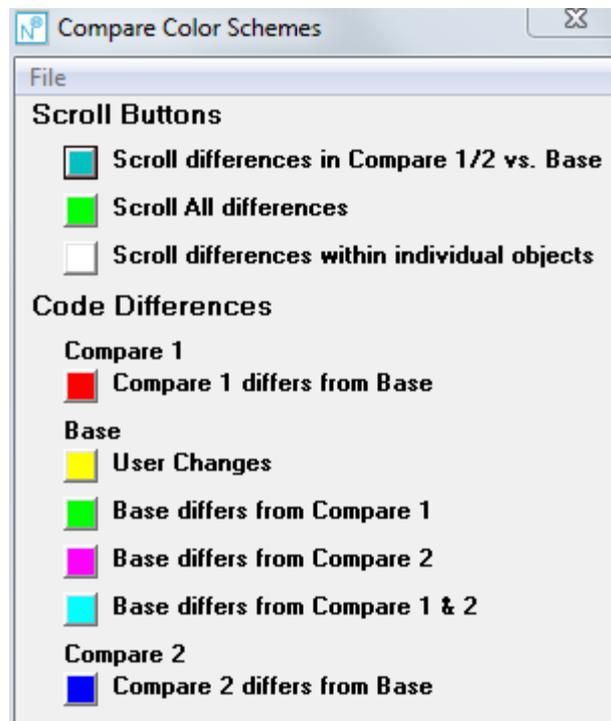
Figure 2-7 Compare Color Schemes screen for three-way compare

The following Figure 2-8 illustrates the Compare Color Schemes screen for two-way compare.
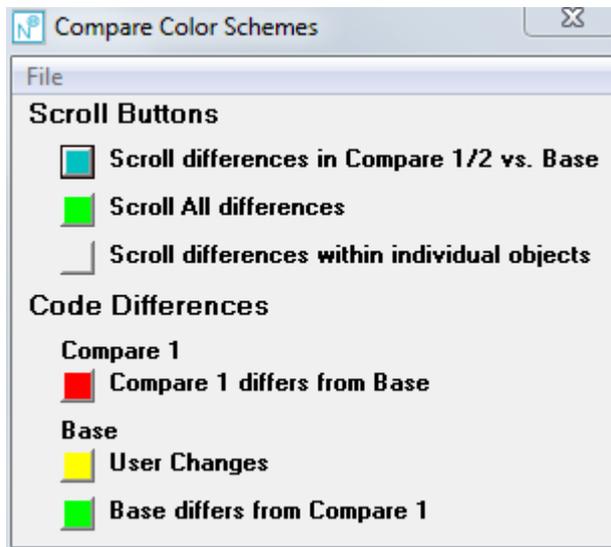
Figure 2-8 Compare Color Schemes screen for two-way compare

MENU ITEMS	OPTIONS	DESCRIPTION
File	**Always on Top**	This option allows you to control the display position of the Color Schemes screen.
		If selected (indicated by a tick to the left of the text) it will always keep the Color Schemes screen in the foreground.
		If de-selected (no tick) then the Color Schemes screen can be moved to the background.
		Note: The default setting when the Compare Results screen is first invoked is Always on Top.
	Exit	Exit the Compare Color Schemes screen.

SCREEN ITEMS	DESCRIPTION
Scroll Buttons	The Scroll Buttons allow you to scroll through the differences within the objects being displayed.
	Scroll through all differences between Compare 1 and Base or Compare 2 and Base. The default color is blue/green.
	Scroll through all differences in Base, Compare 1 and Compare 2. The default color is bright green.
	Scroll through all differences within an individual object. The default color is white.
Code Differences	Any differences that exist between the objects being compared are color coded for easier viewing.
Compare 1	Compare 1 object differs from Base object. The default color is red.
Base	User changes applied to Base object. The default color is yellow. *Note: This color scheme is only available for Natural Object and Natural Library compares. For Natural Library compares this will reflect a difference in the save/stow date and time stamp.*
	Base object differs from Compare 1 object. The default color is bright green.
	Base object differs from Compare 2 object. The default color is bright pink.
	Base object differs from both Compare 1 object and Compare 2 object. The default color is turquoise.
Compare 2	Compare 2 object differs from Base object. The default color is blue.

Object Detail Context Menus

The Object Details context menus provide basic editing functionality and are invoked by placing the cursor on any code line and using the right hand mouse button with a single click.

Editing can only be applied to the Base Object details and allows you to incorporate differences from Compare 1 and/or Compare 2 objects, as well as adding or deleting code lines in the Base object.

Note: The Object Details context menus are only available for Natural Object compares.

The following editing tasks can be performed:

- Copy code lines from Compare 1 Object.

- Copy code lines from Compare 2 Object.

- Edit existing code lines within Base Object.

- Insert new blank lines within Base Object and type in new code or comments

- Delete a code line within Base Object.

- Undo the last deletion in Base Object.

There are two types of Object detail context menu available:

1. Compare 1 and Compare 2 Object details context menu for copying code lines.

2. Base Object details context menu for all the editing functions to add or amend code lines in the Base object.

The following Figure 2-9 illustrates the Compare 1 Object Details context menu.
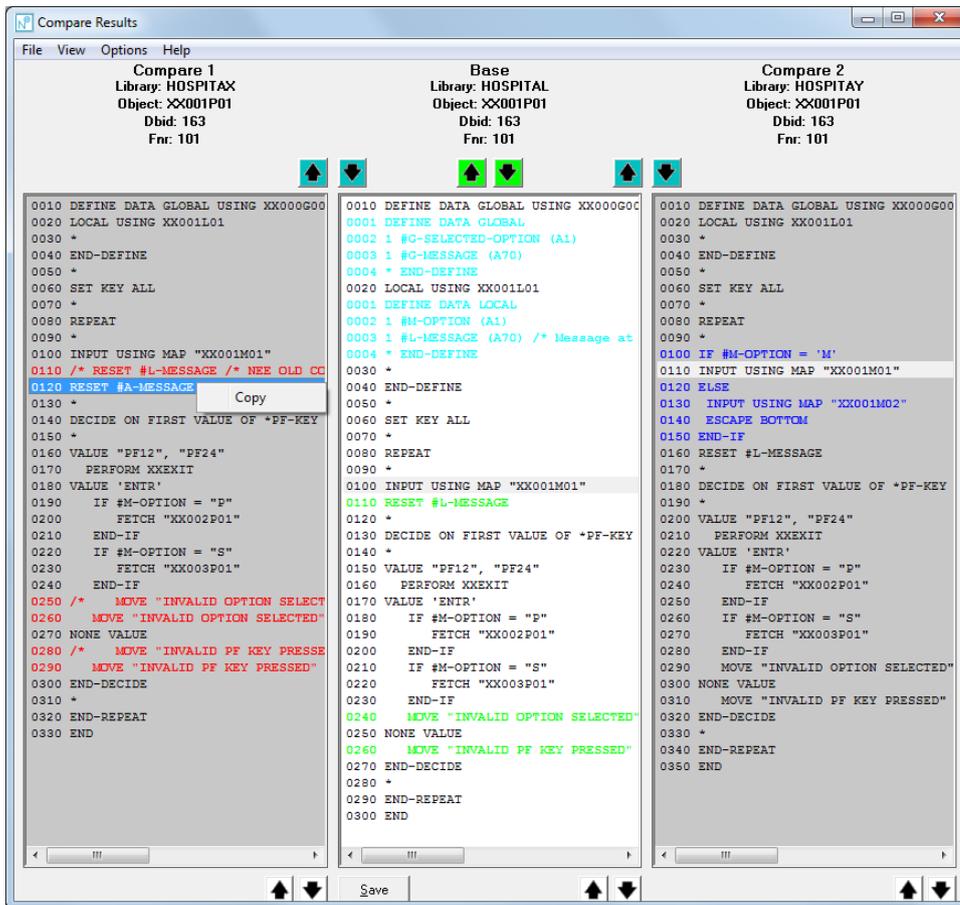
Figure 2-9 Compare 1 Object details context menu

CONTEXT MENU ITEM	DESCRIPTION
Copy	Copies the selected code lines to the clipboard.

Note: The same context menu is invoked for code lines selected in Compare 2 Object details.

The following Figure 2-10 illustrates the Base Object Details context menu.


Figure 2-10 Base Object details context menu

CONTEXT MENU ITEM	DESCRIPTION
Edit	Opens the selected line for editing.
Paste	Paste any copied code lines that have been placed in the clipboard by a previous copy.
	This will paste the lines after the current selected line.
Insert Blank Line	Insert a blank line after the current selected line.

CONTEXT MENU ITEM	DESCRIPTION
Delete	Delete the current selected line.
Undo Delete	Reinstate the last deletion.
	Note: This option is only available after a previous line deletion has been executed.

Using the Save Function

The Save function allows you to save a new copy of the Base object to a Natural library when running Natural object compares. This option is only available for Natural object compares.

The Save function is invoked by using the '**Save**' button on the Compare Results screen. This will invoke the Compare Save Source Code screen where the Natural library can be specified in one of two ways:

1. Using the modification library specified in the Application Properties. This method requires an Application to be opened within Natural Engineer before the Compare function is invoked.

2. Specifying the Natural library using the Compare Save Source Code screen. This method does not require an Application to be opened before the Compare function is invoked.

After the library name has been specified and the '**OK**' button used from the Compare Save Source Code screen, the object will be saved. A confirmation message is produced after the object has been saved.

If the object already exists on the destination library, an overwrite warning message is displayed. You can accept or decline the save. If accepted then the existing object will be overwritten.

Note: No syntax checking is performed during the save. The saved objects will need to be checked manually using the Natural Editor.

With Natural Engineer Application Open

With a Natural Engineer Application open, the Compare Save function will save the object to the Natural library specified in the Modification Library within Application Properties.

Note: For more information on the Application Properties refer to Chapter 1 in the Application Management manual.

Audit trail records are generated for objects saved by the Compare when a Natural Engineer Application is open. These can be viewed using the Change Management Tracking option from the Utilities menu.

Note: For more information on audit trail records refer to Chapter 5.

The following Figure 2-11 illustrates the Compare Save Source Code screen with Application open.
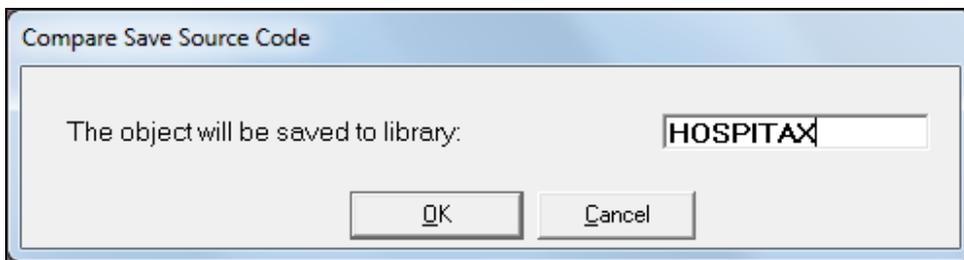
Figure 2-11 Compare Save Source Code screen with Application open

SCREEN ITEMS	DESCRIPTION
The object will be saved to library:	This will contain the name of the modification library specified in the Application Properties. This can only be changed using the Application Properties screen.

BUTTON NAME	DESCRIPTION
OK	Accept the library selection details and save the object.

BUTTON NAME	DESCRIPTION
Cancel	Cancel the Compare Save Source Code process and return back to the Compare Results screen. The object will not be saved.

With No Natural Engineer Application Open

With no Natural Engineer Application open, the Compare Save function will save the object to the Natural library specified in the Compare Library Selection screen.

No Audit trail records are generated for objects saved by the Compare when No Natural Engineer Application is open.

The following Figure 2-12 illustrates the Compare Save Source Code screen with no Application open.
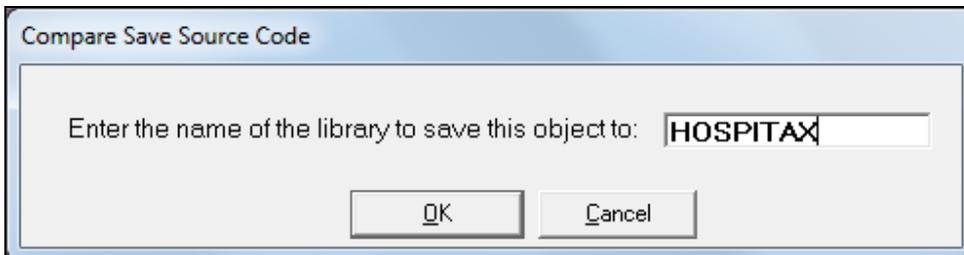
Figure 2-12 Compare Save Source Code screen with no Application open

SCREEN ITEMS	DESCRIPTION
Enter the name of the library to save this object to:	Specify the name of the library to be used. This must be 1-8 characters and conform to Natural standards. *Note: It is recommended that the library name is different to the Base library to avoid overwriting the original object.*

BUTTON NAME	DESCRIPTION
OK	Accept the library selection details and save the object.
Cancel	Cancel the Compare Save Source Code process and return back to the Compare Results screen. The object will not be saved.

3

MODE CONVERSION

Chapter Overview

This chapter describes the Mode Conversion option available from the Utilities menu. The Mode Conversion option provides the facility to convert Natural Reporting mode objects into Natural Structured mode objects.

The following topics are covered:

1. Mode Conversion Overview

2. Mode Conversion Techniques

3. Mode Conversion GDA Processing

4. Mode Conversion Object Processing

Mode Conversion Overview

Applications that utilize Natural Reporting mode can become more difficult to maintain, as they become more complex through continual expansion and development.

Key issues with Natural Reporting mode are:

- User defined variables can be defined anywhere, making it difficult to identify what variables are in use.

- Database fields do not need to be defined anywhere, making it difficult to identify the database data that is being referenced.

- Loop constructs are closed using the LOOP statement, making it difficult to identify where loop processing ends. For example READ, FIND, REPEAT and FOR blocks.

- Logical constructs are bound using the DO/DOEND statements, making it difficult to identify what conditional statements will be executed within complex logical blocks (nested IF statements).

Applications written in Natural Structured mode provide clear and well-defined program structure for complex application solutions.

Key benefits with Natural Structured mode are:

- All user defined variables are contained in the DEFINE DATA statement at the top of each object, making it easier to identify what variables are in use.

- All database fields must be defined using a view of the database file and are contained in the DEFINE DATA statement at the top of each object, making it easier to identify the database data being referenced.

- Loop constructs must be explicitly closed using corresponding 'END' constructs, making it easier to identify where each individual loop construct ends. For example END-READ, END-FIND, END-REPEAT and END-FOR.

- Logical constructs must be bound by using END-IF statements, making it easier to identify what conditional statements will be executed within complex logical blocks.

The Mode Conversion option provides the facility to convert Natural Reporting mode objects into Natural Structured mode objects.

Applications that are to be converted are extracted and loaded into the Repository using the Extract and Load processes. The modification library (where the converted objects will reside) is controlled within the Application Properties screen. The Mode Conversion option can be used once the application has been loaded into the Repository.

Note: For more information on the Application Properties, Extract and Load processes refer to the Application Management for Windows manual.

The Mode Conversion process is split into two sub-processes:

1. Global Data

The Global data requirements within an application are specified first and if required, a new GDA object can be generated. Once generated, it will contain all the Global data referenced within the application.

2. Object Conversion

Objects to be converted can be selected individually, in groups, or all objects within the application. The GDA option specified will be taken into account and the correct references added to the converted objects.

Mode Conversion can only be applied to the following Natural object types:

- Copycodes
- Helproutines
- Programs
- Subprograms
- Subroutines

After the Mode Conversion process has completed, the conversion details are displayed on the Mode Conversion Log window.

Audit trail records are generated for each object converted (including new GDA objects) and can be viewed using the Change Management Tracking (CMT) option.

Note: The audit trail records are only available using the CMT Object Viewer option. For more information on CMT refer to Chapter 4.

Mode Conversion Techniques

This section describes the main conversion techniques applied during the Mode Conversion process.

Global Data Definitions

There are 2 conversion techniques available for Global data definitions:

1. Generate a new GDA.

- Will rationalize all existing GDA objects and/or in-line Global data definitions into one single new GDA object.

- Existing DEFINE DATA GLOBAL USING statements will be modified to reference the new GDA object name.

- A DEFINE DATA GLOBAL USING statement will be added to any objects that reference in-line Global data definitions only.

- Format and length attributes will be removed from in-line Global data definitions.

Example:

<u>Before Conversion:</u>

```
GDA1                                    GDA2
0010 DEFINE DATA GLOBAL                  0010 DEFINE DATA GLOBAL
0020 1 +ALPHA(A5)                        0020 1 +NUMBER(N3)
0030 END-DEFINE                          0030 END-DEFINE

PROGRAM1                                 PROGRAM2
0010 DEFINE DATA                         0010 DEFINE DATA
0020 GLOBAL USING GDA1                   0020 GLOBAL USING GDA2
0030 END-DEFINE                          0030 END-DEFINE
0040 MOVE 'ABCDE' TO +ALPHA              0040 MOVE 123 TO +NUMBER
0050 FETCH 'PROGRAM2'                    0050 MOVE 'HELLO WORLD'
0060 END                                 0060   TO +TEXT-GLOBAL(A20)
                                         0070 END
```

After Conversion:

<u>**NEWGDA**</u>
```
0010 DEFINE DATA GLOBAL
0020 1 +ALPHA(A5)
0030 1 +NUMBER(N3)
0040 1 +TEXT-GLOBAL(A20)
0050 END-DEFINE
```

<u>**PROGRAM1**</u>
```
::::
0050 DEFINE DATA
0060 GLOBAL USING NEWGDA
0070 END-DEFINE
0080 MOVE 'ABCDE' TO +ALPHA
0090 FETCH 'PROGRAM2'
0100 END
```

<u>**PROGRAM2**</u>
```
::::
0050 DEFINE DATA
0060 GLOBAL USING NEWGDA
0070 END-DEFINE
0080 MOVE 123 TO +NUMBER
0090 MOVE 'HELLO WORLD'
0100 TO +TEXT-GLOBAL
0110 END
```

2. Use existing GDA object structure.

- No new GDA objects will be generated.

- Existing DEFINE DATA GLOBAL USING statements will not be modified.

Example:

Before Conversion:

<u>**OLDGDA**</u>
```
0010 DEFINE DATA GLOBAL
0020 1 +LAST-PGM(A8)
0030 1 +NEXT-PGM(A8)
0040 END-DEFINE
```

<u>**PROGRAM1**</u>
```
0010 DEFINE DATA
0020 GLOBAL USING OLDGDA
0030 END-DEFINE
0040 MOVE 'PROGRAM1' TO +LAST-PGM
0050 MOVE 'PROGRAM2' TO +NEXT-PGM
0060 FETCH +NEXT-PGM
0070 END
```

After Conversion:

<u>**OLDGDA**</u>
```
0010 DEFINE DATA GLOBAL
0020 1 +LAST-PGM(A8)
0030 1 +NEXT-PGM(A8)
0040 END-DEFINE
```

<u>**PROGRAM1**</u>
```
::::
0050 DEFINE DATA
0060 GLOBAL USING OLDGDA
0070 END-DEFINE
0080 MOVE 'PROGRAM1' TO +LAST-PGM
0090 MOVE 'PROGRAM2' TO +NEXT-PGM
0100 FETCH +NEXT-PGM
0110 END
```

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User Defined Variables

- A DEFINE DATA LOCAL statement is added to the object and all user defined variables used within the object are defined here.

- Format and length attributes will be removed from the in-line user defined variables.

- RESET statements are added immediately after the END-DEFINE statement for any in-line user defined variables that have been defined using the RESET statement. For example: RESET #FIELD(A10).

Example:

Before Conversion:

```
PROGRAM1
0010 RESET #NAME(A20) #ADDRESS(A50)
0020 REDEFINE #ADDRESS(#ADDRESS-1(A25) #ADDRESS-2(A25))
0030 MOVE 'SMITH' TO #NAME
0040 MOVE '101 THE AVENUE' TO #ADDRESS-1
0050 MOVE 'UNITED KINGDOM' TO #ADDRESS-2
0060 MOVE 1234567890        TO #TELEPHONE-NUMBER(N10)
0070 END
```

After Conversion:

```
PROGRAM1
::::
0050 DEFINE DATA LOCAL
0060 1 #NAME (A020)
0070 1 #ADDRESS (A050)
0080 1 REDEFINE #ADDRESS
0090 2 #ADDRESS-1 (A025)
0100 2 #ADDRESS-2 (A025)
0110 1 #TELEPHONE-NUMBER (N010)
0120 END-DEFINE
0130 RESET #NAME #ADDRESS
0140 MOVE 'SMITH' TO #NAME
0150 MOVE '101 THE AVENUE' TO #ADDRESS-1
0160 MOVE 'UNITED KINGDOM' TO #ADDRESS-2
0170 MOVE 1234567890 TO #TELEPHONE-NUMBER
0180 END
```

Database Fields

- A DEFINE DATA LOCAL statement is added to the object and view definitions are added here.

- A separate view definition will be created for each database access statement referencing the same database file.

- The view definitions will contain the definitions found for each database field referenced within the object.

Example:

Before Conversion:

```
PROGRAM1
0010 READ EMPLOYEES
0020 DISPLAY PERSONNEL-ID NAME
0030 END
```

```
PROGRAM2
0010 FIND VEHICLES WITH MAKE = 'FORD'
0020   DISPLAY MAKE MODEL
0030 LOOP
0040 FIND VEHICLES WITH MAKE = 'TVR'
0050   DISPLAY MAKE MODEL
0060 LOOP
0070 END
```

After Conversion:

```
PROGRAM1
::::
0050 DEFINE DATA LOCAL
0060 1 EMPLOYEES VIEW OF EMPLOYEES
0070 2 PERSONNEL-ID
0080 2 FULL-NAME
0090 3 NAME
0100 /*
0110 END-DEFINE
0120 READ-0010.
0130 READ EMPLOYEES
0140 DISPLAY PERSONNEL-ID NAME
0150 END-READ
0160 END
```

```
PROGRAM2
::::
0050 DEFINE DATA LOCAL
0060 1 VEHICLES VIEW OF VEHICLES
0070 2 CAR-DETAILS
0080 3 MAKE
0090 3 MODEL
0100 /*
0110 1 VEHICLES-1 VIEW OF VEHICLES
0120 2 CAR-DETAILS
0130 3 MAKE
0140 3 MODEL
0150 /*
0160 END-DEFINE
0170 FIND-0010.
0180 FIND VEHICLES WITH MAKE = 'FORD'
0190 DISPLAY MAKE MODEL
0200 END-FIND
0210 FIND-0040.
0220 FIND VEHICLES-1 WITH MAKE = 'TVR'
0230 DISPLAY MAKE MODEL
0240 END-FIND
0250 END
```

Loop Constructs

- LOOP processing statements are replaced with corresponding END constructs.

- Applies to the following Natural statements:

Statement	Corresponding END Construct
CALL FILE	END-FILE
CALL LOOP	END-LOOP
FIND	END-FIND
FOR	END-FOR
HISTOGRAM	END-HISTOGRAM
READ	END-READ
READ WORK FILE	END-WORK
REPEAT	END-REPEAT
SORT	END-SORT

Example:

Before Conversion:

```
PROGRAM1
0010 READ EMPLOYEES
0020 DISPLAY PERSONNEL-ID NAME
0030 LOOP
::::
```

After Conversion:

```
PROGRAM1
::::
0120 READ-0010.
0130 READ EMPLOYEES
0140 DISPLAY PERSONNEL-ID NAME
0150 END-READ
::::
```

Conditional Logic Blocks

- Conditional statements will have the corresponding END constructs added.

- Any DO/DOEND statements will be removed.

- Applies to the following Natural statements:

Statement	Corresponding END Construct
IF	END-IF
IF NO RECORDS FOUND	END-NOREC
AT BREAK	END-BREAK
AT START OF DATA	END-START
AT END OF DATA	END-ENDDDATA
AT TOP OF PAGE	END-TOPPAGE
AT END OF PAGE	END-ENDPAGE
ON ERROR	END-ERROR

Example:

Before Conversion:

```
PROGRAM1
::::
0030 REPEAT
0040 ADD 1 TO #LOOP-CONTROL
0050 IF #LOOP-CONTROL LE 10
0060 DO
0070 WRITE 'STILL SOME PROCESSING TO DO'
0080 ESCAPE TOP
0090 DOEND
0100 ELSE
0110 DO
0120 WRITE 'PROCESSING COMPLETED'
0130 ESCAPE
0140 DOEND
0150 LOOP
::::
```

After Conversion:

<u>**PROGRAM1**</u>
```
::::
0100 REPEAT-0030.
0110 REPEAT
0120 ADD 1 TO #LOOP-CONTROL
0130 IF #LOOP-CONTROL LE 10
0140 WRITE 'STILL SOME PROCESSING TO DO'
0150 ESCAPE TOP
0160 ELSE
0170 WRITE 'PROCESSING COMPLETED'
0180 ESCAPE BOTTOM
0190 END-IF
0200 END-REPEAT
::::
```

Subroutine Blocks

- Internal and external subroutines will have the RETURN statement replaced by the corresponding END-SUBROUTINE construct.

