software AG

Natural Engineer

Application Management for Windows

Version 8.3

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ADABAS & NATURAL

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ABOUT THIS MANUAL

Purpose of this manual

This manual covers the Application Management for Natural Engineer.

It describes the various processes available that enable you to create and manage Natural applications within Natural Engineer.

The topics covered include:

- How to create new applications, open existing applications and delete applications.

- Customizing the control of the application by setting preferences.

- Field level interrogation using the Field Viewer option.

- Object Level interrogation using the Object Viewer options.

- JCL object level interrogation using the JCL Viewer options.

- Complexity interrogation using the Application Metrics options.

- An overview of the Object Quality reports available.

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.
Underlined	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.
$\square$	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 Application Management options of Natural Engineer in the following chapters:

Chapter	Contents
1	Describes the Natural Engineer window.
2	Describes the various extract and load processes available within Natural Engineer that allow you to load your applications into the Repository.
3	Describes the various application management options available to maintain and review your loaded applications. For example:

- Field reviewing option, which provides the facility to review objects within applications loaded into the Repository at field level. This allows you to see the use of a field across the whole application as well as its use between objects.

- Object reviewing options, which provide the facility to review objects within each application loaded into the Repository at object level. This allows you to review the inventory, structures, relationships, objects and source code within an application.

- Object Documentation option which allows you to specify comments for each object within an application on the Repository. This complements the object source code information already stored in the Repository.

- Cobol Links option to specify Cobol modules within a Cobol linked program executed from a JCL.

- JCL reviewing options, which provide the facility to review JCL objects within applications loaded into the Repository. The JCL options review the JCL objects, data sets, DDMs and Natural programs within an application

4	Provides an overview of the reporting options available for the topics covered in this manual.
5	Describes the various Application Metrics options, which provide summary and detailed information about the application, objects and source code, for the purpose of providing structural statistics and complexity information.
6	Describes the various management options available to maintain and review the Data Definition modules within your Repository.
7	Describes the various management options available to maintain and review the JCL within your Repository.
8	Describes the various management options available to maintain and review the CICS Regions within your Repository.

Natural Engineer Application Management

<table>
<tr><td>9</td><td>Describes the various management options available to maintain and review the SQL Tables within your Repository.</td></tr>
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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, and 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'.

Natural Engineer Application Management

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.

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 (NEE83-006ALL)**

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 (NEE83-008ALL)**

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 (NEE83-010WIN)**
       Natural Engineer Installation Guide for Mainframes(NEE83-010MFR)
       Natural Engineer Installation Guide for Unix (NEE83-010UNX)

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

4   **Natural Engineer Administration Guide (NEE83-040WIN)**
       Natural Engineer Administration Guide (NEE83-040MFR)

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 (NEE83-020WIN)**
       Natural Engineer Application Management (NEE83-020MFR)

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

6   **Natural Engineer Application Documentation (NEE83-022WIN)**
       Natural Engineer Application Documentation (NEE83-022MFR)

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.

7   **Natural Engineer Application Analysis and Modification (NEE83-023WIN)**
       Natural Engineer Application Analysis and Modification (NEE83-023MFR)

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 (NEE83-024WIN)
     Natural Engineer Application Restructuring (NEE83-024MFR)

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

9   Natural Engineer Utilities (NEE83-080WIN)
     Natural Engineer Utilities (NEE83-080MFR)

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

10   Natural Engineer Reporting (NEE83-025ALL)

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] (NEE83-026MFR)

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

12   Natural Engineer Messages and Codes (NEE83-060ALL)

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

13   Natural Engineer Web Interface Installation and Configuration Guide(NEA83-010ALL)

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 (NEE83-017WIN)

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 and Business Rule processing.

1

THE NATURAL ENGINEER WINDOW

Chapter Overview

This chapter provides a basic overview of the Natural Engineer user interface - the Natural Engineer window.

Natural Engineer Window

Natural Engineer is an MDI application, that is, it utilizes the MDI concept of an MDI frame and client window. The client window hosts MDI child windows, allowing multiple windows to be displayed at the same time.

Note: MDI stands for Multiple Document Interface. This is a common term for windows applications that show multiple documents in the same window.

All the Natural Engineer functions will open as MDI child windows. These can be either modal or non-modal windows.

A modal window is a window that needs to be completed first before any other window can be accessed.

Natural Engineer uses modal windows for any functions that affect the display of an already open window. For example: selecting reporting options or setting filter criteria to change the content of a list.

Non-modal windows have no restrictions, and can be opened continuously within the MDI child workspace.

The Natural Engineer window is displayed when Natural Engineer is started.

The main components of the Natural Engineer window are the site workspace and the MDI child workspace.

Natural Engineer functions can be accessed from the main menu bar and from context menus attached to the various nodes in the site workspace.