Example:

Before Conversion:

<u>**PROGRAM1**</u>
```
::::
0060 PERFORM ##CALCULATE-COST
0070 /*
0080 WRITE 'TOTAL COST WITH TAX =' #TOTAL-COST
0090 /*
0100 DEFINE SUBROUTINE ##CALCULATE-COST
0110 RESET #TEMP-COST #TOTAL-COST
0120 COMPUTE #TEMP-COST = #COST * #TAX
0130 #TOTAL-COST = #COST + #TEMP-COST
0140 RETURN
0150 END
```

After Conversion:

PROGRAM1

```
::::
0160 PERFORM ##CALCULATE-COST
0170 /*
0180 WRITE 'TOTAL COST WITH TAX =' #TOTAL-COST
0190 /*
0200 DEFINE SUBROUTINE ##CALCULATE-COST
0210 RESET #TEMP-COST #TOTAL-COST
0220 COMPUTE #TEMP-COST = #COST * #TAX
0230 COMPUTE #TOTAL-COST := #COST + #TEMP-COST
0240 END-SUBROUTINE
0250 END
```

Open-ended ESCAPE Statements

- Any ESCAPE statements that do not specify a destination will have a destination of BOTTOM added.

Example:

Before Conversion:

PROGRAM1

```
::::
0030 REPEAT
0040 ADD 1 TO #LOOP-CONTROL
0050 IF #LOOP-CONTROL GE 10
0060 DO
0070 WRITE 'LOOP WILL NOW STOP'
0080 ESCAPE
0090 DOEND
0100 LOOP
::::
```

After Conversion:

```
PROGRAM1
::::
0100 REPEAT-0030.
0110 REPEAT
0120 ADD +1 TO #LOOP-CONTROL
0130 IF #LOOP-CONTROL GE 10
0140 WRITE 'LOOP WILL NOW STOP'
0150 ESCAPE BOTTOM
0160 END-IF
0170 END-REPEAT
::::
```

Short Form ASSIGN and COMPUTE Statements

- Short form ASSIGN and COMPUTE statements (i.e. statements with the ASSIGN/COMPUTE keyword omitted) will have the ASSIGN/COMPUTE keyword added.

Example:

Before Conversion:

```
PROGRAM1
::::
0030 #TAX = 0.0010
0040 ASSIGN #COST = 15000
::::
0120 COMPUTE #TEMP-COST = #COST * #TAX
0130 #TOTAL-COST = #COST + #TEMP-COST
::::
```

After Conversion:

```
PROGRAM1
::::
0130 ASSIGN #TAX = 0.0010
0140 ASSIGN #COST = 15000
::::
0220 COMPUTE #TEMP-COST = #COST * #TAX
0230 COMPUTE #TOTAL-COST = #COST + #TEMP-COST
::::
```

Multiple Statements per Statement Line

- Any single statement line containing more than one statement will be split so that each statement is on a separate line.

Example:

Before Conversion:

```
PROGRAM1
::::
0140 READ (10) PERSONNEL
0150 IF NAME EQ 'ADKINSON' DO WRITE PERSONNEL-NUMBER NAME DOEND
0160 LOOP
::::
```

After Conversion:

```
PROGRAM1
::::
0430 READ-0140.
0440 READ (10) PERSONNEL
0450 IF NAME EQ 'ADKINSON'
0460 WRITE PERSONNEL-NUMBER NAME
0470 END-IF
0480 END-READ
::::
```

MOVE INDEXED Statements

- MOVE INDEXED statements are replaced with standard MOVE statements.

- Suitable array definitions will be added for any MOVE INDEXED source variables that are not defined as arrays.

Example:

Before Conversion:

```
PROGRAM1
::::
0010 RESET #BLOCK-MULTIPLE(A26) #FIRST(A1) #LAST(A1)
0020 REDEFINE #BLOCK-MULTIPLE(#BLOCK-SINGLE(A1))
0030 RESET #CURRENCY-CODES(A3/4) #INDEX(I02)
0040 /*
0050 FORMAT LS=250
0060 /*
0070 MOVE 'ABCDEFGHIJKLMNOPQRSTUVWXYZ' TO #BLOCK-MULTIPLE
0080 MOVE INDEXED #BLOCK-SINGLE <1> TO #FIRST
0090 MOVE INDEXED #BLOCK-SINGLE <26> TO #LAST
0100 WRITE '=' #FIRST '=' #LAST
0110 /*
0120 FORMAT LS=250
0130 MOVE 3 TO #ISN
0140 FIND EMPLOYEES WITH PERSONNEL-ID EQ '11100106'
0150   OBTAIN CURR-CODE(1-4)
0160   WRITE '=' PERSONNEL-ID / '=' NAME
0170   FOR #INDEX EQ 1 TO 4
0180     MOVE INDEXED CURR-CODE<#INDEX> TO #CURRENCY-CODES(#INDEX)
0190     WRITE #INDEX '=' #CURRENCY-CODES(#INDEX)
0200   LOOP
0210 LOOP
0220 /*
0230 END
```

After Conversion:

PROGRAM1

```
::::
0050 DEFINE DATA LOCAL
0060 1 #BLOCK-MULTIPLE (A026)
0070 1 REDEFINE #BLOCK-MULTIPLE
0080 2 #BLOCK-SINGLE (A001)
0090 1 REDEFINE #BLOCK-MULTIPLE
0100 2 #NEE@MI-#BLOCK-SINGLE (A001/1:26)
0110 1 #FIRST (A001)
0120 1 #LAST (A001)
0130 1 #CURRENCY-CODES (A003/1:4)
0140 1 #INDEX (I002)
0150 1 #ISN (N007)
0160 1 EMPLOYEES VIEW OF EMPLOYEES
0170 2 PERSONNEL-ID
0180 2 FULL-NAME
0190 3 NAME
0200 2 INCOME
0210 3 CURR-CODE(0000001:0000004)
0220 /*
0230 END-DEFINE
0240 RESET #BLOCK-MULTIPLE #FIRST #LAST
0250 RESET #CURRENCY-CODES (1:4) #INDEX
0260 /*
0270 FORMAT LS=250
0280 /*
0290 MOVE 'ABCDEFGHIJKLMNOPQRSTUVWXYZ' TO #BLOCK-MULTIPLE
0300 MOVE #NEE@MI-#BLOCK-SINGLE (1) TO #FIRST
0310 MOVE #NEE@MI-#BLOCK-SINGLE (26) TO #LAST
0320 WRITE '=' #FIRST '=' #LAST
0330 /*
0340 FORMAT LS=250
0350 MOVE 3 TO #ISN
0360 FIND-0140.
0370 FIND EMPLOYEES WITH PERSONNEL-ID EQ '11100106'
0380 WRITE '=' PERSONNEL-ID / '=' NAME
0390 FOR-0170.
0400 FOR #INDEX EQ 1 TO 4
0410 MOVE CURR-CODE (#INDEX) TO #CURRENCY-CODES (#INDEX)
0420 WRITE #INDEX '=' #CURRENCY-CODES (#INDEX)
0430 END-FOR
0440 END-FIND
0450 /*
0460 END
```

Statement Reference Notation

- Statement labels are added to all loop processing statements and also to GET and STORE statements. The format used is:

  KEYWORD-NNNN

  where:

  KEYWORD   is the Natural keyword used in the statement. For example READ or FIND.

  NNNN   is the line number for the start of the statement in the original object.

- Any existing statement reference notation using source-code line numbers will be modified to use the new statement labels.

- Any existing statement labels will remain unchanged.

- Any database access view names will be modified to reflect the new view definitions.

- Any view name qualifiers on database fields will be modified to reflect the new view definitions.

Example:

Before Conversion:

PROGRAM1
```
0010 LIMIT 5
0020 READ EMPLOYEES
0030   DISPLAY PERSONNEL-ID NAME
0040 LOOP
0050 /*
0060 R2.
0070 READ EMPLOYEES
0080   DISPLAY PERSONNEL-ID(R2.) NAME(R2.)
0090 LOOP(R2.)
0100 /*
0110 READ EMPLOYEES
0120   DISPLAY PERSONNEL-ID(0110) NAME(0110)
0130 LOOP(0110)
0140 /*
0150 READ EMPLOYEES
0160   DISPLAY EMPLOYEES.PERSONNEL-ID EMPLOYEES.NAME
0170 LOOP
0180 /*
0190 END
```

After Conversion:

<u>**PROGRAM1**</u>

```
::::
0050 DEFINE DATA LOCAL
0060 1 EMPLOYEES VIEW OF EMPLOYEES
0070 2 PERSONNEL-ID
0080 2 FULL-NAME
0090 3 NAME
0100 /*
0110 1 EMPLOYEES-1 VIEW OF EMPLOYEES
0120 2 PERSONNEL-ID
0130 2 FULL-NAME
0140 3 NAME
0150 /*
0160 1 EMPLOYEES-2 VIEW OF EMPLOYEES
0170 2 PERSONNEL-ID
0180 2 FULL-NAME
0190 3 NAME
0200 /*
0210 1 EMPLOYEES-3 VIEW OF EMPLOYEES
0220 2 PERSONNEL-ID
0230 2 FULL-NAME
0240 3 NAME
0250 /*
0260 END-DEFINE
0270 LIMIT 5
0280 READ-0020.
0290 READ EMPLOYEES
0300 DISPLAY PERSONNEL-ID NAME
0310 END-READ
0320 /*
0330 R2.
0340 READ EMPLOYEES-1
0350 DISPLAY PERSONNEL-ID (R2.) NAME (R2.)
0360 END-READ
0370 /*
0380 READ-0110.
0390 READ EMPLOYEES-2
0400 DISPLAY PERSONNEL-ID(READ-0110.) NAME(READ-0110.)
0410 END-READ
0420 /*
0430 READ-0150.
0440 READ EMPLOYEES-3
0450 DISPLAY EMPLOYEES-3.PERSONNEL-ID EMPLOYEES-3.NAME
0460 END-READ
0470 /*
0480 END
```

OBTAIN Statements

- OBTAIN statements are removed and are replaced with index values specified in the view definition for each database field referenced in the old OBTAIN statements.

Example:

Before Conversion:

```
PROGRAM1
0010 FIND EMPLOYEES WITH PERSONNEL-ID EQ '88888888'
0020   OBTAIN CURR-CODE(1:4)
0030   OBTAIN BONUS(4,1:4)
0040   DISPLAY PERSONNEL-ID BONUS(*,*) CURR-CODE(*)
0050 LOOP
0060 END
```

After Conversion:

```
PROGRAM1
::::
0050 DEFINE DATA LOCAL
0060 1 EMPLOYEES VIEW OF EMPLOYEES
0070 2 PERSONNEL-ID
0080 2 INCOME
0090 3 CURR-CODE(0000001:0000004)
0100 3 BONUS(0000001:0000004,0000001:0000004)
0110 /*
0120 END-DEFINE
0130 FIND-0010.
0140 FIND EMPLOYEES WITH PERSONNEL-ID EQ '88888888'
0150 DISPLAY PERSONNEL-ID BONUS (*,*) CURR-CODE (*)
0160 END-FIND
0170 END
```

SORT Statements

- The END-ALL statement will be inserted prior to the SORT statement.

- A statement notation label will be added using the format SORT-NNNN, where NNNN is the statement line number for the SORT statement in the original object.

- Corresponding END-SORT added.

Example:

Before Conversion:

```
PROGRAM1
::::
0190 FIND EMPLOYEES WITH CITY = 'DERBY'
0200   OBTAIN SALARY(1:2)
0210 /*
0220   COMPUTE #TOTAL-SALARY (P11) = SALARY (1) + SALARY (2)
0230   ACCEPT IF #TOTAL-SALARY GT 0
0240 /*
0250   SORT BY PERSONNEL-ID USING #TOTAL-SALARY SALARY(*) CURR-CODE
0260       GIVE AVER(#TOTAL-SALARY)
0270 /*
0280     AT START OF DATA
0290     DO
0300       WRITE NOTITLE '*' (40)
0310         'AVERAGE CUMULATIVE SALARY:' *AVER(#TOTAL-SALARY)
0320       MOVE *AVER (#TOTAL-SALARY) TO #AVERAGE (P11)
0330     DOEND
0340 /*
0350     COMPUTE #AVERAGE-PERCENT (N3.2) = #TOTAL-SALARY / #AVERAGE * 100
0360     ADD #TOTAL-SALARY TO #TOTAL-TOTAL (P11)
0370 /*
0380     DISPLAY NOTITLE PERSONNEL-ID SALARY (1) SALARY (2)
0390       #TOTAL-SALARY CURR-CODE (1)
0400       'PERCENT/OF/AVER' #AVERAGE-PERCENT
0410 /*
0420     AT END OF DATA
0430     WRITE / '*' (40) 'TOTAL SALARIES PAID: ' #TOTAL-TOTAL
0440 /*
0450 END
```

After Conversion:

PROGRAM1

```
::::
0370 FIND-0190.
0380 FIND EMPLOYEES WITH CITY = 'DERBY'
0390 /*
0400 COMPUTE #TOTAL-SALARY = SALARY (1) + SALARY (2)
0410 ACCEPT
0420 IF #TOTAL-SALARY GT 0
0430 /*
0440 END-ALL
0450 SORT-0250.
0460 SORT BY PERSONNEL-ID USING #TOTAL-SALARY SALARY (*) CURR-CODE (1:1)
0470 GIVE AVER (#TOTAL-SALARY)
0480 /*
0490 AT START OF DATA
0500 WRITE NOTITLE '*' (40)
0510 'AVERAGE CUMULATIVE SALARY:' *AVER (#TOTAL-SALARY)
0520 MOVE *AVER (#TOTAL-SALARY) TO #AVERAGE
0530 END-START
0540 /*
0550 COMPUTE #AVERAGE-PERCENT = #TOTAL-SALARY / #AVERAGE * 100
0560 ADD #TOTAL-SALARY TO #TOTAL-TOTAL
0570 /*
0580 DISPLAY NOTITLE PERSONNEL-ID SALARY (1) SALARY (2)
0590 #TOTAL-SALARY CURR-CODE (1)
0600 'PERCENT/OF/AVER' #AVERAGE-PERCENT
0610 /*
0620 AT END OF DATA
0630 WRITE / '*' (40) 'TOTAL SALARIES PAID: ' #TOTAL-TOTAL
0640 /*
0650 END-ENDDATA
0660 END-SORT
0670 END
```

FIND FIRST/NUMBER/UNIQUE Statements

- FIND FIRST statements are converted to FIND (1) statements and a GET statement is added to reference any data. FIND FIRST is not valid in Structured mode.

- FIND NUMBER statements using the WHERE clause, are converted to FIND (1) statements. The WHERE clause for FIND NUMBER is not valid in Structured mode. If the WHERE clause is not present, then the FIND NUMBER statement is retained.

- FIND UNIQUE statements are converted to FIND (1) statements and a GET statement is added to reference any data. FIND UNIQUE is not valid in Structured mode.

Example:

Before Conversion:

```
PROGRAM1
::::
0040 FIND FIRST EMPLOYEES WITH NAME = 'ADKINSON'
0050   WHERE SEX EQ 'F'
0060 WRITE '=' (70)
0070 WRITE 'THE NUMBER OF ADKINSON''S ON FILE =' *NUMBER
0080 WRITE 'THE NUMBER OF FEMALE ADKINSON''S  =' *COUNTER
0090 WRITE 'THE FIRST RECORD LOCATED IS:'
0100 / 5T'P-id:' PERSONNEL-ID (CD=RE)
0110 / 5T 'Name:' NAME (CD=RE)
0120 / 5T 'Sex :' SEX (CD=RE)
::::
0160 FIND NUMBER VEHICLES WITH MAKE = 'BMW'
0170   WHERE COLOR EQ 'BLACK'
0180 WRITE 'THE NUMBER OF BMW''S FOUND =' *NUMBER
0190 WRITE 'THE NUMBER OF BLACK BMW''S =' *COUNTER
::::
0230 FIND NUMBER VEHICLES WITH MAKE = 'FORD'
0240 WRITE 'THE NUMBER OF FORD''S FOUND =' *NUMBER
::::
0280 FIND UNIQUE PERSONNEL WITH NAME = 'BAYER'
0290 WRITE 'PERSONNEL INFORMATION FOUND :'
0300 / 'Last  Name:' NAME (CD=GR)
0310 / 'First Name:' FIRST-NAME (CD=GR)
0320 / 'Job Title :' JOB (CD=GR)
::::
```

After Conversion:

PROGRAM1

```
::::
0280 FIND-0040.
0290 FIND (1) EMPLOYEES WITH NAME = 'ADKINSON'
0300 WHERE SEX EQ 'F'
0310 END-FIND
0320 GET-FIND-0040.
0330 GET EMPLOYEES *ISN ( FIND-0040. )
0340 WRITE '=' (70)
0350 WRITE 'THE NUMBER OF ADKINSON''S ON FILE =' *NUMBER (FIND-0040.)
0360 WRITE 'THE NUMBER OF FEMALE ADKINSON''S  =' *COUNTER (FIND-0040.)
0370 WRITE 'THE FIRST RECORD LOCATED IS:'
0380 / 5T 'P-id:' PERSONNEL-ID (CD=RE)
0390 / 5T 'Name:' NAME (CD=RE)
0400 / 5T 'Sex :' SEX (CD=RE)
::::
0440 FIND-0160.
0450 FIND (1) VEHICLES WITH MAKE = 'BMW'
0460 WHERE COLOR EQ 'BLACK'
0470 END-FIND
0480 WRITE 'THE NUMBER OF BMW''S FOUND =' *NUMBER (FIND-0160.)
0490 WRITE 'THE NUMBER OF BLACK BMW''S =' *COUNTER (FIND-0160.)
::::
0530 FIND-0230.
0540 FIND NUMBER VEHICLES-1 WITH MAKE = 'FORD'
0550 WRITE 'THE NUMBER OF FORD''S FOUND =' *NUMBER (FIND-0230.)
::::
0590 FIND-0280.
0600 FIND (1) PERSONNEL WITH NAME = 'BAYER'
0610 END-FIND
0620 GET-FIND-0280.
0630 GET PERSONNEL *ISN (FIND-0280.)
0640 WRITE 'PERSONNEL INFORMATION FOUND :'
0650 / 'Last  Name:' NAME (CD=GR)
0660 / 'First Name:' FIRST-NAME (CD=GR)
0670 / 'Job Title :' JOB (CD=GR)
::::
```

Mode Conversion GDA Processing

The first stage of the Mode Conversion process is to address the Global data requirements within the application.

GDA Options Overview

When the Mode Conversion option is invoked, the Mode Conversion GDA Information window is displayed showing the GDA usage for the current application and the default GDA Options that will be set on the Mode Conversion GDA Options screen.

For each application being converted, there are three possible GDA options available:

1. Use new GDA

This will generate a new GDA object that will contain all the Global data used within the application. This may include all Global data from one or more existing GDA objects already used by the application and/or any in-line Global data definitions found within individual objects. The Mode Conversion process will use the new GDA object name as part of the 'DEFINE DATA GLOBAL USING' statement within each newly converted object that references Global data.

It is recommended that this option is used to ensure all Global data used by the application, is encapsulated within one GDA object. For applications using multiple GDA objects, this option will rationalize the GDA objects into one single GDA object.

2. Use converted GDA

This will use a previously generated GDA object, from a previous Mode Conversion execution using option 1 above. The Mode Conversion process will use the previously converted GDA object name as part of the 'DEFINE DATA GLOBAL USING' statement within each newly converted object that references Global data.

This option may be used if an application is being converted in phases using object ranges, or when additional single objects are being converted.

Note: This option is only available if the Mode Conversion process has been previously executed using the 'Use new GDA' option and the modification library contains the GDA object specified.

3. Use existing GDA

This will use the existing application GDA objects and the Mode Conversion process will not change the 'DEFINE DATA GLOBAL USING' statements within each newly converted object that references the GDA data.

If the application uses any in-line Global data definitions in addition to GDA objects, then the Mode Conversion In-line Global Variables option is invoked. This option allows you to specify the GDA object name, which will be generated to encapsulate all in-line Global data definitions used by the application. The Mode Conversion process will then add the 'DEFINE DATA GLOBAL USING' statements within each newly converted object that only references in-line Global data definitions.

Note: The Mode Conversion In-line Global Variables option is mandatory for any application that uses a mix of GDA objects and in-line Global data definitions when using the 'Use existing GDA' option. This is to ensure that the application Global data usage integrity is maintained after conversion.

GDA Processing Considerations

1. Duplicate Global data definitions.

Any Global data definitions that have the same name, format and length will be rationalized as one variable in the generated GDA.

Any Global data definitions that have the same name but different format and/or length will not be added to the generated GDA object. These will be reported in the Mode Conversion Log. For example:

```
Duplicate Global variable name with different format detected in Object: G02
  - Global variable: +DUPLICATE-NAME-DIFF-FORMAT (A020)
  - Global variable already included from Object: G01
```

2. Global data definitions used by subprograms.

Any Global data definitions found within GDA objects only used by subprograms will not be added to the generated GDA object. These will be reported in the Mode Conversion Log. For example:

```
GDA object only used by Subprograms detected - Object: SPGMGDA1
  - This GDA is not included in the new GDA
```

Any in-line Global data definitions found within subprograms will not be added to the generated GDA object. These will be reported in the Mode Conversion Log. For example:

```
In-line Global variable only used by Subprograms detected - Object: SUBPGM1
  - Global variable: +SUBPGM-INLINE-GLOBAL
  - This Global variable is not included in the new GDA
```

Note: Any subprograms containing in-line Global data definitions will not be converted. These will have to be manually rationalized before conversion is allowed. Subprograms using GDA objects will be converted.

3. Applications using multiple GDA objects.

Applications using multiple GDA objects can be addressed in any one of three ways:

1. Manually rationalize the multiple GDA objects into a new single GDA object. Any in-line Global data definitions would need to be identified and added to the new single GDA object. The application objects referencing Global data need to be changed to reference the new single GDA. Once this has been completed, the application needs to be extracted and loaded into the Repository, then the Mode Conversion process executed using the 'Use new GDA' option.

Note: This is the recommended method of dealing with multiple GDA objects as it will ensure the stability of the Global data usage within the application.

2. Automatically rationalize the multiple GDA objects into a new single GDA object using the Mode Conversion 'Use new GDA' option. This will generate a new single GDA object based on the GDA objects and any in-line Global data definitions found within the application.

3. Use the existing GDA objects. The existing GDA object usage within the application will be retained and any in-line Global data definitions will be encapsulated within a new single GDA object.

Mode Conversion GDA Information Window

The Mode Conversion GDA Information screen displays the Global data usage information for the application along with the default options that will be displayed on the Mode Conversion GDA Options screen.

The Mode Conversion GDA Information screen will be displayed after selecting the option Utilities➔Mode Conversion.

The following Figure 3-1 illustrates an example of the Mode Conversion GDA Information screen.
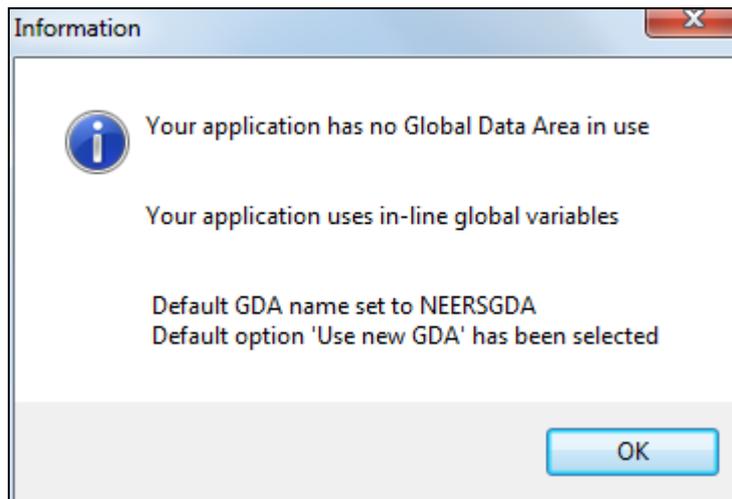
Figure 3-1 Example of the Mode Conversion GDA Information screen

The information displayed will be based on the following cases:

1. Application uses no Global data.

The application uses no Global data, either as GDA objects or in-line Global variable definitions.

SCREEN ITEMS	DESCRIPTION
GDA Information	For all GDA process executions:
	"Your application has no Global variables"
Default Options	Not applicable for this case.
OK button	Invoke the Mode Conversion Object Selection screen.

2. Application uses in-line Global variables only.

The application uses Global variables that have been defined in-line. The application does not use any GDA objects.

SCREEN ITEMS	DESCRIPTION
GDA Information	For all GDA process executions:
	"Your application has no Global Data Area in use"
	"Your application uses in-line global variables"
Default Options	For first time GDA process execution:
	"Default GDA name set to NEERSGDA"
	"Default option 'Use new GDA' has been selected"
	For subsequent GDA process execution:
	"Default option 'Use converted GDA' has been selected"
OK button	Invoke the Mode Conversion GDA Options screen.

3. Application uses a single GDA object only.

The application uses Global variables that have been defined in a single GDA object. The application does not use any Global variables that have been defined in-line.

SCREEN ITEMS	DESCRIPTION
GDA Information	For all GDA process executions:
	"Your application has one Global Data Area in use"
	- 'GDA-name'
Default Options	For all GDA process executions:
	"Default option 'Use existing GDA' has been selected"
OK button	Invoke the Mode Conversion GDA Options screen.

Note: 'GDA-name' will be the GDA object name within the application.

4. Application uses a single GDA object and in-line Global variables.

The application uses Global variables that have been defined using a single GDA object and in-line definitions.

SCREEN ITEMS	DESCRIPTION
GDA Information	For all GDA process executions:
	"Your application has one Global Data Area in use"
	- 'GDA-name'
	"Your application uses in-line global variables"
Default Options	For first time GDA process execution:
	"Default GDA name set to 'GDA-name'"
	"Default option 'Use new GDA' has been selected"
	For subsequent GDA process execution:
	"Default option 'Use converted GDA' has been selected"
OK button	Invoke the Mode Conversion GDA Options screen.

Note: 'GDA-name' will be the GDA object name within the application.

5. Application uses multiple GDA objects and no in-line Global variables.

The application uses Global variables that have been defined in more than one GDA object. The application does not use any Global variables that have been defined in-line.

SCREEN ITEMS	DESCRIPTION
GDA Information	For all GDA process executions:
	"Your application has more than one Global Data Area in use"
	- 'GDA-name' - 'GDA-name'
	Note: A maximum of four GDA object names will be displayed. If there are more than four GDA objects are used, then the text '<MORE>' will be shown. For example:
	- 'GDA-name' *- 'GDA-name'* *- 'GDA-name'* *- 'GDA-name'* *- <MORE>*
Default Options	For all GDA process executions:
	"Default option 'Use existing GDAs' has been selected"
OK button	Invoke the Mode Conversion GDA Options screen.

Note: 'GDA-name' will be the GDA object name within the application.

6. Application uses a mix of multiple GDA objects and in-line Global variables.

The application uses Global variables that have been defined using both GDA objects and in-line definitions.

SCREEN ITEMS	DESCRIPTION
GDA Information	For all GDA process executions:
	"Your application has more than one Global Data Area in use"
	- 'GDA-name' - 'GDA-name'
	"Your application uses in-line global variables"
	Note: A maximum of four GDA object names will be displayed. If there are more than four GDA objects are used, then the text '<MORE>' will be shown. For example:
	- 'GDA-name' *- 'GDA-name'* *- 'GDA-name'* *- 'GDA-name'*
	- <MORE>
Default Options	For all GDA process executions:
	"Default option 'Use existing GDAs' has been selected"
OK button	Invoke the Mode Conversion GDA Options screen.

Note: 'GDA-name' will be the GDA object name within the application.

Mode Conversion GDA Options Window

The Mode Conversion GDA Options screen allows you to specify what GDA processing is to be applied to the converted application.

Note: If the application uses no Global data (either as GDA objects or in-line Global variable definitions) then the Mode Conversion GDA Options screen will not be displayed.

The Mode Conversion GDA Options screen is invoked by using the '**OK**' button on the Mode Conversion GDA Information screen.

The following Figure 3-2 illustrates the Mode Conversion GDA Options screen.
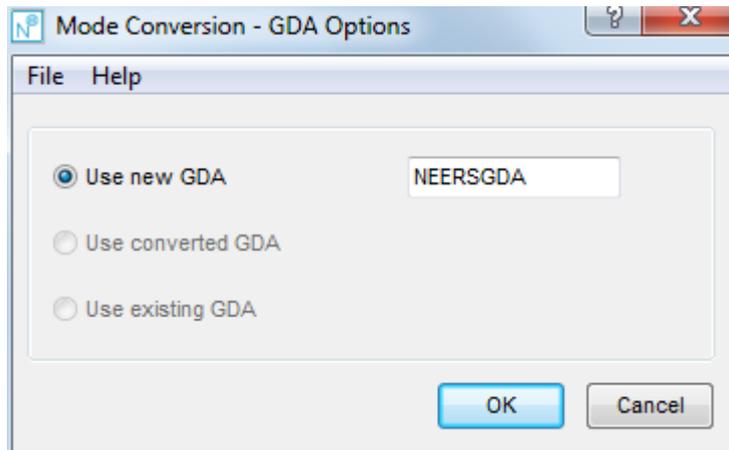
Figure 3-2 Mode Conversion GDA Options screen

MENU ITEMS	OPTIONS	DESCRIPTION
File	**Exit**	Exit the Mode Conversion GDA Options screen and return back to the main Natural Engineer screen.
Help		Invoke the Mode Conversion GDA Options help.

SCREEN ITEMS	DESCRIPTION
Use new GDA	Specify this option to create a new GDA object to be used by the converted application.
GDA Name	Specify the GDA object name to be used. The GDA name is mandatory if the 'Use new GDA' option has been selected.
	The GDA name will normally appear 'blank' except under the following conditions:
	1. Will be set to NEERSGDA if the application only uses in-line Global definitions and has no GDA objects.
	2. Will be set to the 'GDA-name' used by the application if the application uses in-line Global definitions and a single GDA object.
	Note: These default values may be overwritten as required.
Use converted GDA	Specify this option if you wish to use a previously converted GDA object.
	The name of the previously converted GDA object will appear enclosed in brackets. For example [NEERSGDA].
	Note: This option is only available if the Mode Conversion process has been previously executed using the 'Use new GDA' option and the modification library contains the GDA object specified.
Use existing GDA	Specify this option if you wish to use the application's existing GDA objects.
	Note: If the application uses any in-line Global definitions, then the Mode Conversion In-line Global Variables screen will be displayed.

BUTTON NAME	DESCRIPTION
OK	Validates the selection made and invokes one of the following processes depending on the option selected:
	1. 'Use new GDA'
	Mode Conversion process will be invoked to generate the new GDA object. Depending on the volume of Global data present, the GDA generation may take some time to complete. The Mode Conversion Object Selection screen will not be displayed until this process has completed.
	2. 'Use converted GDA'
	Mode Conversion Object Selection screen displayed.
	3. 'Use existing GDA'
	If the application uses no in-line Global definitions then the Mode Conversion Object Selection screen will be displayed.
	If the application does use in-line Global definitions, then the Mode Conversion In-line Global Variables screen will be displayed.
Cancel	Cancel the Mode Conversion GDA Options process and return back to the main Natural Engineer screen.

Mode Conversion In-line Global Variables Window

The Mode Conversion In-line Global Variables screen allows you to specify the GDA object name to be used for any in-line Global variable definitions found within the application.

This option is mandatory if the application uses both GDA objects and in-line Global variable definitions.

Note: The Mode Conversion In-line Global Variables screen is only displayed if the 'Use existing GDA' option has been selected on the Mode Conversion GDA Options screen and the application contains in-line Global variable definitions.

The Mode Conversion In-line Global Variables screen is invoked by selecting option 'Use existing GDA' on the Mode Conversion GDA Options screen and using the '**OK**' button.

The following Figure 3-3 illustrates the Mode Conversion In-line Global Variables screen.
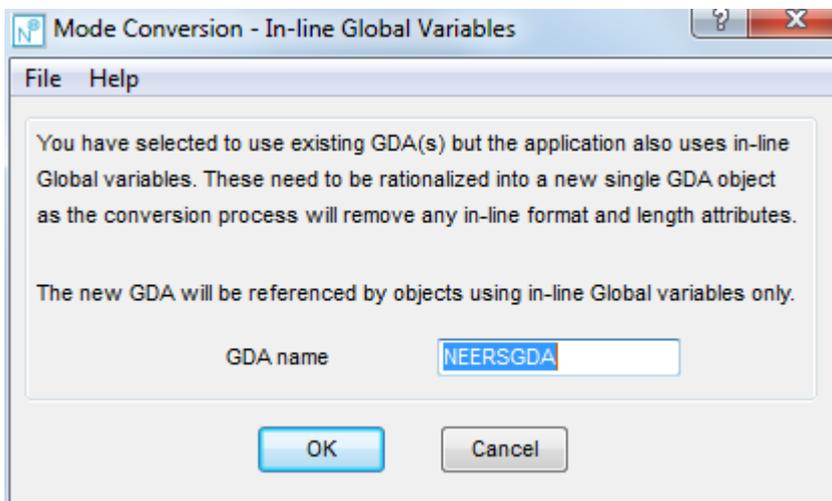
Figure 3-3 Mode Conversion In-line Global Variables screen

MENU ITEMS	OPTIONS	DESCRIPTION
File	**Exit**	Exit the Mode Conversion In-line Global Variables screen and return back to the Mode Conversion GDA Options screen.
Help		Invoke the Mode Conversion In-line Global Variables help.

SCREEN ITEMS	DESCRIPTION
Explanation text	Provides an explanation for the Mode Conversion In-line Global Variables option.
GDA name	Specify the GDA object name to be used. The GDA name is mandatory and the GDA object name must not already exist on the modification library. The default GDA name will be set to 'NEERSGDA'. This may be overwritten as required.

BUTTON NAME	DESCRIPTION
OK	Validates the selection made and invokes the Mode Conversion process to generate the new GDA object. Once completed, the Mode Conversion Object Selection screen will be displayed. *Note: If the GDA name specified already exists on the modification library an error message will be displayed. The GDA name will need to be changed before you can continue.*
Cancel	Cancel the Mode Conversion In-line Global Variables process and return back to the Mode Conversion GDA Options screen.

Mode Conversion Object Processing

The second stage of the Mode Conversion process is to select the objects to be converted and then invoke the Mode Conversion Object processing.

Mode Conversion Object Selection Window

The Mode Conversion Object Selection screen allows you to select the objects that are to be converted for the application.

The Mode Conversion Object Selection screen is invoked by using the '**OK**' button on the Mode Conversion GDA Options screen.

The following Figure 3-4 illustrates the Mode Conversion Object Selection screen.
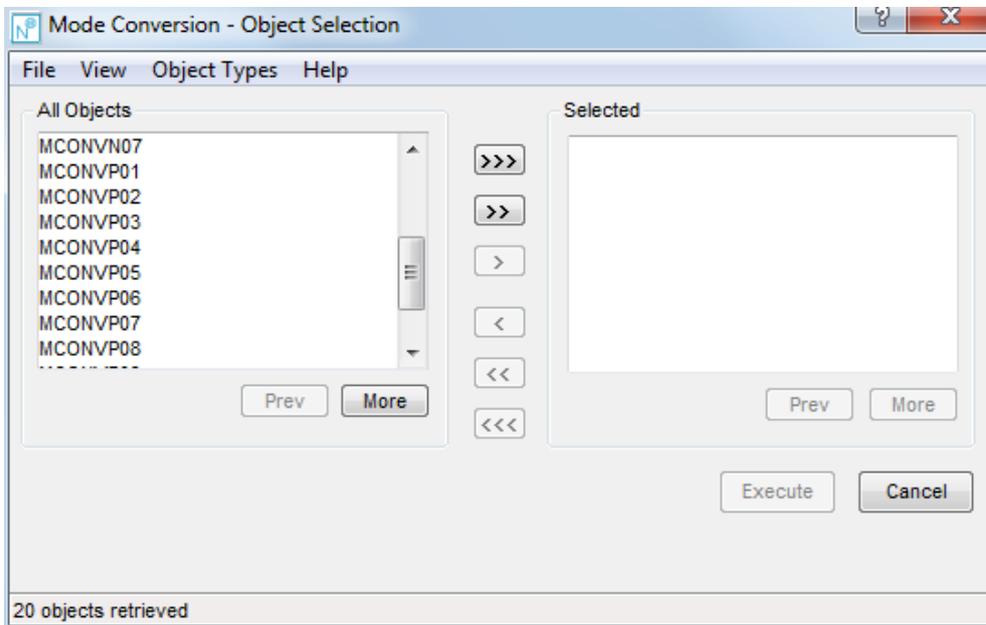
Figure 3-4 Mode Conversion Object Selection screen

MENU ITEMS	OPTIONS	DESCRIPTION
File	**Exit**	Exit the Mode Conversion Object Selection screen and return back to the main Natural Engineer screen.
View	**Change Start Position of Object List…**	Reposition the list of objects to start from a particular object name.
		The reposition value can be input using either a complete name or part name using an '*' (asterisk) wildcard.
		The reposition value is appended to the object list title to highlight the type of repositioning being applied.
		Possible reposition values are:

Value	Result
' ' (blank)	Reposition to the top of the object list.
*	Reposition to the top of the object list.
ABC*	Only show objects that are prefixed by 'ABC'.
XYZ	Reposition to the first object that either matches or is greater than 'XYZ' and then continue the object list from that point.

Object Types	Allows you to select the types of object to be listed.	
	Available selections are:	
	▪ **All Objects**	
	▪ **Copycodes**	
	▪ **Helproutines**	
	▪ **Programs**	
	▪ **Subprograms**	
	▪ **Subroutines**	
Help	Invoke the Mode Conversion Object Selection help.	

SCREEN ITEMS	DESCRIPTION
Object List	List all the Reporting mode objects used by the currently selected application.
	Note: No Structured mode objects will be listed.
	The list of objects can be tailored to your requirements using the options available in the Object Types menu. Further refinement can be made using the option 'Change Start Position of Object List…' from the View menu.
	The Object List title reflects the Object Types being listed and will append any reposition values that may have been specified.
	Objects can be selected by using a double click with the **left hand mouse button**.
Selected	List all the objects that have been selected for Mode Conversion.
	Note: At least one object must be selected to run the conversion process.
	Objects can be de-selected by using a double click with the **left hand mouse button**.

BUTTON NAME	DESCRIPTION
Object List group:	
Prev	Scrolls the object list to previous page.
	This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
More	Scrolls the object list forward one page.
	This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.

BUTTON NAME	DESCRIPTION
Selection / De-selection buttons:	
>>>	Select all objects in the object list (when more than one page is available, as set by the LISTBOXMAX parameter in the NATENG.INI file).
>>	Select all objects on the current page in the object list.
>	Select all selected objects in the object list.
<	De-select all selected objects in the selected list.
<<	De-select all objects on the current page in the selected list.
<<<	De-select all objects in the selected list (when more than one page is available, as set by the LISTBOXMAX parameter in the NATENG.INI file).
Selected group:	
Prev	Scrolls the selected list to previous page.
	This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
More	Scrolls the selected list forward one page.
	This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
Mode Conversion Object Selection screen:	
Execute	Invoke the Mode Conversion process for the selected objects.
Cancel	Cancel any object selection and return back to the Mode Conversion GDA Options screen.
	Note: If your application uses no Global data (either as GDA objects or in-line Global variable definitions) then you will be returned to the main Natural Engineer screen.

Note: For more information on the NATENG.INI file parameter LISTBOXMAX refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.

STATUS BAR ITEM	DESCRIPTION
Pane	Any Mode Conversion Object Selection processing messages.

Mode Conversion Information Window

The Mode Conversion Information screen summarizes the GDA options to be applied during the conversion process. It is possible at this stage to cancel the conversion process and make new object selection and/or change the GDA options to be used.

Note: If the application uses no Global data (either as GDA objects or in-line Global variable definitions) then the Mode Conversion Information screen will not be displayed.

The following Figure 3-5 illustrates an example of the Mode Conversion Information screen.
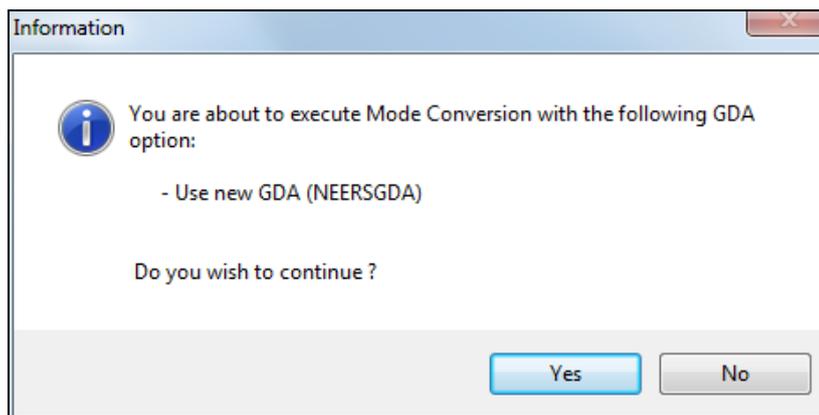
Figure 3-5 Example of the Mode Conversion Information screen

SCREEN ITEMS	DESCRIPTION
You are about to execute Mode Conversion with the following GDA option:	List the GDA option that will be used during the conversion process. The GDA options available are: **- Use new GDA ['GDA-name']** Conversion will use the new GDA 'GDA-name' when converting objects. **- Use converted GDA ['GDA-name']** Conversion will use the previously converted GDA 'GDA-name' when converting objects. **- Use existing GDA** Conversion will use the existing application GDA when converting objects. *Note: 'GDA-name' will contain the name of the GDA that has been specified on the Mode Conversion GDA Options screen.*

BUTTON NAME	DESCRIPTION
Yes	Invoke the Mode Conversion process.
No	Cancel the Mode Conversion process and return back to the Mode Conversion Object Selection screen.

Canceling Active Mode Conversion Tasks

Once the Mode Conversion process has been invoked, it is possible to cancel the conversion by using the '**Cancel**' button on the Mode Conversion progress window.

This will cancel the mode conversion process after the current object has been converted. A log entry will then be displayed in the Mode Conversion Log. For example:

PGM1 converted to Structured mode
PGM2 - Process interrupted by user

Note: For more information on the Mode Conversion Log refer to section *Mode* *Conversion Log Window.*

Overwrite Warning Window

In the event that Mode Conversion is being re-run for an application, any objects that already exist in the modification library will result in the Overwrite Warning window being displayed.

The following Figure 3-6 illustrates the Overwrite Warning window.
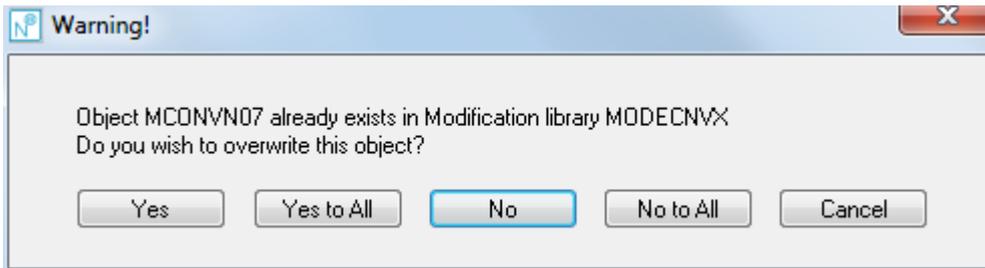
Figure 3-6 Overwrite Warning window

BUTTON NAME	DESCRIPTION
Yes	Allow the current object to be overwritten in the modification library. The Overwrite Warning window will re-display for the next object found in the modification library.
Yes to All	Allow the current object to be overwritten in the modification library and also overwrite any subsequent objects. The Overwrite Warning window will not be displayed for any subsequent objects found in the modification library.
No	Do not allow the current object to be overwritten in the modification library. The object will not be converted. The Overwrite Warning window will re-display for the next object found in the modification library. A log entry for each object will be displayed in the Mode Conversion Log. For Example: **PGM1 not replaced - user specified**
No to All	Do not allow the current object to be overwritten in the modification library and also do not overwrite any subsequent objects. These objects will not be converted. The Overwrite Warning window will not be displayed for any subsequent objects found in the modification library. A log entry for each object will be displayed in the Mode Conversion Log. For Example: **PGM1 not replaced - user specified** **PGM2 not replaced - user specified**
Cancel	Cancel the Mode Conversion Process and display the Mode Conversion Log screen with the following log entry: **Process cancelled**

Mode Conversion Log Window

The Mode Conversion Log screen is displayed at the end of a conversion process. The Mode conversion log screen will contain a list of entries showing the conversion process activity.

The following Figure 3-7 illustrates the Mode Conversion Log screen showing GDA conversion details.
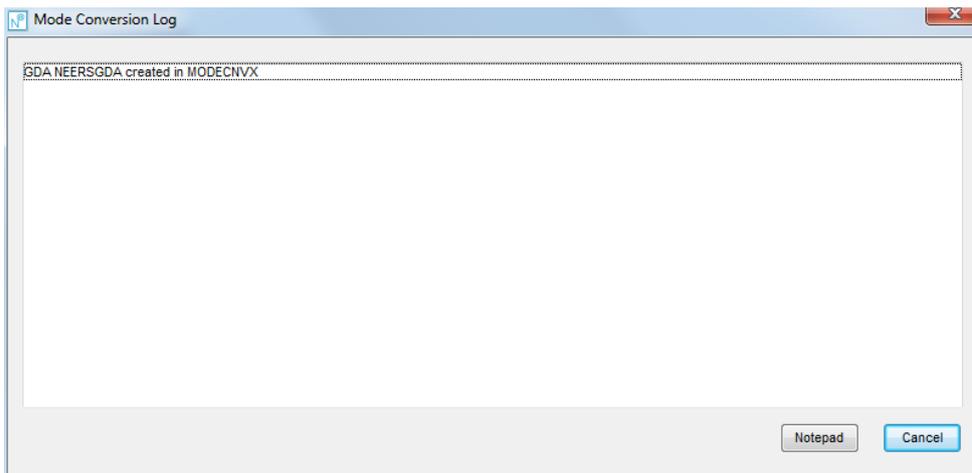
Figure 3-7 Mode Conversion Log screen showing GDA conversion details

The following Figure 3-8 illustrates the Mode Conversion Log screen showing object conversion details.
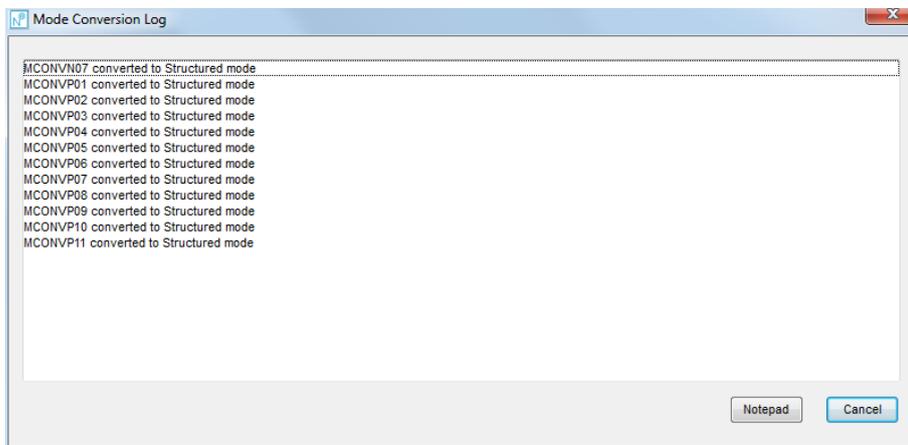
Figure 3-8 Mode Conversion Log screen showing object conversion details

SCREEN ITEMS	DESCRIPTION
Details	A separate entry for each object and/or process action will be displayed here. Example entries: **GDA NEERSGDA created in MODECNVX** **PGM1 converted to Structured mode** **PGM1 not replaced - user specified** **PGM1 - Process interrupted by user** **Process cancelled** **SUBPGM1 cannot be converted. SubProgram contains in-line globals** *Note: Entries for duplicate Global data definitions and Global data definitions used by subprograms are also displayed. For examples of these refer to section GDA Processing Considerations.*

BUTTON NAME	DESCRIPTION
Notepad	Opens the text editor Notepad using the Mode Conversion files: • 'Convgda.txt' - for GDA conversion details. • 'Convobj.txt' - for object conversion details. From here it is possible to print the log details and/or save them. *Note: The Mode Conversion files are located in the DATA directory of the Natural Engineer installation.*
Cancel	Cancel the Mode Conversion Log process and return to the main Natural Engineer screen. *Note: If the last function was 'Use new GDA', the Mode Conversion Object Selection screen will be displayed.*

CHANGE MANAGEMENT TRACKING (CMT)

Chapter Overview

This chapter describes the Change Management Tracking (CMT) option available from the Utilities menu. The CMT option provides the facility to track changes that have been applied to objects within an application using Natural Engineer.

The following topics are covered:

Change Management Tracking Overview

The CMT option provides audit trail data per object within an application that has used Natural Engineer to administer maintenance changes.

Any updates applied by Natural Engineer to an application's objects generate audit trail records for the application on the Repository. These audit trail records contain the before and after images of updated code, a date and time stamp of when the updates were made and the User Id of the person making the update.

The audit trail records are accumulated per object, and are only deleted when the application is deleted from the Repository. This allows for complete tracking of updates for an application during its maintenance life cycle within Natural Engineer.

The audit trail records can be viewed online or as hardcopy reports using the standard reporting formats.

CMT Object Viewer Window

The CMT Object Viewer screen allows you to select and review online audit trail records for individual objects. These audit trail records can be seen for a single version or for all versions for that object.

The list of objects that have been loaded in the Repository and have had modification within Natural Engineer applied to them, are listed in a selection box. When an object is selected the relevant audit trail records will be displayed.

The CMT Object Viewer screen is accessed by the following menu navigation: Utilities ➔Change Management Tracking➔Object Viewer.

The following Figure 4-1 illustrates the CMT Object Viewer screen.
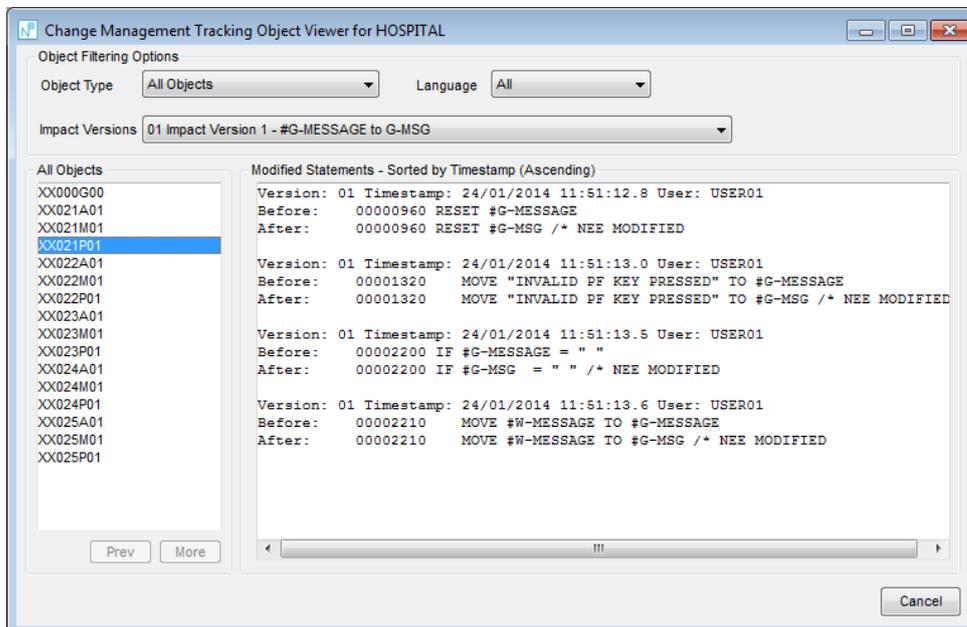
Figure 4-1 CMT Object Viewer screen

SCREEN ITEMS	DESCRIPTION
Object Filtering group:	
Object Types	Allows you to select the types of object to be listed.
	Available selections are:
	All Objects **Classes** **Copycodes** **Dialogs** **Functions** **Global Data Areas** **Helproutines** **Local Data Areas** **Maps** **Parameter Data Areas** **Programs** **Subprograms** **Subroutines**
Language	Allows you to select the programming language of the objects to be listed.
	Available selections are:
	All **Cobol** **Natural**
Impact Version	Change the Impact version to review alternate audit trail records for the currently selected application.
Object List group:	
Object List	Lists all the impacted objects for the current Impact Version.
	The list of objects can be tailored to your requirements using the options available in the Object Types and Language menus. Further refinement can be made using the option 'Change Start Position of Object List…' from the Object List context menu.
	The Object List title reflects the Object Types being listed and will append any reposition values that may have been specified.

SCREEN ITEMS	DESCRIPTION
Modified Statements group:	
Modified Statements	Displays the audit trail records for the selected object, for the selected Impact Version.
	The sort order for the list of statements can be tailored to your requirements using the options available in the Modified Statements context menu.
	The Modified Statements title reflects the sort order selection in force.

BUTTON NAME	DESCRIPTION
Object Filtering group:	
Prev	Scrolls the object list to previous page.
	This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
More	Scrolls the object list forward one page.
	This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
CMT Object Viewer screen:	
Cancel	Cancel the CMT Object Viewer process and return back to the main Natural Engineer screen.

Note: For more information on the NATENG.INI file parameter LISTBOXMAX refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.

CMT Object Viewer Context Menus

The CMT Object Viewer context menus are invoked by placing the cursor on any of the items listed in the Object or Modified Statements lists using the right hand mouse button with a single click.

Object List Context Menu

The Object list context menu provides the facility to tailor the list of objects displayed in the Object list.

CONTEXT MENU ITEM	DESCRIPTION
Change Start Position of Object List…	Reposition the list of objects to start from a particular object name.
	The reposition value can be input using either a complete name or part name using an '*' (asterisk) wildcard.
	The reposition value is appended to the object list title to highlight the type of repositioning being applied.
	Possible reposition values are:

Value	Result
' ' (blank)	Reposition to the top of the object list.
*	Reposition to the top of the object list.
ABC*	Only show objects that are prefixed by 'ABC'.
XYZ	Reposition to the first object that either matches or is greater than 'XYZ' and then continue the object list from that point.

Modified Statements Context Menu

The Modified Statements context menu provides the facility to reorganize the list of audit trail records in the Modified Statements list.

CONTEXT MENU ITEM	DESCRIPTION
Audit Record Sort Order	Sort the data to show the audit trail records in one of the following orders: ▪ **Timestamp – Ascending.** ▪ **Timestamp – Descending.** ▪ **User Id – Ascending.** ▪ **User Id – Descending.** ▪ **Line Number – Ascending.** ▪ **Line Number – Descending.**

CMT Reports Window

The CMT Reports screen allows you to review audit trail records for individual or a range of objects within an application using any one of three reporting options.

The CMT Reports screen is accessed by the following menu navigation: Utilities➔ Change Management Tracking➔Reports.

The following Figure 4-2 illustrates the CMT Reports screen.
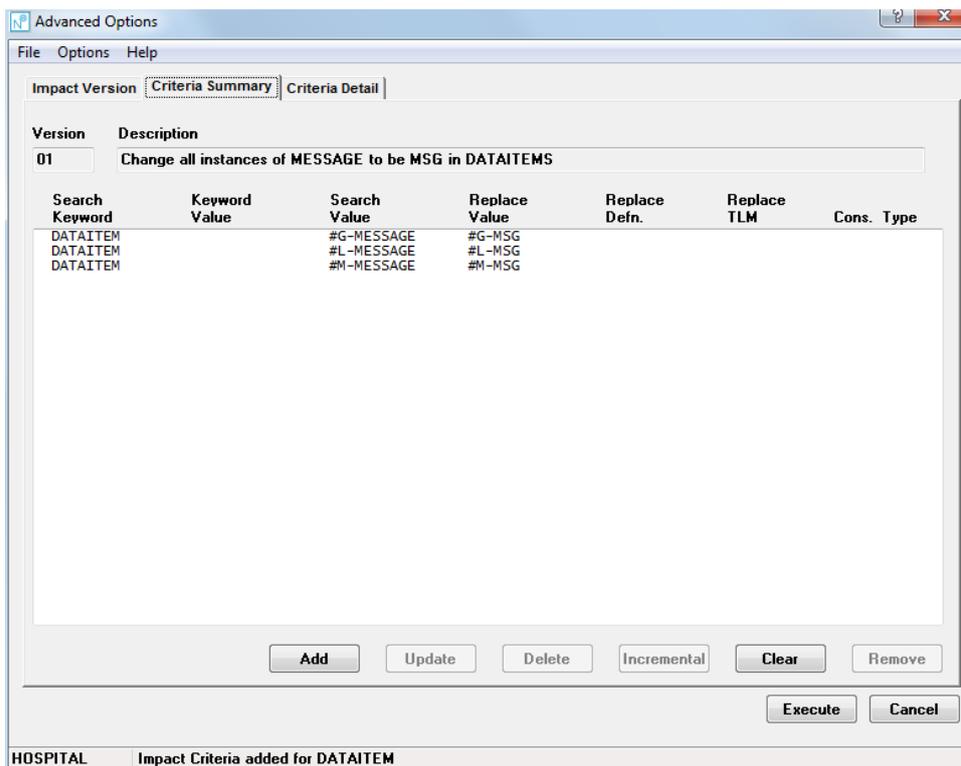
Figure 4-2 CMT Reports screen

SCREEN ITEMS	DESCRIPTION	
Report Options group:		
Selected Object	The name of the object or range of objects to be used in the report.	
	A single object can be selected by typing in the object name.	
	A range of objects can be selected by typing in the start of range object name in the 'from' section followed by the end of range object name in the 'to' section. For example: 'XX001P01' to 'XX002P01' will include all objects that are within this range.	
	A group of objects can be selected by typing in a part name with a single '*' (asterisk). For example: 'XX001*' will include all the objects that are prefixed with 'XX001'.	
	All objects can be selected by typing in a single '*' (asterisk).	
	The object names can also be selected by using the Selected Object from and Selected Object to Selection buttons [….].	
Version	Change the Impact version to review alternate audit trail records for the currently selected application.	
Date	Date ranges, to limit the audit trail records reported to the selected date range values.	
	Date Operator	The operator used to qualify the date range specified. Available selections are: **GT – greater than.** **LT – less than.** **EQ – equal to**.
	From Date	Start from date using format DDMMYYYY.
	To Date	End at date using format DDMMYYYY.
Language	Programming language of the objects, to limit the audit trail records reported to the selected programming language. Available selections are: ▪ **All** ▪ **Cobol** ▪ **Natural**	
User Id	User Id of the person responsible for the changes, to limit the audit trail records reported to the selected user.	
	This input is case dependent. For example:	
	'xx209' will only report a User Id of 'xx209' and not 'XX209'.	

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SCREEN ITEMS	DESCRIPTION

Sort Order — The Sort order that the audit trail records will be displayed in the report. Available selections are:

- **Timestamp – Ascending.**
- **Timestamp – Descending.**
- **User Id – Ascending.**
- **User Id – Descending.**
- **Line Number – Ascending.**
- **Line Number – Descending.**

Object Types group:

Object Types — The types of object to be included in the report, to limit the audit trail records reported to the selected object types. Available selections are:

- **Classes**
- **Copycodes**
- **Dialogs**
- **Functions**
- **Global Data Areas**
- **Helproutines**
- **Local Data Areas**
- **Maps**
- **Parameter Data Areas**
- **Programs**
- **Subprograms**
- **Subroutines**

Display Options group:

Display Options — Select the required display option.

Screen	Display the report using Natural screen.
Spreadsheet	Display the report using a spreadsheet.
Word	Display the report using Word document.
PDF	Display the report using PDF document.
HTML	Display the report using HTML.

BUTTON NAME	DESCRIPTION
Report Options group:	
Selected Object from Selection [….]	Invokes the General Selection screen, listing all the objects available for the selected Impact version and programming language.
Selected Object to Selection [….]	Invokes the General Selection screen, listing all the objects available for the selected Impact version and programming language.
CMT Reports screen:	
OK	Accept the CMT Reports criteria and produce the report.
Cancel	Cancel the CMT Reports process and return back to the main Natural Engineer screen.

CMT Examples

To illustrate the Change Management Tracking process, two examples are shown using the sample Natural application HOSPITAL.

The two examples are:

1. To demonstrate the CMT Object Viewer option for a simple modification applied to the sample application HOSPITAL.

2. To demonstrate the CMT Reports option for a simple modification applied to the sample application HOSPITAL.

Example 1 – Use of CMT Object Viewer option.

This example will demonstrate the CMT Object Viewer option showing a simple set of audit trail records for objects that have been modified using the sample application HOSPITAL.

All the objects from the HOSPITAL application have been extracted and loaded into the Repository and the steps in this example start from the Impact Analysis process.

Step 1 Version 1 impact search criteria have been specified to search for keyword DATAITEM with search values of #G-MESSAGE, #L-MESSAGE and #M-MESSAGE. Replace values for each of these criteria have been specified as #G-MSG, #L-MSG and #M-MSG respectively.

The following Figure 4-3 illustrates the Criteria Summary tab screen after specifying all the criteria.
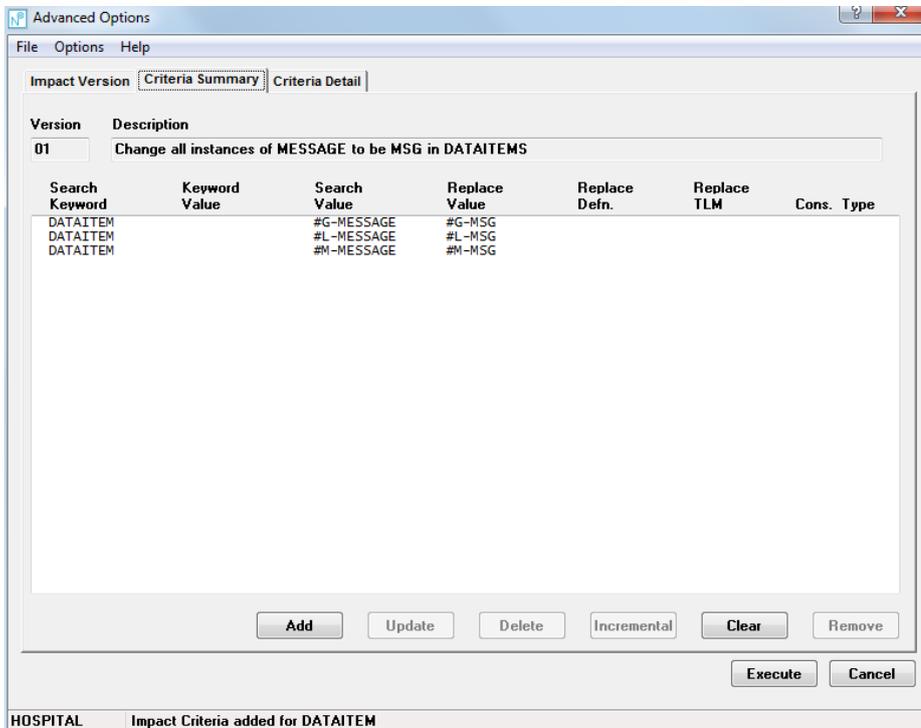
Figure 4-3 Criteria Summary tab screen after specifying all the criteria

Step 2   After Impact Analysis has been executed; modification has been applied to all the impacted objects.

The following Figure 4-4 illustrates the Modification Element Maintenance screen after all the objects have been modified. Object XX000G00 has been selected and also data item #G-MESSAGE, just to show the modification parameters that have been applied.
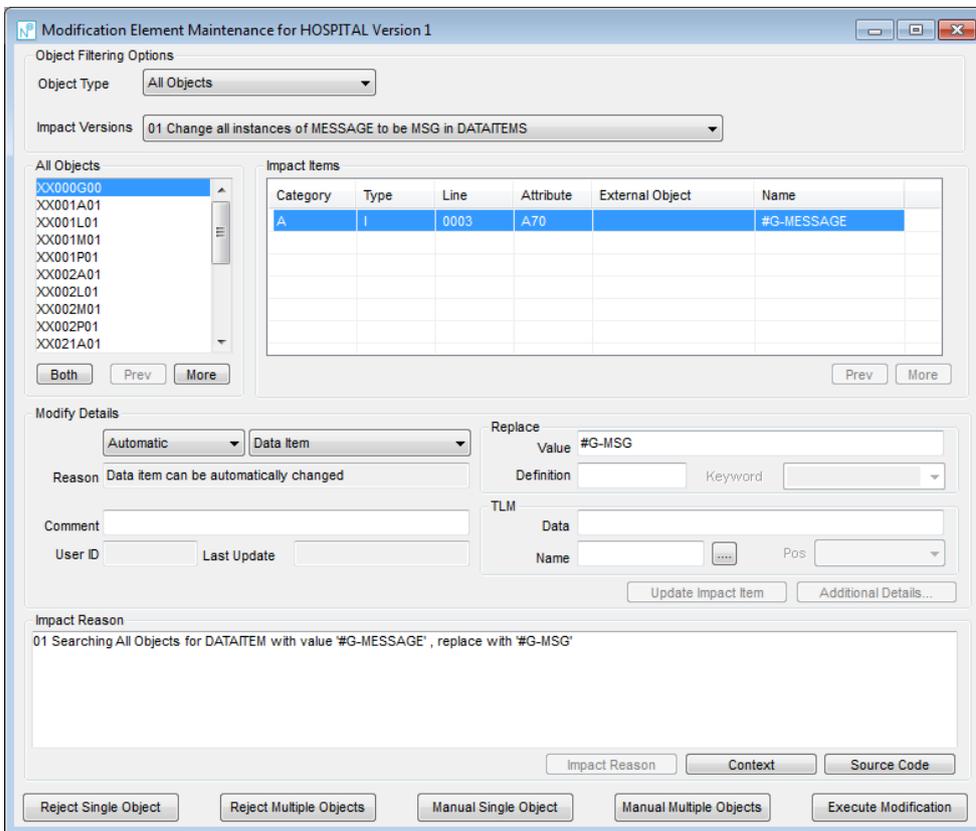
Figure 4-4 Modification Element Maintenance screen after all objects have been modified

Step 3 The CMT Object Viewer option is selected using the menu navigation Utilities➔Change Management Tracking➔Object Viewer. On the Object Viewer screen; object XX001P01 has been selected from the Modified Objects List to produce the relevant audit trail records for that object.

In the Modified statements box all the audit trail records are displayed. For each modification applied to object XX001P01 there is a before and after image of the statements. For this object, it shows the modification of #L-MESSAGE to #L-MSG. For each set of before and after images there is information to show the version applicable to that change, the timestamp of when the change was applied and the User Id that applied the change.

The following Figure 4-5 illustrates the CMT Object Viewer screen displaying object XX001P01 audit trail records.
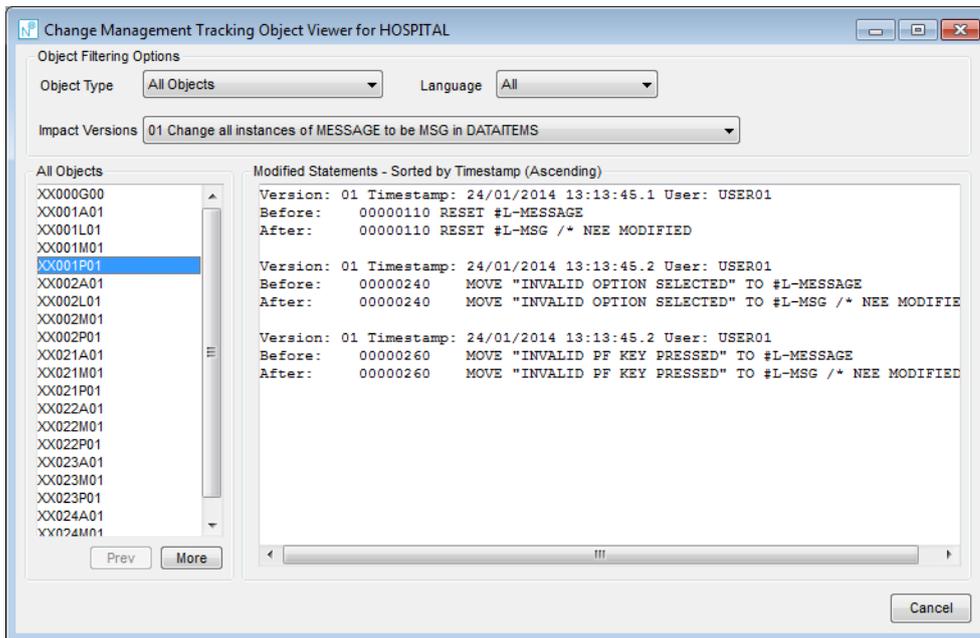
Figure 4-5 CMT Object Viewer screen displaying object XX001P01 audit trail records

Example 2 – Use of CMT Reports option.

This example will demonstrate the CMT Reports option showing a simple set of audit trail records for objects using a selection of the reporting display options.

This example uses the same objects from the application HOSPITAL, as used in example 1.

Step 1   The same set of Version 1 impact search criteria have been applied as in Example 1 above. Also, the same modifications have been executed.

Step 2   The CMT Reports option is selected using the menu navigation Utilities➔Change Management Tracking➔Reports. On the CMT Reports selection screen; module XX001P01 has been selected and the Screen reporting destination has been checked.

The following Figure 4-6 illustrates the CMT Reports screen showing the specified reporting options.

Figure 4-6 CMT Reports selection screen showing the specified reporting options

Step 3 By clicking the **OK** button on the CMT Reports selection screen; the audit trail records are displayed on the Natural screen.

The following Figure 4-7 illustrates the CMT audit trail records being displayed on the Natural screen.


```
Natural
                              Change Management Tracking System Report
                              ---------------------------------------

Application:    HOSPITAL
Criteria Order: Sorted by Timestamp - Ascending
Criteria Range: Object: XX001P01 (Object Lang.: *) (Object Types: 4C37GHLMAPNS)
Criteria Dates: For all Timestamps
Criteria Vers:   1

Object Name: XX001P01
-----------------------------------------------------------------------------------------------

  Version:   1 Timestamp: 24/01/2014 13:13:45.1 User: USER01
     Before: 00000110 RESET #L-MESSAGE
     After:  00000110 RESET #L-MSG /* NEE MODIFIED

  Version:   1 Timestamp: 24/01/2014 13:13:45.2 User: USER01
     Before: 00000240    MOVE "INVALID OPTION SELECTED" TO #L-MESSAGE
     After:  00000240    MOVE "INVALID OPTION SELECTED" TO #L-MSG /* NEE MODIFIED

  Version:   1 Timestamp: 24/01/2014 13:13:45.2 User: USER01
     Before: 00000260    MOVE "INVALID PF KEY PRESSED" TO #L-MESSAGE
     After:  00000260    MOVE "INVALID PF KEY PRESSED" TO #L-MSG /* NEE MODIFIED




Natural Engineer                          Page    1                24/January/2014    13:16
```

Figure 4-7 CMT audit trail records being displayed on the Natural screen

5

KEYWORD CATALOGUE

Chapter Overview

This chapter describes the Keyword Catalogue option available from the Utilities menu. The Keyword Catalogue option provides the facility to identify related items within the Natural Engineer Repository.

Keywords may be added when maintaining the following Natural Engineer options:

- Business Rules

- Services

- Data Model Perspectives

- Object Documentation

Note: The exact options available depend on the Natural Engineer version installed.

By specifying suitable keywords the user may group related entities. These entities can be quickly identified by using the Keyword Catalogue.

Keyword Catalogue Window

The Keyword Catalogue screen allows you to view all grouped entities depending on the keyword selected.

The Keyword Catalogue screen is accessed using the following menu navigation: Utilities➔ Keyword Catalogue.

The following Figure 5-1 illustrates the Keyword Catalogue screen.
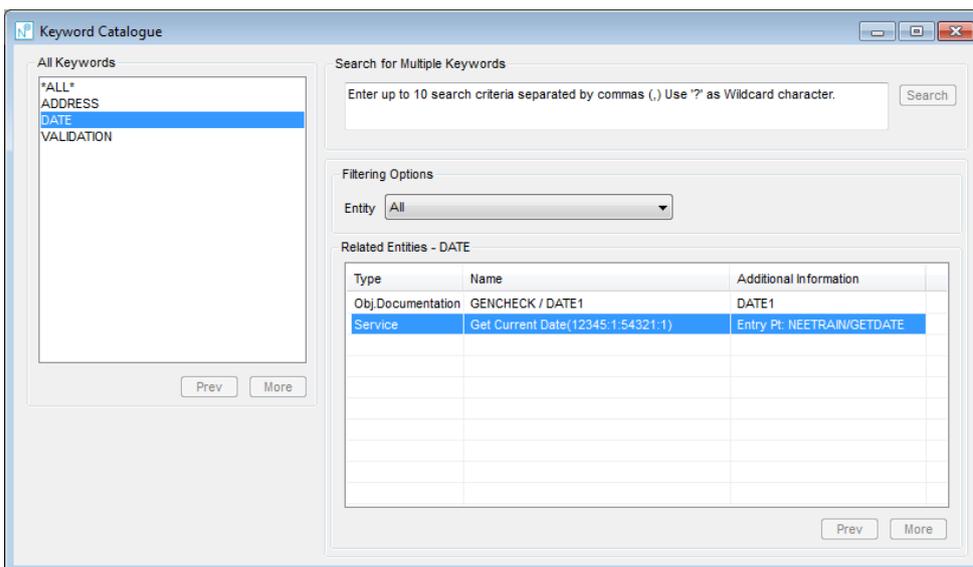
Figure 5-1 Keyword Catalogue screen

Selecting an entity will display the relevant maintenance screens for that type of entity.

SCREEN ITEMS	DESCRIPTION

Keyword Catalogue screen:

All Keywords
The list of keywords that have been added to the various entities. *ALL* will show all entities that have keywords.

*NB: By default each entity will have *ALL* added as a keyword. This allows for the identification of any 'orphaned' documentation.*

A context menu is available to change the start position of the keyword list by using the **right hand mouse button** on a selected keyword.

Search for Multiple Keywords
Searches the relevant documentation for Keywords that match all the criteria specified. The entities whose Keywords match the criteria are then shown.

Filtering Options group:

Entity
The type of Entity you wish to display.

Options available are:

All

Business Rules

Services

Data Model Perspectives

Object Documentation

Note: The exact options available depend on the Natural Engineer version installed.

Application
Filters the Object Documentation list, if selected, by application name.

NB: This is only available if Object Documentation has been selected as the entity to display.

Related Entities group:

Type
The type of Entity.

Name
The name of the Entity.

Business Rules – The name of the Business Rule

Services – The name of the Service

Data Model Perspectives – The name of the Data Model Perspective

Object Documentation – The application and object name

A context menu is available, which is tailored to the type of entity selected, by using the **right hand mouse button** on a selected object.

SCREEN ITEMS	DESCRIPTION
Additional Information	Business Rules – The component associated with the Business Rule
	Services – The entry point object of the Service
	Data Model Perspectives – The entry point DDM of the Data Model Perspective
	Object Documentation – The object title of the Object Documentation

BUTTON NAME	DESCRIPTION
All Keywords group:	
Prev	Scrolls the object list to previous page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
More	Scrolls the object list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
Related Entities group:	
Prev	Scrolls the object list to previous page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
More	Scrolls the object list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
Keyword Catalogue screen:	
Cancel	Cancel the Keyword Catalogue process and close the current screen.

Note: For more information on the NATENG.INI file parameter LISTBOXMAX refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.

Keyword Catalogue Context Menu

The Keyword Catalogue context menu is invoked by placing the cursor on any of the entities listed in the Related Entities box and using the right hand mouse button with a single click.

Related Entities Context Menu

The Related Entities context menu allows you to navigate between the Keyword Catalogue screen and the Object Documentation, Business Rule Definition, Services Viewer or Data Model Perspective Documentation screens , or reposition the name list.

Note: The navigation will depend on the type of entity selected.

The following Figure 5-2 illustrates the Keyword Catalogue context menu when an Object Documentation entity is selected.
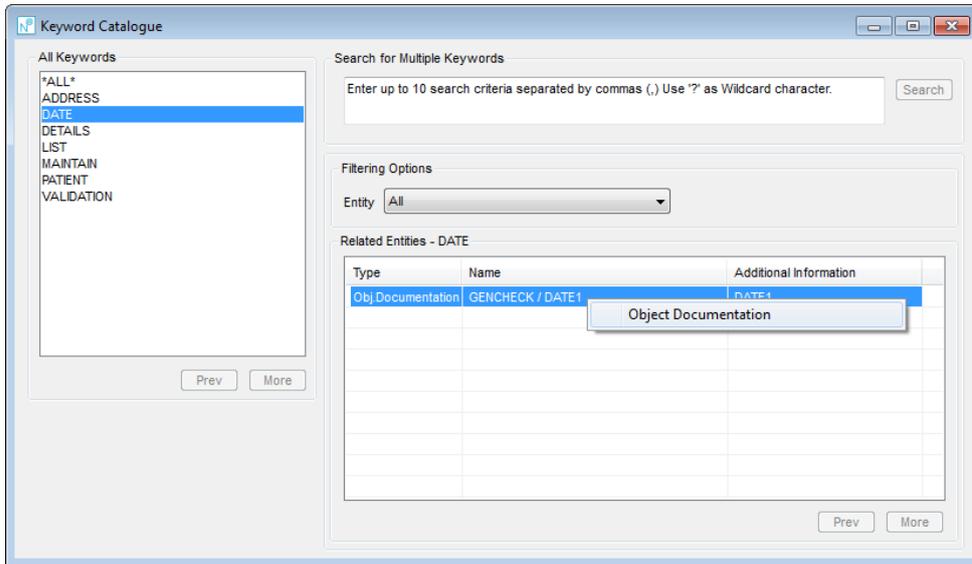
Figure 5-2 Keyword Catalogue context menu

CONTEXT MENU ITEM	DESCRIPTION
Object Documentation	Invoke the Object Documentation screen.
	NB: This is only available if an Object Documentation entity is selected.
Data Model Perspective Documentation	Invoke the Data Model Perspective Documentation screen.
	NB: This is only available if a Data Model Perspective entity is selected.
Services Viewer	Invoke the Services Viewer screen.
	NB: This is only available if a Services entity is selected.
Rule Definition	Invoke the Rule Definition screen.
	NB: This is only available if a Business Rule entity is selected.
Change Start Position of List…	Reposition the list of entities to start from a particular entity name.
	The reposition value can be input using either a complete name or part name using an '*' (asterisk) wildcard.
	The reposition value is appended to the entity list title to highlight the type of repositioning being applied.
	Possible reposition values are:

Value	Result
' ' (blank)	Reposition to the top of the entity list.
*	Reposition to the top of the entity list.
ABC*	Only show entities that are prefixed by 'ABC'.
XYZ	Reposition to the first entity that either matches or is greater than 'XYZ' and then continue the entity list from that point.

ARCHITECTURAL GOVERNANCE

Chapter Overview

This chapter describes the Architectural Governance option available from the Utilities menu. The Architectural Governance option provides the facility to apply global or application specific coding standards to Natural Objects.

The topics covered are:

1. Architectural Governance
2. Global Coding Standards
3. Application Coding Standards
4. Impact Execution
5. Impact Element Maintenance

Architectural Governance Overview

The Architectural Governance screen provides the facility to access the individual tasks for each stage of Architectural Governance.

Architectural Governance Screen

The Architectural Governance screen is accessed using the following menu navigation: Utilities ➔Architectural Governance

The following Figure 6-1 illustrates the Architectural Governance screen.
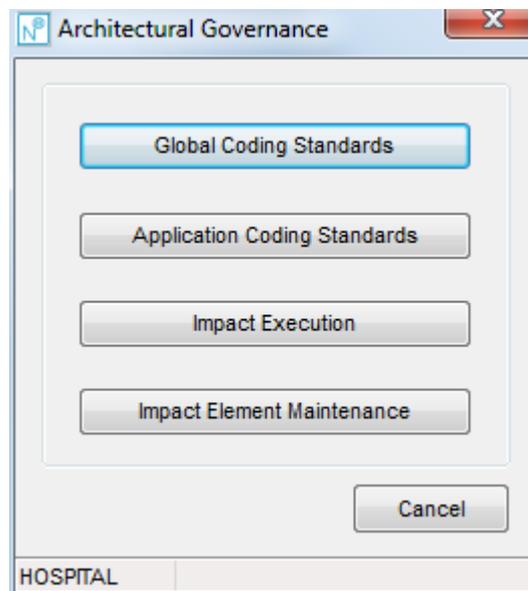
Figure 6-1 Architectural Governance screen

BUTTON NAME	DESCRIPTION
Global Coding Standards	Invoke the Global Coding Standards screen to apply site-wide coding standards. *Note: For more information refer to the section Global Coding Standards.*
Application Coding Standards	Invoke the Application Coding Standards screen to apply application specific coding standards.. *Note: For more information refer to the section Application Coding Standards.*
Impact Execution	Invoke the Coding Standards Impact Execution screen. *Note: For more information refer to the section Coding Standards Impact Execution.*
Impact Element Maintenance	Invoke the Coding Standards Impact Element Maintenance screen to review the impact results. *Note: For more information refer to the section Coding Standards Impact Element Maintenance.*

Architectural Governance screen:

Cancel	Cancel the Architectural Governance process and return back to the main Natural Engineer screen.

STATUS BAR ITEM	DESCRIPTION
The Architectural Governance status bar is divided into 2 individual panes.	
Pane 1	Name of the selected application.
Pane 2	Any Architectural Governance processing messages.

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Global Coding Standards Overview

The Global Coding Standards option provides the facility for the specification of coding standards that are to be used as the default settings within Natural Engineer.

Using Global Coding Standards, it is possible to specify the Natural application coding standards employed at your site, or if none exist, specify the standards that you wish to apply and adhere to. Then by loading each of your applications into the Repository and running the Architectural Governance impact analysis it is possible to report on each application's compliance.

If an Application has individual coding standards than the global definitions may be overridden by using the Application Coding Standards options.

Global Coding Standards Screen

The Global Coding Standards screen is accessed using the following navigation: Utilities➔Architectural Governance➔ Global Coding Standards.

The following Figure 6-2 illustrates the Global Coding Standards screen.

Figure 6-2 Global Coding Standards screen

SCREEN ITEMS	DESCRIPTION
Data Item Specification and Usage	Identifies standards specific to Data Items. Data Item Specification and Usage options are
	Data Item Name Length
	A number from 1 to 32 can be selected. Natural Engineer will identify data items that exceed this number.
	Local Data Item Start Character
	The first character required for locally defined data items.
	Allow Dynamic Variables
	Dynamic variables, such as &variables are permitted by standards.
	Allow AIVs
	Application Independent Variables are permitted by the standards.
	Allow Reserved Words as Data Items
	If selected, data item names may also be reserved words.
	Allow use of Hexadecimal
	If selected, hexadecimal code is permitted by standards.
Database Access	Identifies usage of Database Access statements e.g., READ, FIND or HISTOGRAM
	Allow Database Access
	If selected, Database Access statements are permitted by standards.
Object Complexity	Allows the specification of industry standard complexity limits.
	McCabe
	If defined any objects that exceed the specified McCabe number will be identified.
	Halsted Difficulty
	If defined any objects that exceed the specified Halsted difficulty will be identified.
	Maximum Nested Levels
	The number of nested levels that are allowed.
	Max Nbr for Conditional Stmts
	The number of conditional statements that are allowed.

SCREEN ITEMS	DESCRIPTION
Miscellaneous	Identifies standards for miscellaneous options. Miscellaneous options are:

Allow Numeric Back References

If selected numeric back references are allowed by standards.

Check for Unused Variables

Impact will look for any unused variables. These can be user-defined variables or logical view variables.

Check for Redundant Code

Impact will look for any unused source code lines within programming objects, across a whole application.

Any source code that is driven by event rather than position is ignored. For example AT BREAK, AT END OF PAGE, WRITE TITLE.

Unused source code within internal subroutines is included, but for external subroutines the Unused Objects report should be referenced.

Note: Only Structured Mode objects will be impacted. For Reporting Mode objects, it is recommended that they are converted to Structured Mode first using the Mode Conversion function, and then impacted.

BUTTON NAME	DESCRIPTION
Prohibited Keywords group	
Add Prohibited Keywords	Invokes a screen where Natural keywords that are not permitted by standards may be defined.
Architectural Governance Screen	
View Summary	Will display a summary of what Global Coding Standards have been set.
Delete	Delete the Global Coding Standards. *Note: This button is only enabled if any Global Coding Standards exist.*
OK	Save the Global Coding Standards and close the current screen.
Cancel	Cancel the Global Coding Standards process and return back to the main Natural Engineer screen.
Apply	Save the Global Coding Standards and retain the current screen. *Note: This button is only enabled if any changes have been made.*

Application Coding Standards Overview

The Application Coding Standards option provides the facility for the specification of coding standards that are specific to a particular application within Natural Engineer. If set, these will override the Global Coding Standards.

The Application Coding Standards screen is accessed using the following navigation: Utilities➔Architectural Governance➔ Application Coding Standards

For further information on the options available please refer to the Global Coding Standards section.

Coding Standards Impact Execution Overview

The Coding Standards Impact Execution option invokes the Impact process, which will execute the selected Coding Standards Impact Criteria against the chosen application code held in the Repository.

Impact Execution is accessed by using the following menu navigation: Utilities➔Architectural Governance➔ Impact Execution from the main Natural Engineer screen. A screen is then displayed allowing the selection of applications to run the coding standards against.

Coding Standards Impact Element Maintenance

The Coding Standards Impact Element Maintenance option provides the facility to review the results of the last executed Impact Analysis for the Architectural Governance Option. All impacted objects within the chosen applications are available for selection. Once selected the impacted items within the object are listed.

The impacted items can be selected to reveal the source code context within the object and the impact match reason showing why the item has been impacted. The context of the data item within the data definitions of the selected object are also shown.

Coding Standards Impact Element Maintenance Window

The Coding Standards Impact Element Maintenance window is accessed by using the following menu navigation: Utilities ➔Architectural Governance ➔ Impact Element Maintenance from the main Natural Engineer screen.

The following Figure 6-3 illustrates the Coding Standards Impact Element Maintenance screen.
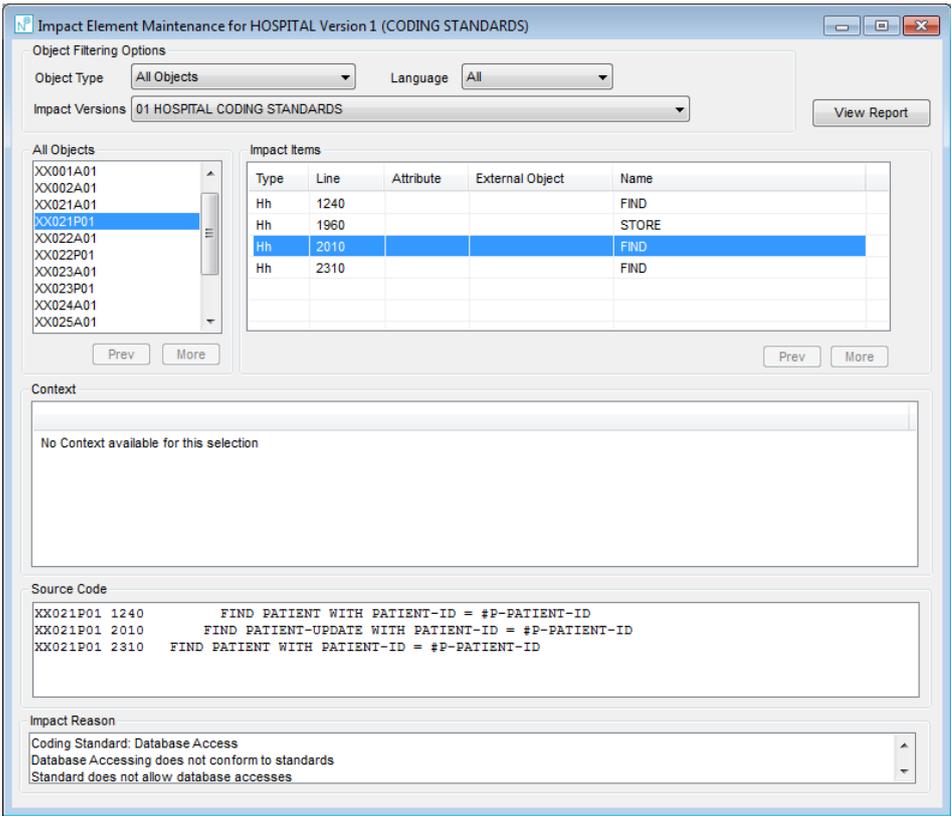
Figure 6-3 Coding Standards Impact Element Maintenance screen

SCREEN ITEMS	DESCRIPTION
	Object Filtering Options group:
Object Types	Allows you to select the types of object to be listed.
	Available selections are:
	All Objects **Programs** **Classes** **Subprograms** **Functions** **Subroutines** **Copycodes** **Helproutines** **Dialogs** **Maps** **Local Data Areas** **Global Data Areas** **Parameter Data Areas** **Data Definition Modules** **Adaptors**
Language	Allows you to select the programming language of the objects to be listed.
	Available selections are:
	All **Cobol** **JCL** **Natural**
Impact Version	Change the Impact version to review alternate Impact results for the application.
	NB: If you have selected more than one application to run the coding standards against, then each application will have its own type of version.

SCREEN ITEMS	DESCRIPTION

Object List group:

Object List

List of all the impacted objects for the currently selected Impact Version.

The list of objects can be tailored to your requirements using the options available in the Object Types and Language options of the Object Filtering Options group. Further refinement can be made using the option 'Change Start Position of Object List…' from the context menu.

The Object List title reflects the Object Types being listed and will append any reposition values that may have been specified.

A context menu is available to invoke viewing options View Structure Diagram for Search Criteria (for the selected object only) or View Impacted Code or to reposition the object list by using the **right hand mouse button** on a selected object.

Note: For more information on the Object List context menu, refer to section Impact Element Maintenance Context Menu.

Impact Item group:

Impact Items

List of all the impacted items for the currently selected object.

A context menu is available to invoke viewing options Enter Filter Value for Impact Items by using the **right hand mouse button** on an entry in the Impact Items box to tailor the list to your requirements.

The columns available are:

Type

This is a 2-byte value, which denotes the type of Impact.

Note: For more information on type of impact refer to the section Impact Types.

Line

The statement line number for the impact item within the selected object.

Attribute

The format and length of the impact item if the item is a data item from a data definition area within the object.

External Object

The name of the object that contains the impact item if the item is in an external object, for example GDA, LDA, PDA or Copycode.

Name

The name of the impact items impacted within the selected object.

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SCREEN ITEMS	DESCRIPTION

Context List group:

Context List Displays the context of the selected data item within the data definition of the selected object.

Note: Only displays details for impacted data items from data definition areas.

If the selected data item is a literal string, then no context details will be displayed.

If the selected data item is part of a view definition, group or redefinition, then the context list will show data items one level lower and one level higher in relation to the selected data item.

Some examples based on the following data definition:

```
0020 01 #GROUP
0030   02 #ALPHA(A10)
0040   02 REDEFINE #ALPHA
0050    03 #NUMERIC(N6)
```

For data item #GROUP, the context list will show:

```
0020 01 #GROUP               G
0030 02 #ALPHA               A10
```

For data item #ALPHA, the context list will show:

```
0020 01 #GROUP               G
0030 02 #ALPHA               A10
0040 02 REDEFINE #ALPHA
0050 03 #NUMERIC             N6
```

For data item #NUMERIC, the context list will show:

```
0030 02 #ALPHA               A10
0040 02 REDEFINE #ALPHA
0050 03 #NUMERIC             N6
```

SCREEN ITEMS	**DESCRIPTION**	
Source Code group:		
Source Code	Displays all the impacted statement references for the selected impact item.	
	The columns available are:	
	Object Name	The name of the object in which the Impact is identified. This will normally be the object selected, but can be an external object such as a GDA, LDA, PDA or Copycode, which is included in the selected object.
	Line Number	The line number of the impacted statement code.
	Statement	The statement code which is impacted.
Impact Reason group:		
Impact Reason	Displays information on the reasons for the impact based on the search criteria specified.	

BUTTON NAME	DESCRIPTION
Object List group:	
Prev	Scrolls the object list to previous page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
More	Scrolls the object list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
Impact Item group:	
Prev	Scrolls the impact items to previous page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
More	Scrolls the impact items forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
Impact Element Maintenance screen:	
View Report	Invokes the All Impacts report to display the Coding Standards results in a report format. *For further details of the All Impacts report refer to the Natural Engineering Reporting manual.*

Note: For more information on the NATENG.INI file parameter LISTBOXMAX refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.

Coding Standards Impact Element Maintenance Context Menu

The Coding Standards Impact Element Maintenance context menu is invoked by placing the cursor on any of the items listed in the Object or Impact Items lists and using the right hand mouse button with a single click.

Object List Context Menu

The Object List context menu allows viewing options View Structure Diagram for Search Criteria (for the selected object only) or View Impacted Code to be invoked. It also provides the option to reposition the object list.

Note: The option View Impacted Code is not available when displaying DDM objects.

The following Figure 6-4 illustrates the Object List context menu.
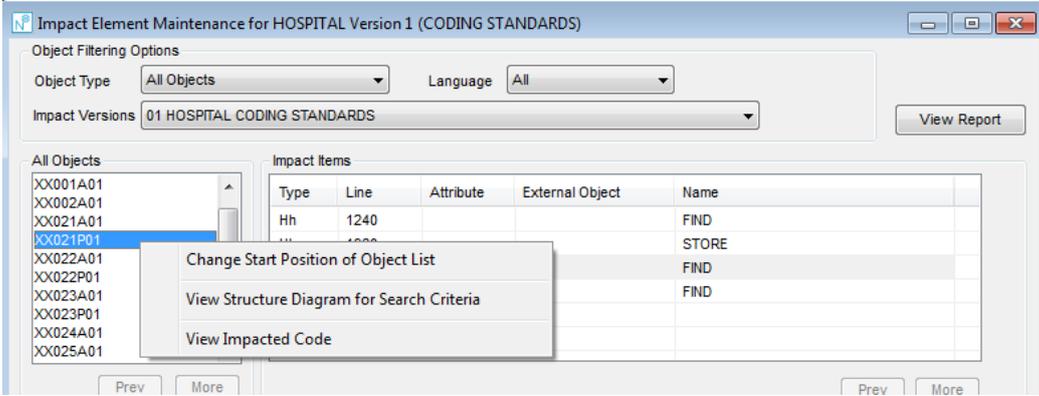
Figure 6-4 Object List context menu

CONTEXT MENU ITEM	DESCRIPTION
Change Start Position of Object List…	Reposition the list of objects to start from a particular object name.
	The reposition value can be input using either a complete name or part name using an '*' (asterisk) wildcard.
	The reposition value is appended to the object list title to highlight the type of repositioning being applied.
	Possible reposition values are:

Value	Result
' ' (blank)	Reposition to the top of the object list.
*	Reposition to the top of the object list.
ABC*	Only show objects that are prefixed by 'ABC'.
XYZ	Reposition to the first object that either matches or is greater than 'XYZ' and then continue the object list from that point.

CONTEXT MENU ITEM	DESCRIPTION
View Structure Diagram for Search Criteria…	Invoke GenTree Structure Analyzer to display the impacts made for the specified search criteria for the selected object.
	Note: For more information on GenTree refer to Chapter 2 in the Natural Engineer Reporting manual.
View Impacted Code	Display the impacts within an object using the Browser. The whole object source code will be displayed with the impacted items highlighted using the colors set by the SPECIFIED, DERIVED and EXCLUDED parameters in the NATENG.INI file.
	Note: For more information on the NATENG.INI file parameters SPECIFIED, DERIVED and EXCLUDED refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.

Impact Items Context Menu

The Impact Items context menu provides the option to filter the Impact Items list.

The following Figure 6-5 illustrates the Impact Items context menu.
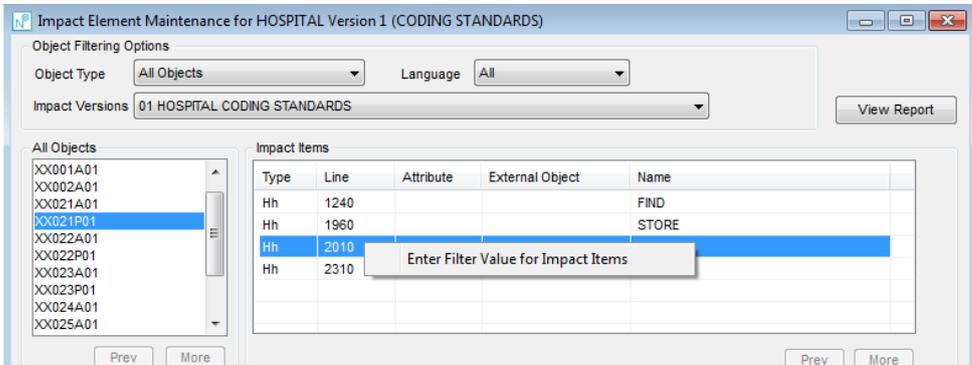
Figure 6-5 Impact Items context menu

CONTEXT MENU ITEM   **DESCRIPTION**

Enter Filter Value for Impact Items	Filters the list of impact items to show impacts for a particular impact item name only.
	The filter value can be input using either a complete name or part name using an '*' (asterisk) wildcard.
	The filter value is appended to the impact item list title to highlight the type of filter being applied.
	Possible filter values are:

Value	Result
' ' (blank)	Reposition to the top of the impact item list.
*	Reposition to the top of the impact item list.
ABC*	Only show impact items that are prefixed by 'ABC'.
XYZ	Only show impact items that are named 'XYZ'.

Coding Standards Impact Types

The following table shows all of the available coding standards impact types:

Type	Description
Coding Standards	
Ha	Data Item Name Length.
Hb	Local Data Item Start Character.
Hc	Allow Dynamic Variables.
Hd	Allow Reserved Words as Data Items.
He	Allow AIVs.
Hf	Allow Hexadecimals.
Hg	Allow Numeric Back References.
Hh	Allow Database Access.
Hi	Unused Variables.
Hj	Redundant Code.
Hk	Object Complexity: Halstead Difficulty.
Hl	Object Complexity: McCabe Number.
Hm	Prohibited Keywords.
Hn	Data Items greater than 32 characters.
Ho	Nested Levels.
Hp	Condition Complexity.

ARIS INTERFACE

Chapter Overview

This chapter describes the Natural Engineer ARIS Interface option available from the Utilities menu.

The ARIS Interface option provides the facility to create an XML file from an object within the Natural Engineer repository. This XML file may be imported into ARIS to create a Business Process Modelling Notation (BPMN) diagram for the object.

Whenever a model is created based on an object and a XML file generated, Natural Engineer will store meta-data within the Natural Engineer Repository for the model/version. If that object changes then the model should be re-generated with a new version number. The new model/version should be created based on a previous model/version. This allows Natural Engineer to compare the meta-data in order to allow comparison between the models. The differences will be shown within ARIS once the new XML file has been imported.

The XML file generated resides in the DATA directory of your Natural Engineer installation.

Note: Subroutines within the object appear as linked diagrams within ARIS.

The ARIS Interface is a Natural Engineer Add-On. It will only be available depending on your Natural Engineer Licensing agreement.

The topics covered are:

1. ARIS Interface Pre-Requisites
2. ARIS Interface Window
3. Import to ARIS

ARIS Interface Pre-Requisites

Natural Engineer ARIS Interface will generate XML which contains Object Source Code.

In order for this to be shown within ARIS, a new Attribute Type needs to be added & then linked as Allowed Attributes to ARIS Object Types Event, Function & Rule.

In ARIS Administration, a new Attribute Type called 'Object Source Code' needs to be added.

The following Figure 7-1 illustrates the ARIS Administration screen.
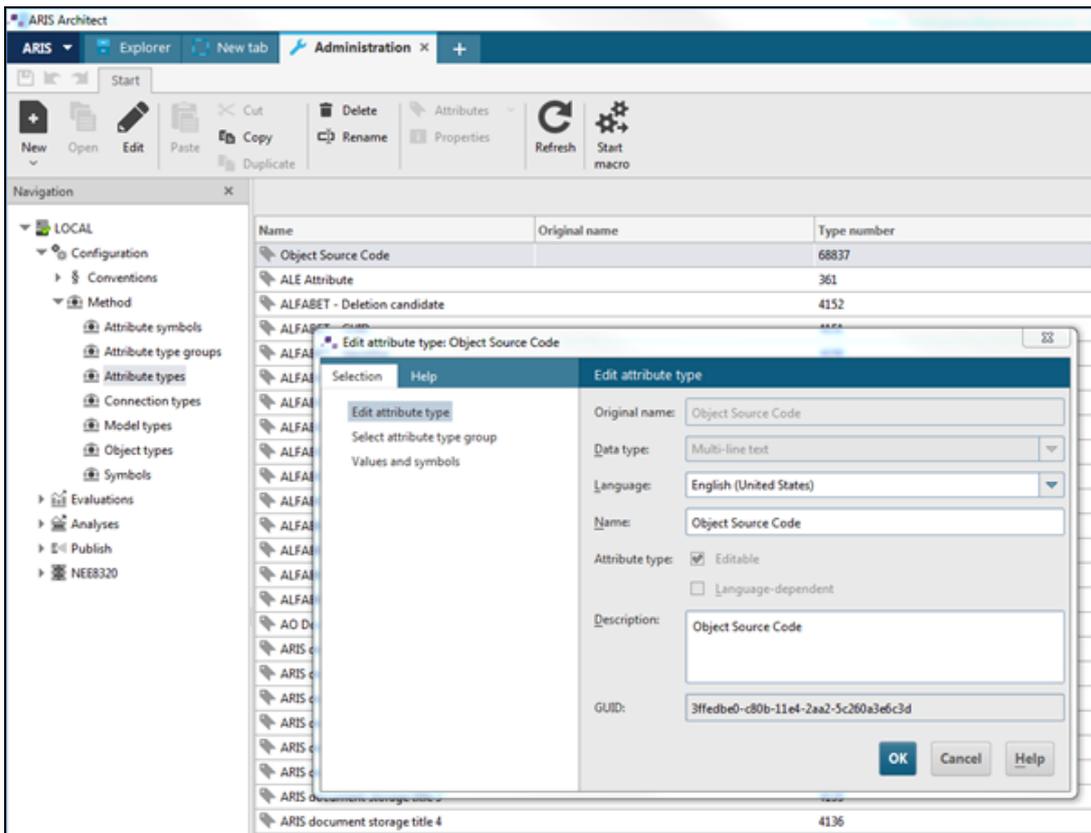
Figure 7-1 ARIS Administration screen

It is of Data Type Multi-line Text with size of 10,000,000.

Generally it is added to the Group '\System environment'

An existing Attribute Type to base this on is 'Assumptions & Constraints', as shown below from the 'ARIS Method – Tables' manual.

The following Figure 7-2 illustrates the 'ARIS Method – Tables' manual.

ARIS Method - Tables
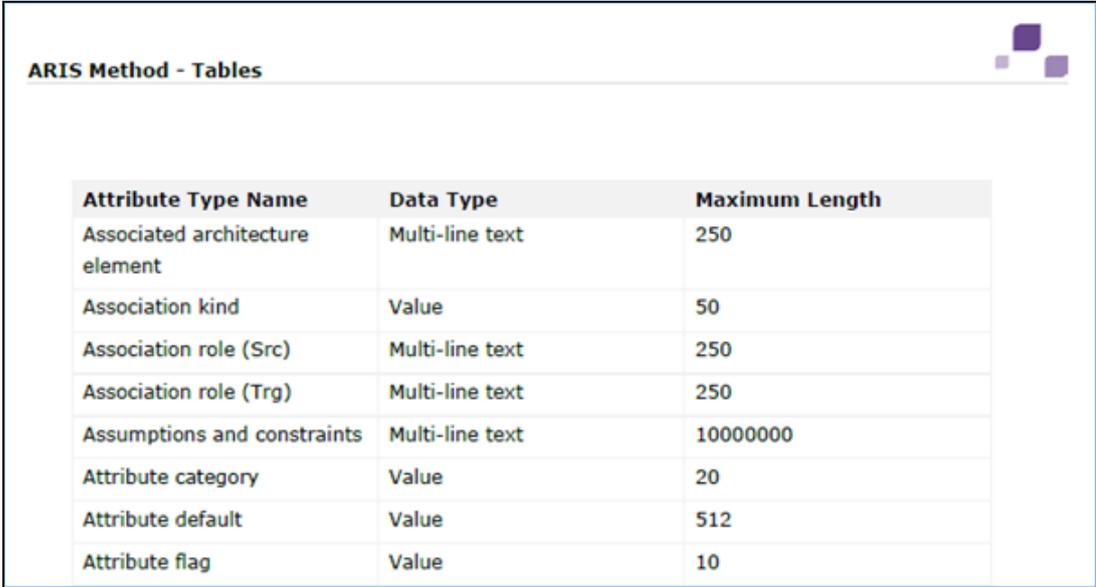
Attribute Type Name	Data Type	Maximum Length
Associated architecture element	Multi-line text	250
Association kind	Value	50
Association role (Src)	Multi-line text	250
Association role (Trg)	Multi-line text	250
Assumptions and constraints	Multi-line text	10000000
Attribute category	Value	20
Attribute default	Value	512
Attribute flag	Value	10

Figure 7-2 'ARIS Method – Tables' manual.

Once added, make a note of the GUID – this needs to be added to the NATENG.INI file as, for example:

```
[ARIS]
AT_SRC=3FFEDBE0-C80B-11E4-2AA2-5C260A3E6C3D
VERSION=97
[ARIS-END]
```

The GUID generated will be unique to each ARIS installation. To make this new Attribute Type allowable for Object Types, Select Edit Object Type & select the new Attribute Type within the 'Allowed attributes' list:

The following Figure 7-3 illustrates the ARIS Administration 'Allowed attributes' list.
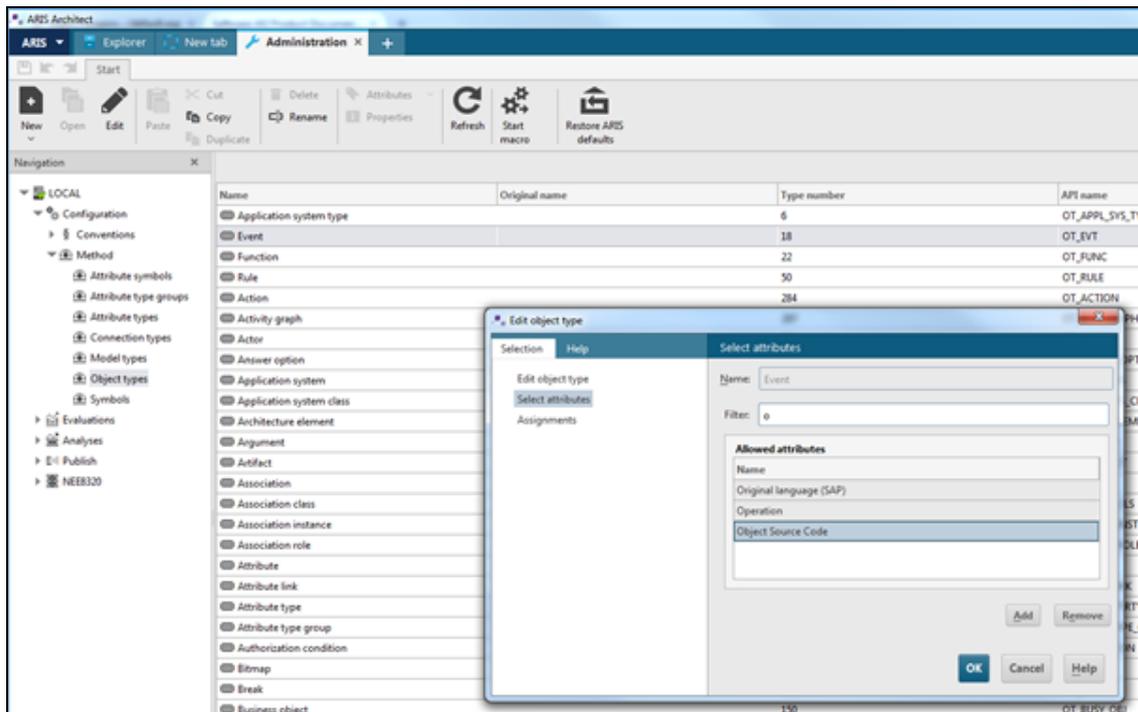
Figure 7-3 ARIS Administration 'Allowed attributes' list.

Restart the ARIS Server & these changes will become active – ready for the first import of a XML file generated by Natural Engineer.

ARIS Interface Window

The ARIS Interface window provides the facility to select an object from Natural Engineer and create an XML file for ARIS containing details to create a Business Process Modelling Notation (BPMN) Diagram of the object.

The ARIS Interface window is accessed using the following menu navigation: Utilities ➔ ARIS Interface

The following Figure 7-4 illustrates the ARIS Interface screen.
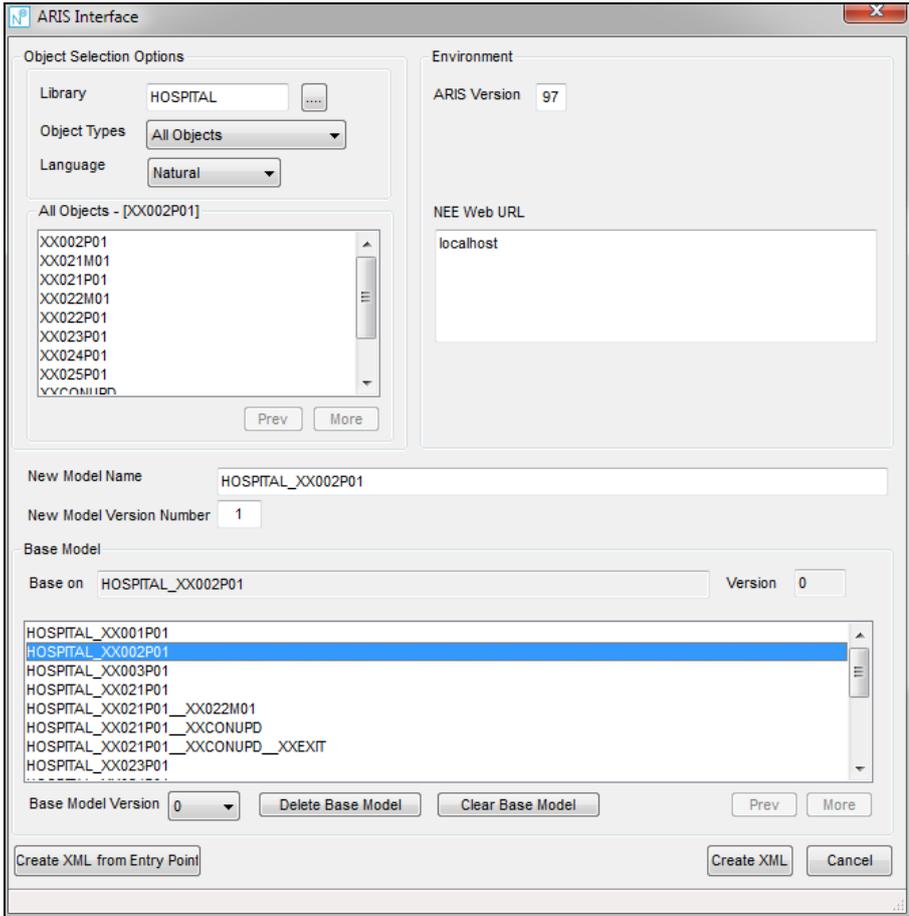
Figure 7-4 ARIS Interface screen

SCREEN ITEMS   **DESCRIPTION**

Object Selection Options Group:

Library	The name of the Library that contains the object you wish to create the XML data for.
	The library name can be typed in or selected by using the Library Selection button [...].
Object Types	Allows you to select the types of object to be listed. The Objects Types are tailored depending on the Language selected.
Language	Allows you to select the programming language of the objects to be listed.

Available selections are:
- **All**
- **Cobol**
- **Natural**

Object List	A list of the objects in the selected library. Select the name of the object you wish to create the XML data for.
	The list of objects can be tailored to your requirements using the options available in the Object Types and Language menus. Further refinement can be made using the option 'Change Start Position of Object List…' from the Object List context menu.
	The Object List title reflects the Object Types being listed and will append any reposition values that may have been specified.

Environment Group:

NEE Web URL	The URL where the Natural Engineer Web Interface is running. Default: localhost.
ARIS Ver.	Specify to version of ARIS you will be importing into e.g. 95 or 97. Default 97.

New Model Group:

New Model Name	The name of the Model to be added.
New Model Version Number	The Version number of the Model to be added.

SCREEN ITEMS	DESCRIPTION
Base Model Group:	
Base on	The name of the Model a new Model will be based on.
Version	The Version number of a Model the new Model will be based on.
Base Model List	List of all Models saved.
Base Model Version	The Version of the Model selected.

BUTTON NAME	DESCRIPTION
Base Model group:	
Delete Base Model	Deletes the selected version.
Clear Base Model	Clears all selections in the base model group.
Prev	Scrolls the list to the previous page.
	This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
More	Scrolls the list forward one page.
	This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
Object Selection Options Group:	
Library Selection […]	Invokes the General Selection screen, listing all Natural Engineer Applications in the repository.
Prev	Scrolls the list to the previous page.
	This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
More	Scrolls the list forward one page.
	This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
ARIS Interface screen:	
Create XML from Entry Point	Invokes the Aris Model Analysis from Entry Point screen to create the required XML file, based on one entry point, for importing into ARIS.
	The amount of levels the process will identify included/called objects may be controlled by the EPT-LEVEL setting in the [ARIS] section of the initialization file.

BUTTON NAME	DESCRIPTION
Create XML	Saves changes and exports the required information to an XML file for importing into ARIS.
Cancel	Cancel the ARIS Interface process and return back to the main Natural Engineer screen.

ARIS Interface Context Menus

The context menus are invoked by placing the cursor within the Objects list and using the right hand mouse button with a single click.

CONTEXT MENU ITEM	DESCRIPTION
Change Start Position of Object List…	Reposition the list of items to start from a particular object or service name.
	The reposition value can be input using either a complete name or part name using an '*' (asterisk) wildcard.
	The reposition value is appended to the Objects list title to highlight the type of repositioning being applied.
	Possible reposition values are:

Value	Result
' ' (blank)	Reposition to the top of the item list
*	Reposition to the top of the item list.
ABC*	Only show items that are prefixed by 'ABC'.
XYZ	Reposition to the first item that either matches or is greater than 'XYZ' and then continue the items list from that point.

ARIS Model Analysis from Entry Point Window

The ARIS Model Analysis from Entry Point window provides the facility to select an object from Natural Engineer and create an individual XML file for that object and all other program type objects referenced by that object, and the objects referenced by those, and so on. Maps and Data Areas are not processed. Exclusions may be specified if you do not wish to create an XML file for a particular object or objects that would be in the referenced object chain.

The amount of levels the process will identify included/called objects may be controlled by the EPT-LEVEL setting in the [ARIS] section of the initialization file. If no setting is specified it will be limited to 9 levels.

The XML files created will contain details that may be used to create a Business Process Modelling Notation (BPMN) Diagram within ARIS. An ARIS script NEE-XML-Import.arx is provided within the ARIS directory of your Natural Engineer Installation. This can be used within ARIS to import the multiple XML files generated by this process.

The ARIS Model Analysis from Entry Point window is accessed from the Export Entry Point button on the ARIS Interface screen.

The following Figure 7-5 illustrates the ARIS Model Analysis from Entry Point screen.
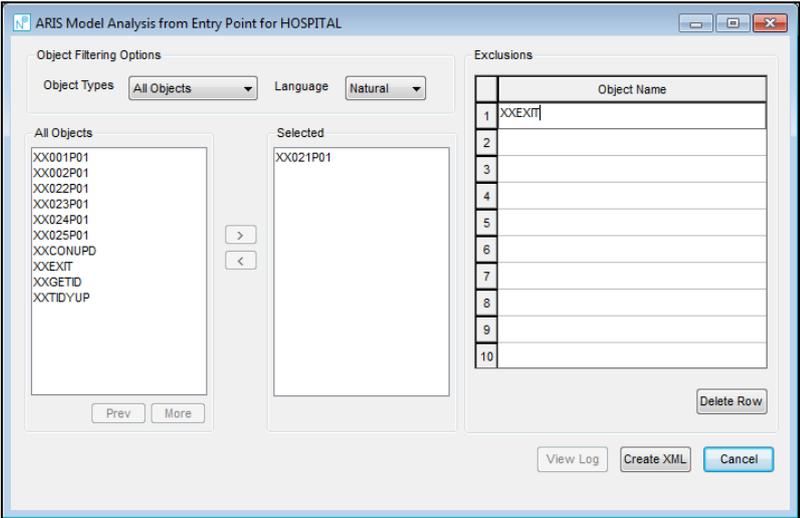
Figure 7-5 ARIS Model Analysis from Entry Point screen

SCREEN ITEMS	DESCRIPTION

Object Filtering group:

Object Types	Allows you to select the types of object to be listed.

Available selections include:

- **All Objects**
- **Programs**
- **Subprograms**
- **Functions**
- **Subroutines**
- **Dialogs**

Language	Allows you to select the programming language of the objects to be listed.

Available selections include:

- **All**
- **Cobol**
- **JCL**
- **Natural**

Object Selection group:

Object List	List of all the objects used by the currently selected application.

Note: Only object types of Dialog, Function, Program, Subprogram, and Subroutine will be displayed.

The list of objects can be tailored to your requirements using the options available in the Object Types and Language menus. Further refinement can be made using the option 'Change Start Position of Object List…' from the Object List context menu.

The Object List title reflects the Object Types being listed and will append any reposition values that may have been specified.

Objects can be selected by using a double click with the **left hand mouse button**.

Selected	Lists all the objects that have been selected as entry points.

Note: Only one object may be specifed as an entry point.

Objects can be de-selected by using a double click with the **left hand mouse button**.

SCREEN ITEMS	DESCRIPTION
Exclusions group:	
Object Name	The object name to be marked for exclusion. There is a maximum limit of 10 objects allowed (part names using wildcards count as 1 object).
	The object name can be input using either a complete name or part name using an '*' (asterisk) wildcard. For example:
XX021P01	Object 'XX021P01' will be excluded.
XX001*	Any objects prefixed with 'XX001' will be excluded.

BUTTON NAME	DESCRIPTION
Object List group:	
Prev	Scrolls the object list to previous page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
More	Scrolls the object list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
Selection / De-selection buttons:	
>	Select all selected objects in the object list.
<	De-select all selected objects in the selected list.
Exclusions group:	
Delete Row	Delete the object name from the selected row.
ARIS Model Analysis from Entry Point screen:	
View Log	Will display the processing messages following the execution of the export process.
Create XML	Call the export process to create the relevant XML files. The files will be located in the DATA directory of your Natural Engineer installation.
Cancel	Cancel the ARIS Model Analysis from Entry Point process and return back to the main Natural Engineer screen.

Note: For more information on the NATENG.INI file parameter LISTBOXMAX refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.

ARIS Model Analysis from Entry Point Context Menu

The ARIS Model Analysis from Entry Point context menu is invoked by placing the cursor on any of the items listed in the Object list and using the right hand mouse button with a single click.

CONTEXT MENU ITEM	DESCRIPTION
Change Start Position of Object List…	Reposition the list of objects to start from a particular object name.
	The reposition value can be input using either a complete name or part name using an '*' (asterisk) wildcard.
	The reposition value is appended to the object list title to highlight the type of repositioning being applied.
	Possible reposition values are:

Value	Result
' ' (blank)	Reposition to the top of the object list.
*	Reposition to the top of the object list.
ABC*	Only show objects that are prefixed by 'ABC'.
XYZ	Reposition to the first object that either matches or is greater than 'XYZ' and then continue the object list from that point.

Import to ARIS Overview

The XML file generated from the ARIS Interface option may be imported into ARIS to create a Business Process Modelling Notation (BPMN) Diagram.

The following Figure 7-6 illustrates a sample generated Natural Engineer ARIS XML file.
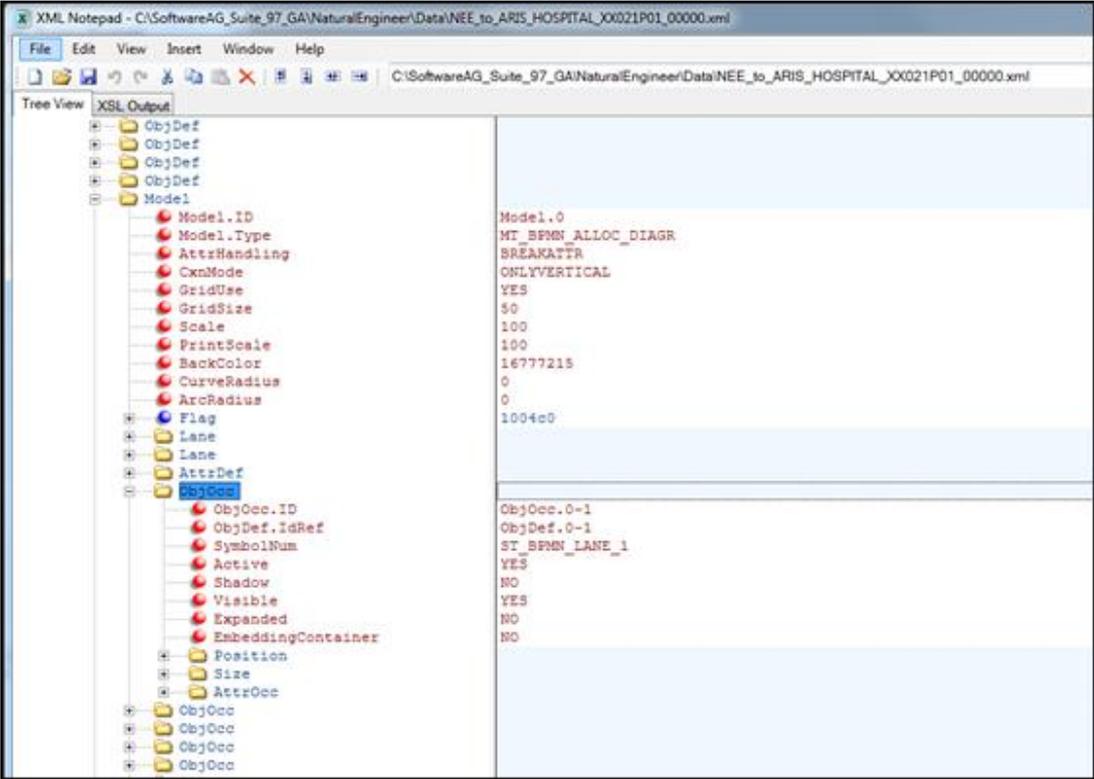
Figure 7-6 Sample Natural Engineer ARIS XML file

Single File Import

The following screens guide you through importing a single XML file into ARIS. They are purely illustrative. For up to date information on importing XML files into ARIS please see the appropriate ARIS documentation.

1) Create a Database within ARIS
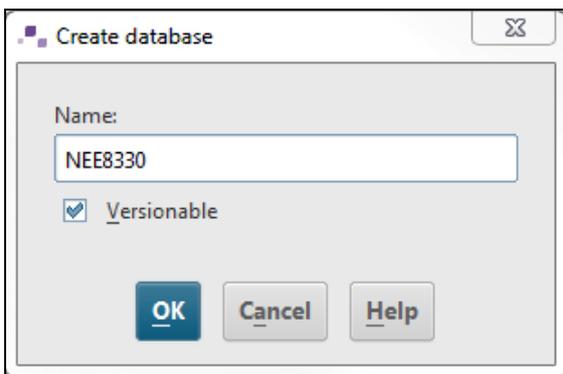
2) When you connect, select 'Entire Method' for 'Filter':
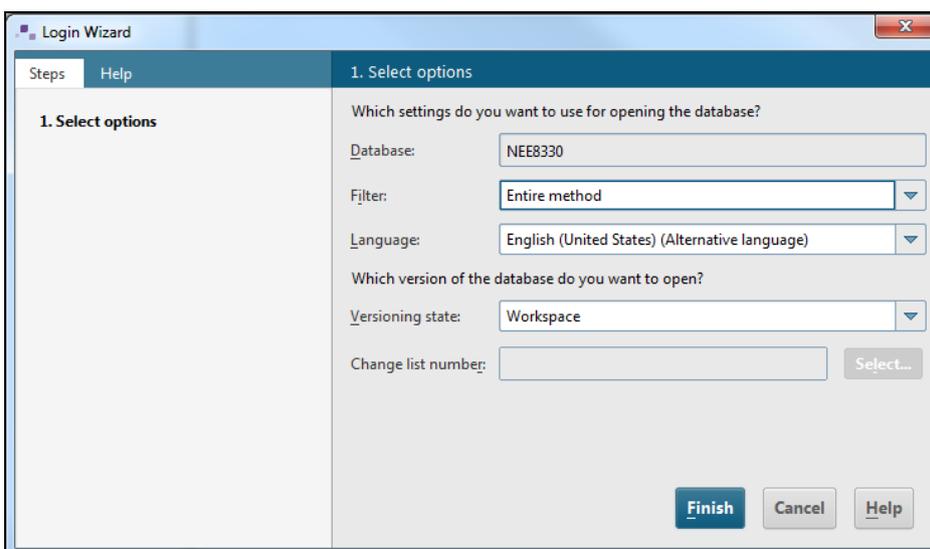
3) To group your models, create a sub-group under the 'Main Group'
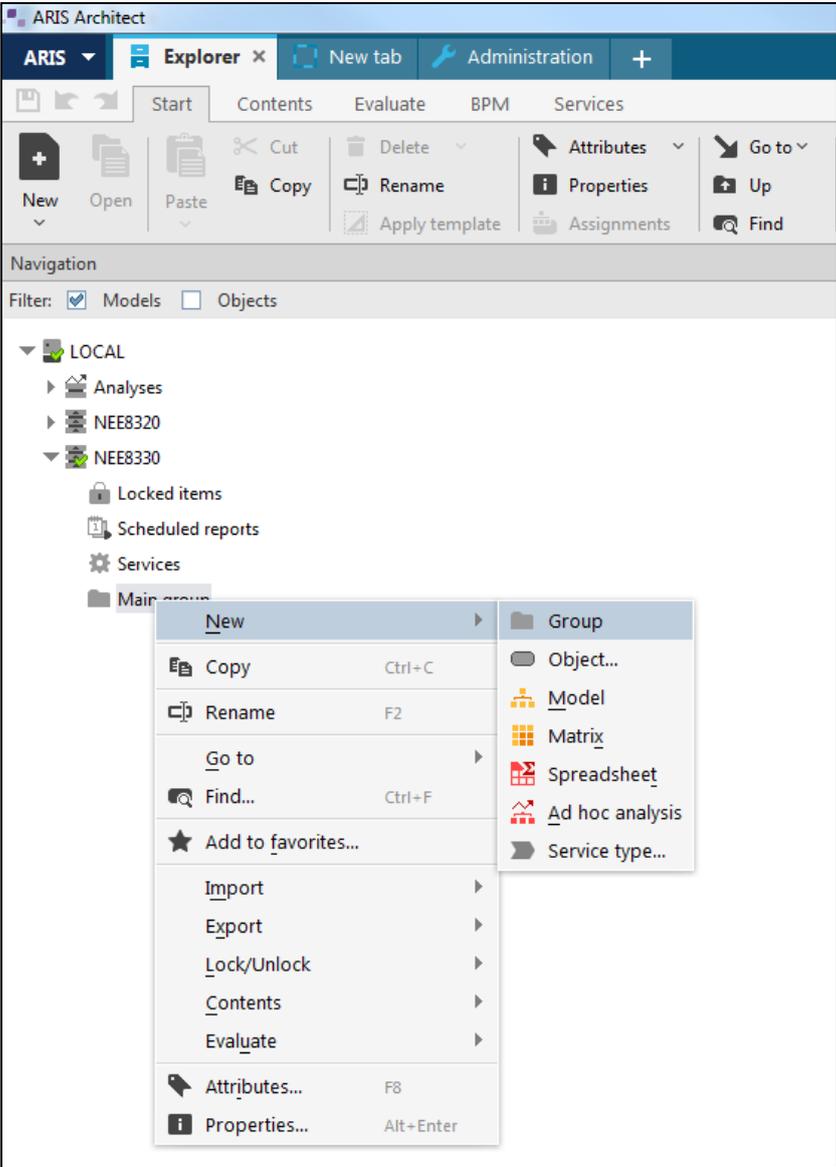
4) Now you should be able to Import XML:
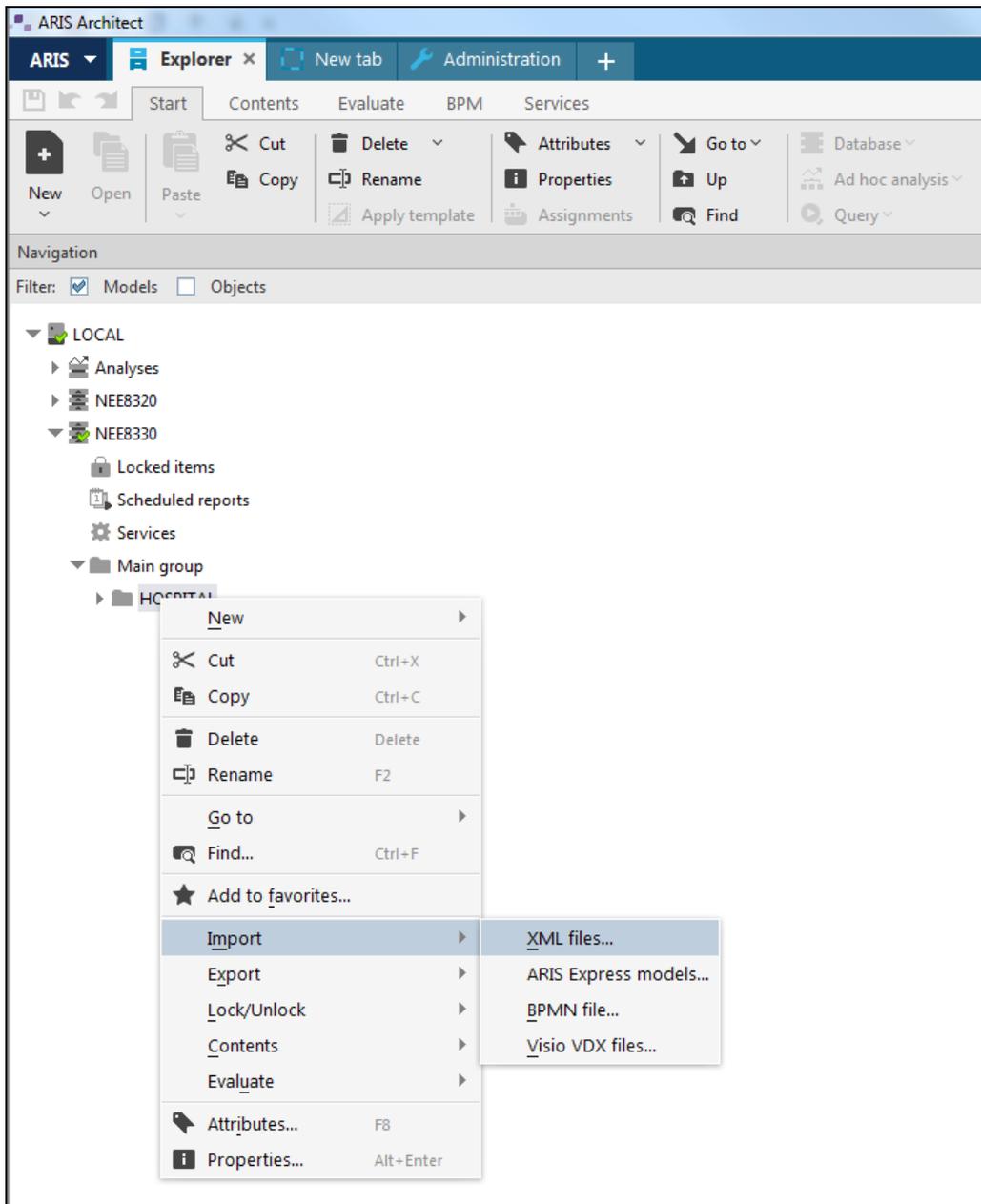
5) From the NEE Data directory, you should find the .XML file required:
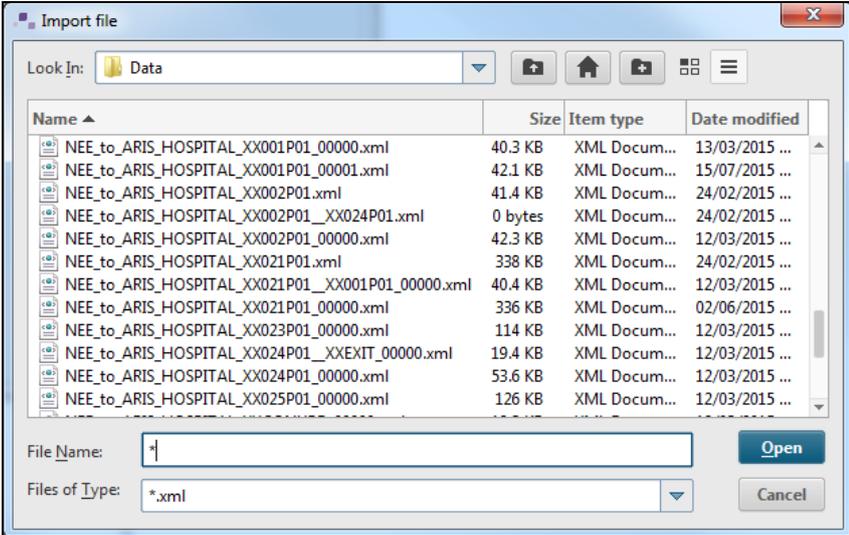
Select one:
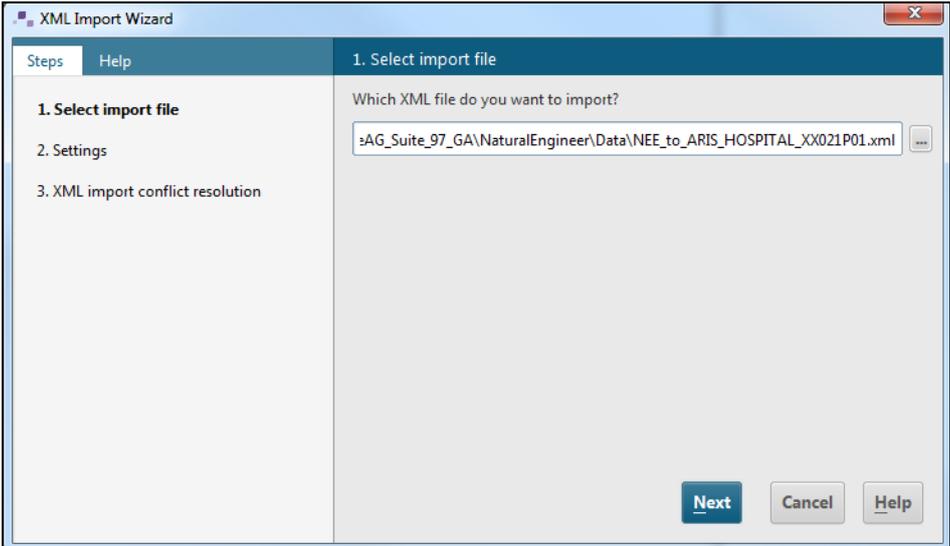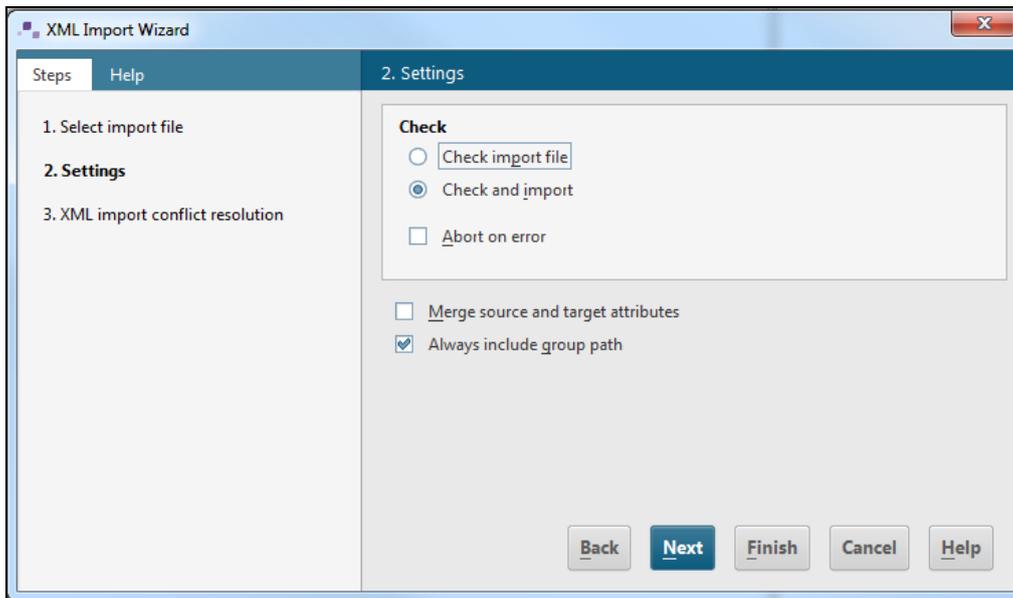
6) Click Next:

7) Leave options to default values, Click Next:
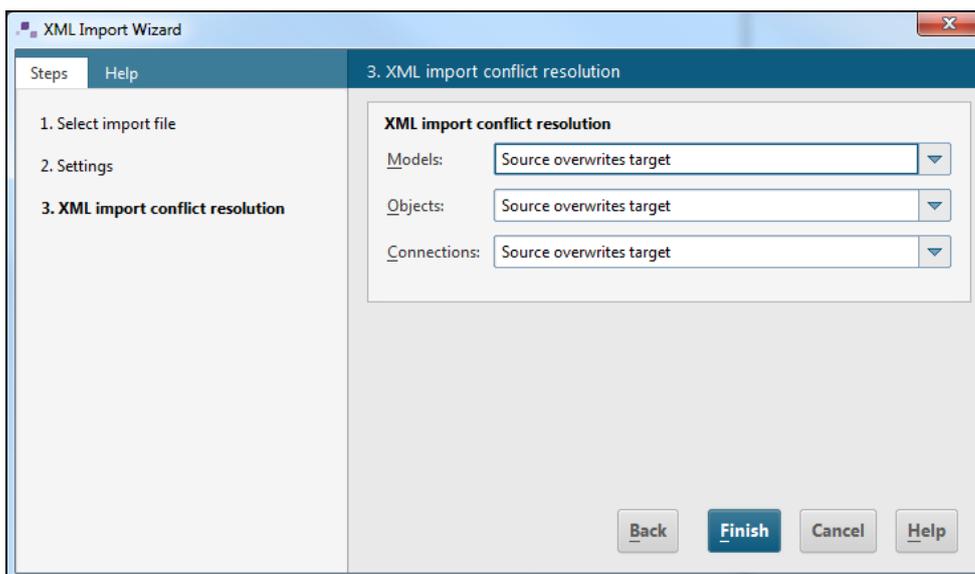
8) Click Finish, If all OK, then:
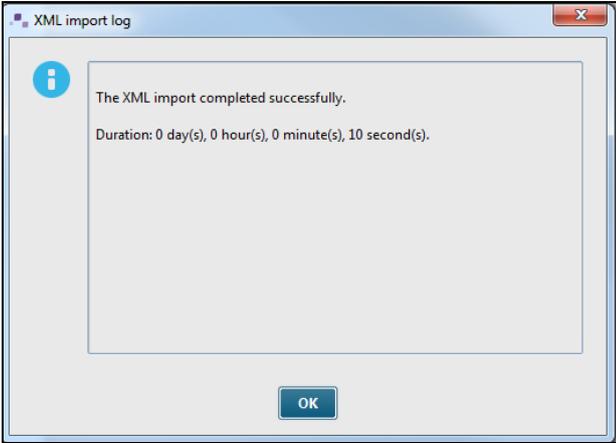
Expand the new group, and you should see the new models:
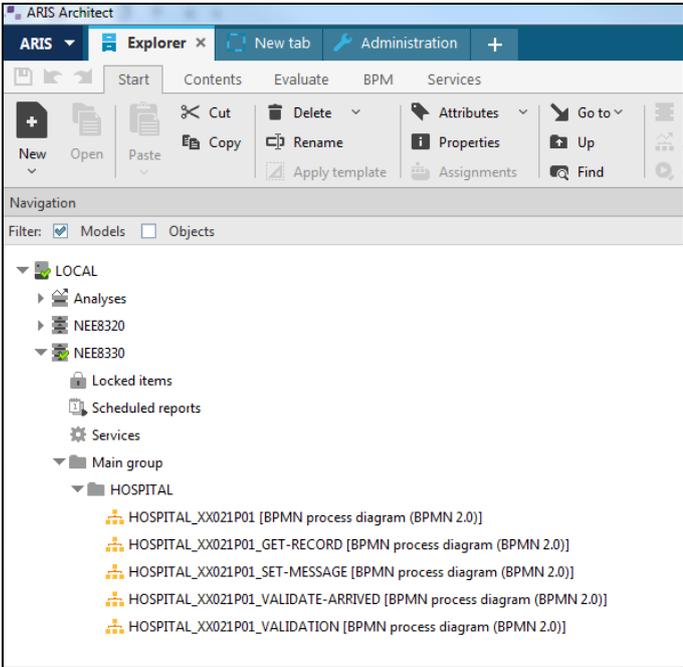
9) Double click on a Model to view it in ARIS:
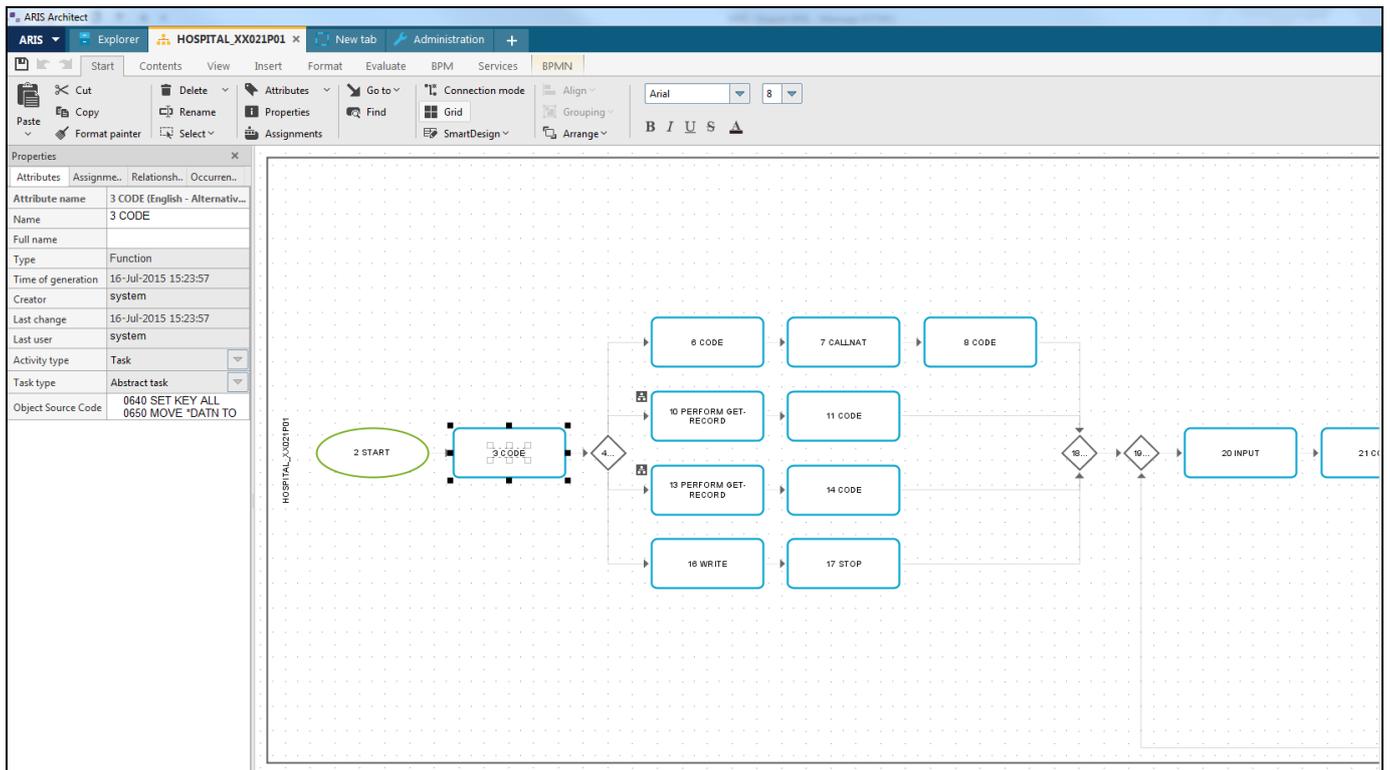
Multiple File Import

The following screens guide you through importing multiple XML files into ARIS generated by the ARIS Model Analysis from Entry Point option within the ARIS Interface.

Natural Engineer provides an ARIS script, NEE-XML-Import.arx, which is located in the DATA/ARIS directory of your Natural Engineer installation. This script has to be imported into ARIS so that the multiple XML files generated may be imported into ARIS.

1)   Open ARIS & then go to Administration
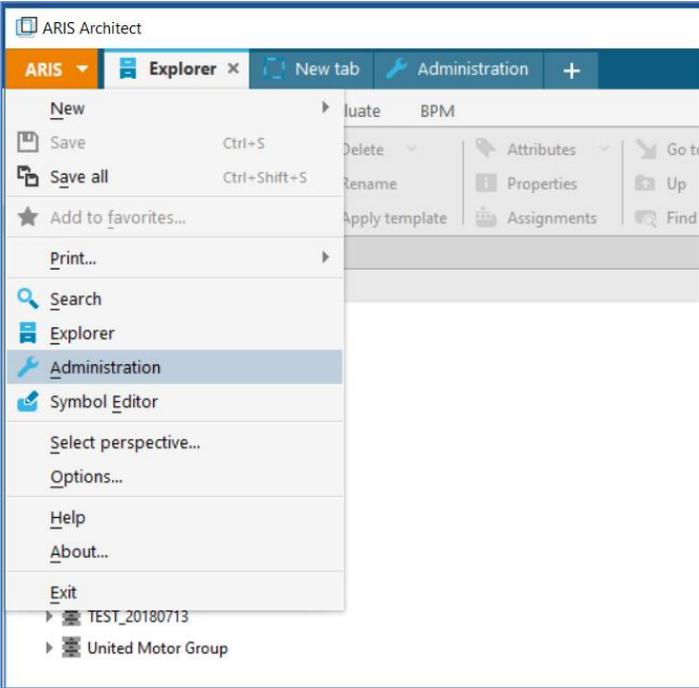
2)   Now select: Evaluations -> Reports
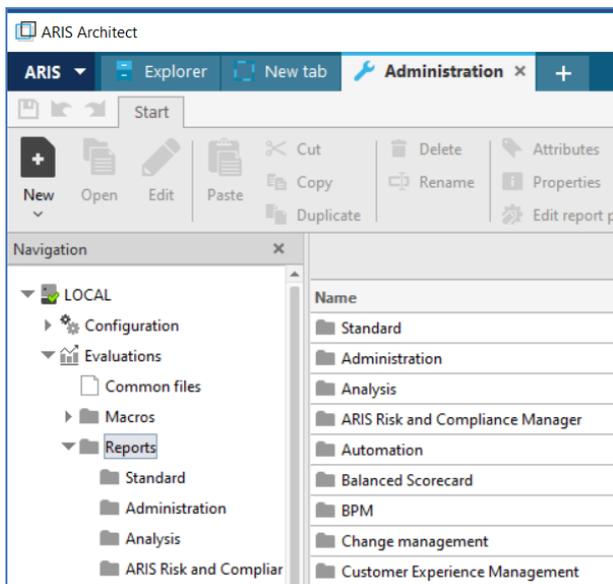
3)   Right Hand Click on 'Reports' – Select New -> Category
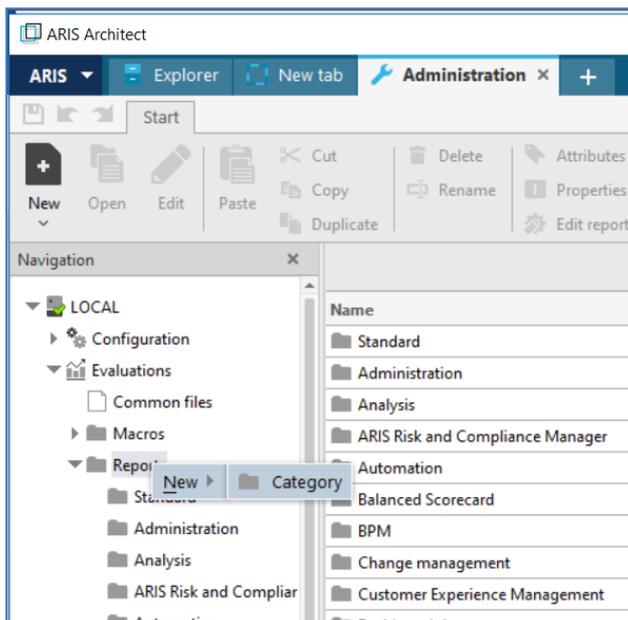
4) Enter 'Natural Engineer'
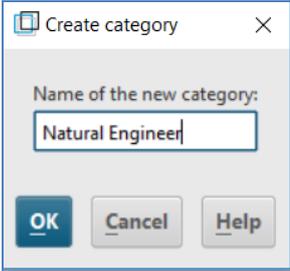
5) Now locate category 'Natural Engineer' & right hand click, then select Import.
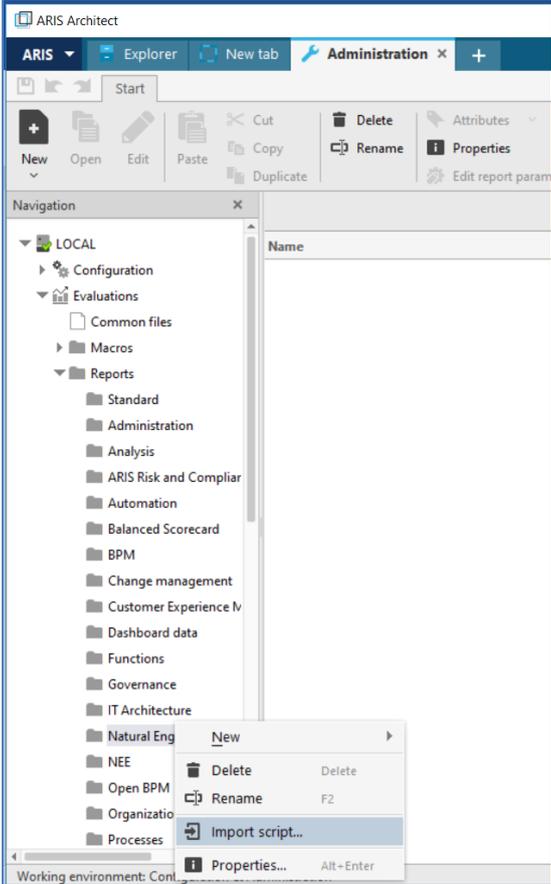
7   **Natural Engineer Utilities**

6)   Enter location & select NEE-XML-Import.arx script.
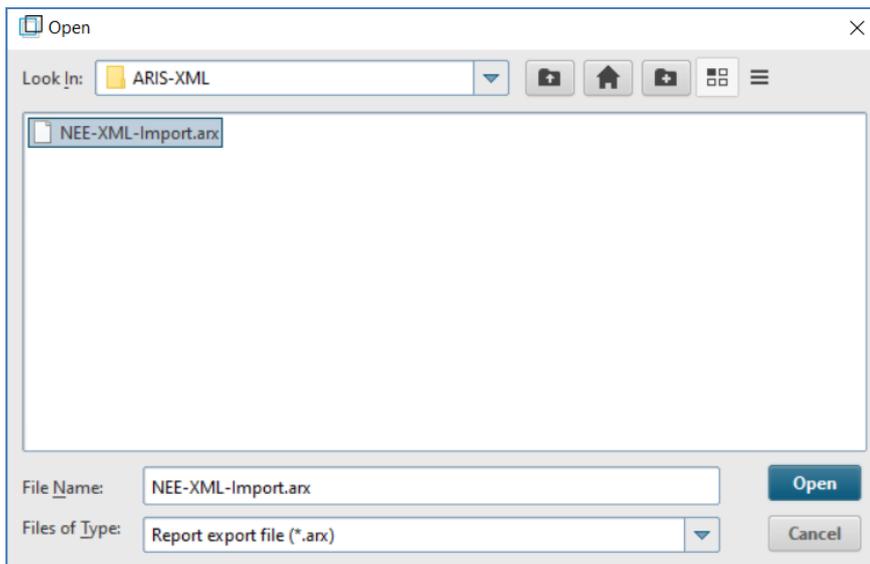
7)   Click Open to Import. You should then see the script in the category.
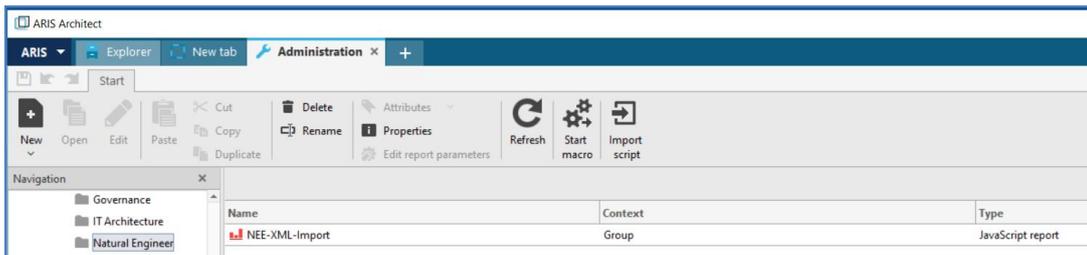
8)   Once imported, now we can import all the XMLs generated in one operation using the report Wizard within ARIS.
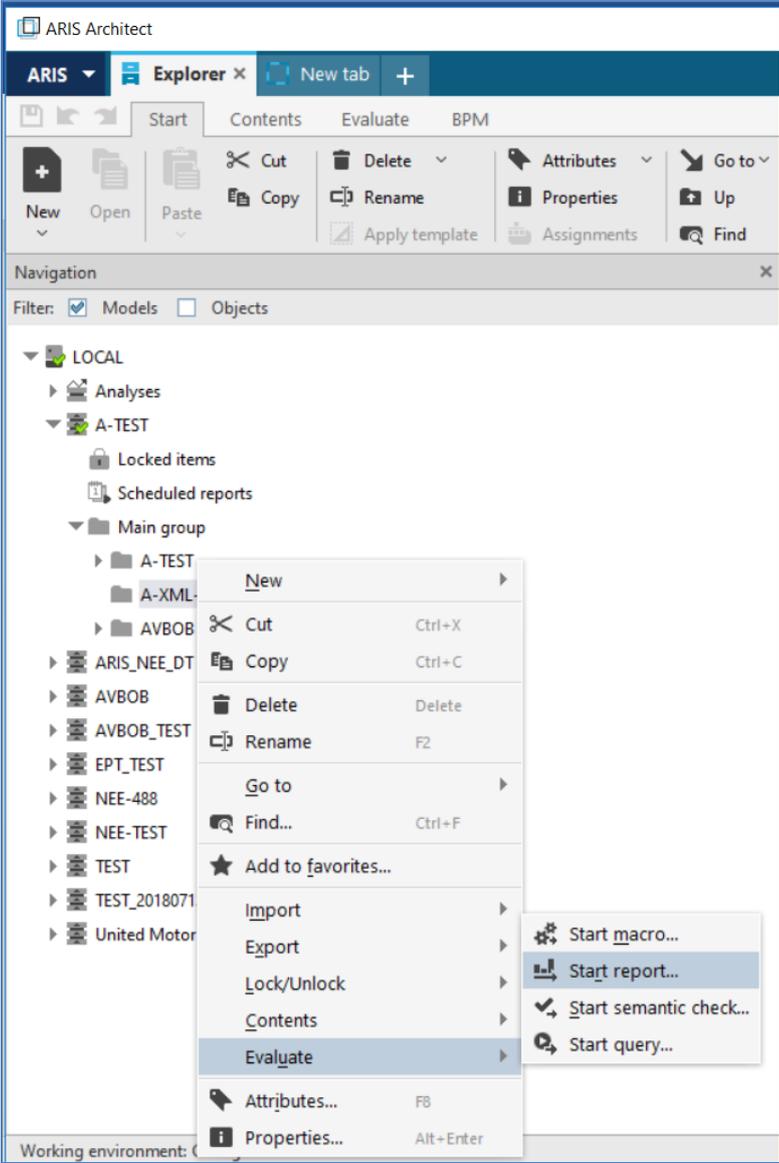
9) Select Category 'Natural Engineer' & the 'NEE XML Import'
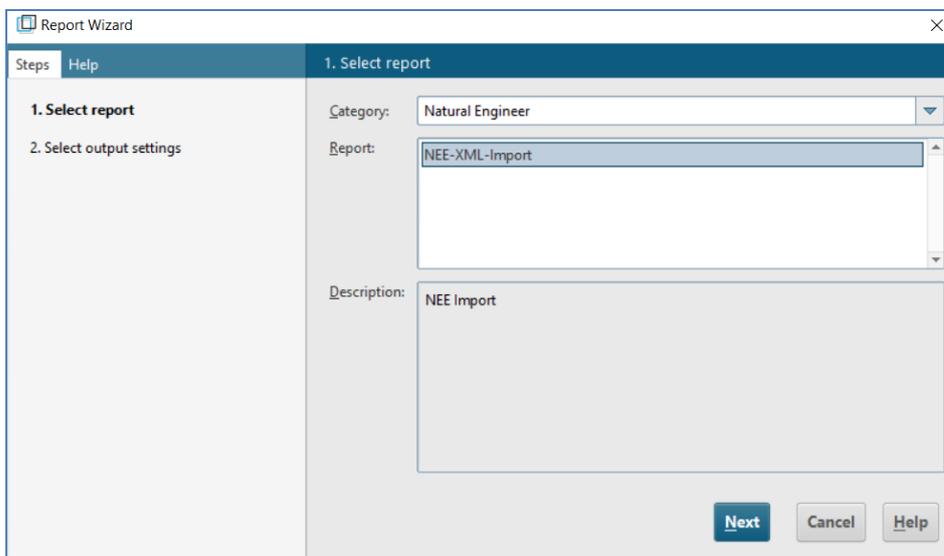
10) Click 'Next'
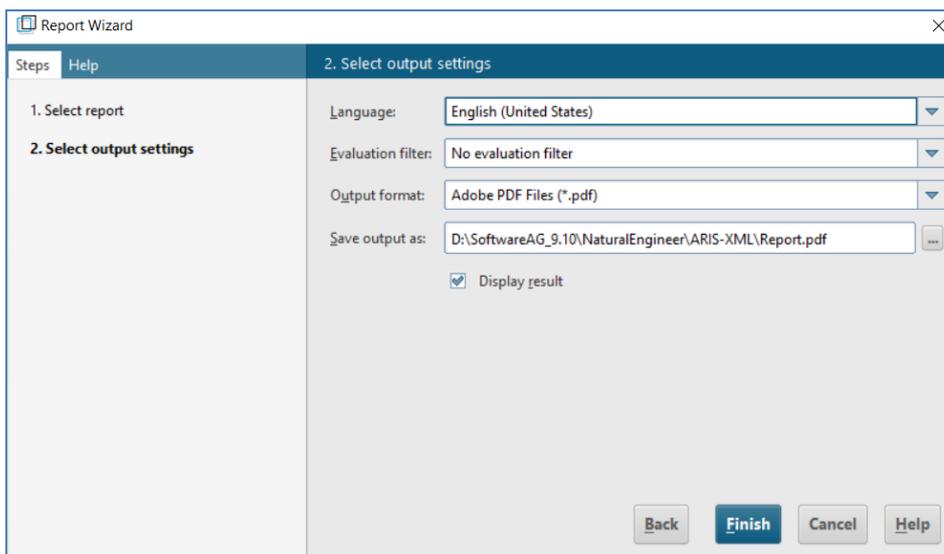
11) Click 'Finish'. It will open a dialog and you need to locate the generated XML Files and select those you wish to import.
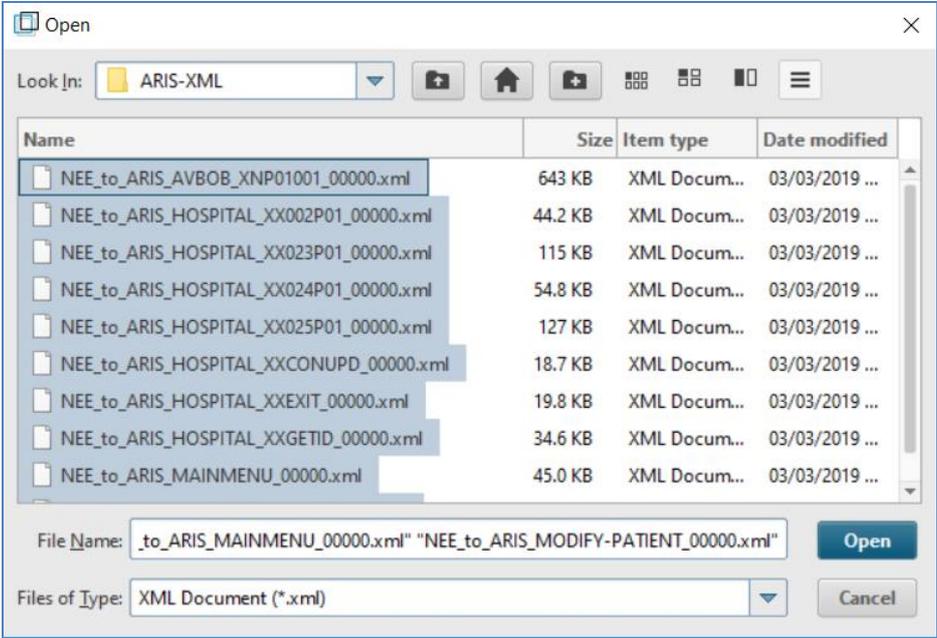
12) Then click 'Open' . It will start to process the XMLs – you should be something like this whilst processing.
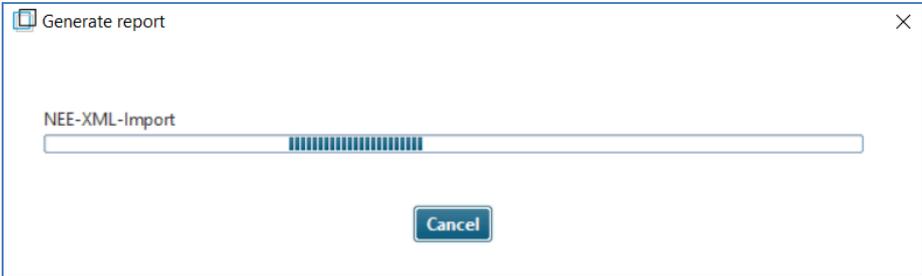
13) On completion, select your ARIS Group, press PF5 & you should all the Models imported.

8
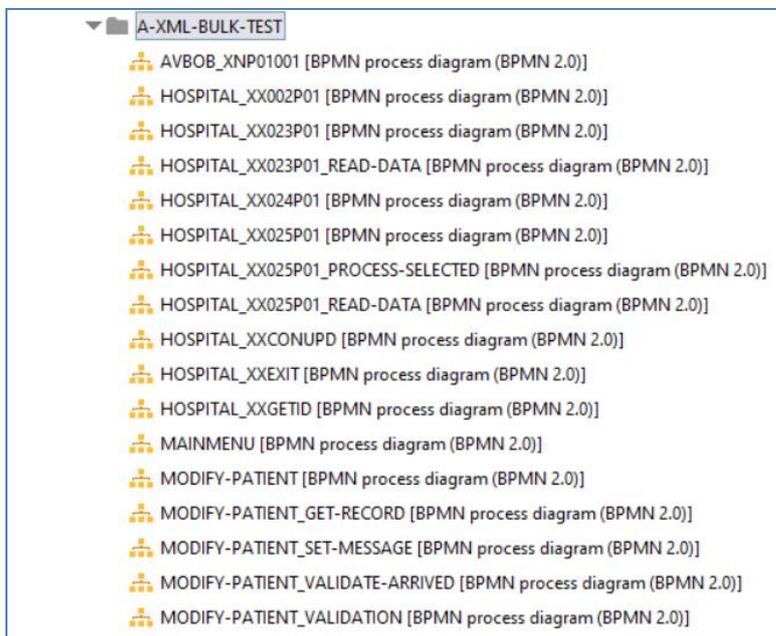
BUSINESS TERM DEFINITIONS

Chapter Overview

This chapter describes the Business Term Definitions option available from the Utilities menu. The Business Term Definitions option provides the facility to add multiple business meanings to fields from a DDM.

These Definitions are used in the Decision Tables function, once the Decision Table Analysis has been executed, to replace the conditions with the business term.

Business Term Definitions Window

The Business Term Definitions screen shows all existing Business Term Definitions for a particular DDM or All DDMs.

The Business Term Definitions screen is accessed using the following menu navigation: Utilities➜ Business Term Definitions or from the context menu of a DDM name on the Global DDM node.

The following Figure 8-1 illustrates the Business Term Definitions screen.
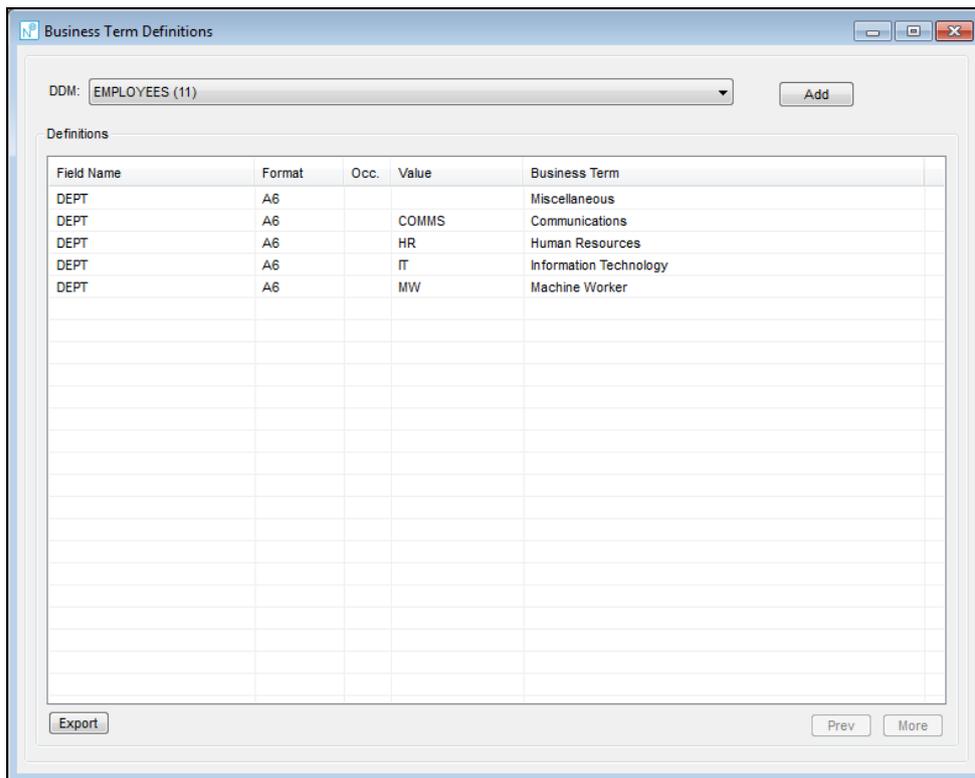
Figure 8-1 Business Term Definitions screen

SCREEN ITEMS	DESCRIPTION
Business Term Definitions screen:	
DDM	The name of the DDM.
Definitions group:	
Field Name	The name of the field from the DDM.
Format	The format of the field.
Occ	The occurrence number of the field if the field is a multiple value field (MU) or in a periodic group (PE).
Business Term	The Business Term specified for the field.

BUTTON NAME	DESCRIPTION
Add	Invokes the <u>Business Term Definitions Field Selection</u> screen.
Prev	Scrolls the field list to previous page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
More	Scrolls the field list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
Export	Will export the data to a CSV file.

Note: For more information on the NATENG.INI file parameter LISTBOXMAX refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.

Business Term Definitions Context Menu

The Business Term Definitions context menu is invoked by placing the cursor on any of the entities listed in the Definitions group and using the right hand mouse button with a single click.

CONTEXT MENU ITEM	DESCRIPTION
Delete this Definition	Will delete the specified definition.
Change Start Position of Definitions List…	Reposition the list of definitions to start from a particular field name.

The reposition value can be input using either a complete name or part name using an '*' (asterisk) wildcard.

The reposition value is appended to the entity list title to highlight the type of repositioning being applied.

Possible reposition values are:

Value	Result
' ' (blank)	Reposition to the top of the field list.
*	Reposition to the top of the field list.
ABC*	Only show fields that are prefixed by 'ABC'.
XYZ	Reposition to the first field that either matches or is greater than 'XYZ' and then continue the entity list from that point.

Business Term Definitions Field Selection Window

The Business Term Definitions Field Selection screen shows all fields for the selected DDM.

The following Figure 8-2 illustrates the Business Term Definitions Field Selection screen.

Figure 8-2 Business Term Definitions Field Selection screen

SCREEN ITEMS	DESCRIPTION
Type	The type of DDM field. May be: ▪ **Periodic Group** ▪ **Multiple Value field**.
Adabas Short Name	The Adabas short name for the DDM field.
Field	The name of the DDM field.
Format	The format of the DDM field.
Length	The length of the DDM field.

BUTTON NAME	DESCRIPTION
OK	Invokes the Add Business Term Definitions screen.
Cancel	Cancel the Field selection process and return to the Business term Definitions screen.

Add Business Terms Window

The Add Business Terms Field Selection screen allows for the definition of specific business terms for the selected DDM field.

The following Figure 8-3 illustrates the Add Business Terms screen.

Figure 8-3 Add Business Terms screen

SCREEN ITEMS	DESCRIPTION
DDM	The name of the selected DDM.
Field	The name of the DDM field.
Occ	The occurrence number of the field. NB This is only shown if the field is a Multiple Value field (MU) or within a Periodic Group (PE).
Value	The value of the field.
Business Term	The Business term/meaning of the corresponding field value.

BUTTON NAME	DESCRIPTION
OK	Saves the information and displays the Business Term Definitions Field Overview screen.
Cancel	Cancel the Add Business Terms process and displays the Business Term Definitions Field Overview screen.

Business Term Definitions Field Overview Window

The Business Term Definitions Field Overview screen shows all existing Business Term Definitions for a particular DDM/Field name combination.

The following Figure 8-4 illustrates the Business Term Definitions Field Overview screen.

Figure 8-4 Business Term Definitions Field Overview screen

SCREEN ITEMS	DESCRIPTION
Business Term Definitions Field Overview screen:	
DDM	The name of the DDM.
Field	The name and format of the DDM field.
Definitions group:	
Occ	The occurrence number of the field if the field is a multiple value field (MU) or in a periodic group (PE).
Value	The value of the field corresponding to the Business Term.
Business Term	The Business Term specified for the field.

BUTTON NAME	DESCRIPTION
Add	Invokes the Add Business Terms screen for the selected field.
Prev	Scrolls the field list to previous page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
More	Scrolls the field list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.

Note: For more information on the NATENG.INI file parameter LISTBOXMAX refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.

Business Term Definitions Context Menu

The Business Term Definitions context menu is invoked by placing the cursor on any of the entities listed in the Definitions group and using the right hand mouse button with a single click.

CONTEXT MENU ITEM	DESCRIPTION
Delete this Definition	Will delete the specified definition.

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