The following Figure 1-1 illustrates the Natural Engineer window.
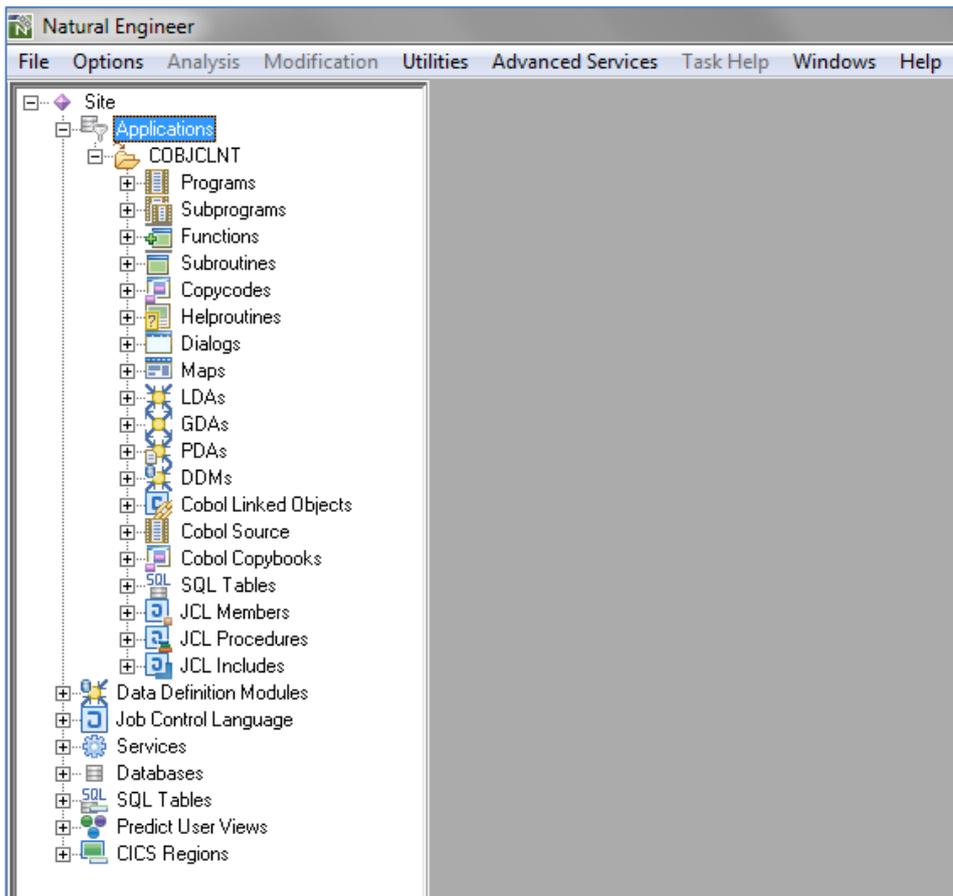
Figure 1-1 Natural Engineer window

MENU ITEMS	DESCRIPTION
File	Exit options from Natural Engineer.
Options	Administrative options.
Analysis	Analysis options
Modification	Modification options.
Utilities	Utility options.
Advanced Services	Advanced Services options. *NB: This may not be available depending on your Natural Engineer Licenses.*
Task Help	Task Help options.
Windows	Standard Windows options.
Help	Help options.

SCREEN ITEMS	DESCRIPTION
Site Workspace	This is a tree view window and is used to manage the various nodes within Natural Engineer. These comprise: **Application Node** The application node displays the applications, object types, objects and fields for each application loaded into the Repository. The application node is a hierarchical structured display controlled by four nodes:

NODE	DESCRIPTION
Application	Each application is listed at this level. Applications can be expanded and collapsed by clicking on the plus or minus signs in front of the application node. If no plus sign is present, then the application has not been loaded into the Repository.
Object Type	Each object type present within an application is listed. Object types can be expanded and collapsed by clicking on the plus or minus signs in front of the application node. This will list all the objects for that type.

SCREEN ITEMS	DESCRIPTION

Object	Each object present within an application is listed. There is no expand/collapse functionality for this node.
Field	Each field present within an application is listed. There is no expand/collapse functionality for this node.

Data Definition Module Node

The Data Definition Module node displays the DDMs loaded into the Repository.

The Data Definition Modules node is a hierarchical structured display controlled by one node:

NODE	DESCRIPTION
Data Definition Modules	Each Data Definition Module is listed at this level.

Services Node

The Services node displays the Services loaded into the Repository.

The Services node is a hierarchical structured display controlled by one node:

NODE	DESCRIPTION
Services	Each Service is listed at this level.

Database Node

The Database node displays the Databases, file numbers, DDMs and applications for each Database loaded into the Repository. This is based on the information in each DDM loaded in the repository.

The Databases node is a hierarchical structured display controlled by four nodes:

NODE	DESCRIPTION
Databases	Each Database is listed at this level.
File Number	Each File Number is listed at this level.
DDM Name	Each DDM Name is listed at this level.
Application Name	Each Application Name is listed at this level.

SCREEN ITEMS	DESCRIPTION

Job Control Language Node

The Job Control Language node displays the JCL Objects that have been loaded into the Repository at a global level.

The Job Control Language node is a hierarchical structured display controlled by two nodes:

NODE	DESCRIPTION
JCL Object Types	Each type of JCL Object is listed at this level.
JCL Object Name	Each JCL Object name present within a JCL Object Type is listed at this level.

CICS Region Node

The CICS Region node displays the CICS Regions that have been loaded into the Repository.

The CICS Region node is a hierarchical structured display controlled by one node:

NODE	DESCRIPTION
CICS Regions	Each type of CICS Region is listed at this level.

Data Definition Module Node

The Data Definition Module node displays the DDMs loaded into the Repository.

The Data Definition Modules node is a hierarchical structured display controlled by one node:

NODE	DESCRIPTION
Data Definition Modules	Each Data Definition Module is listed at this level.

SCREEN ITEMS	DESCRIPTION

Predict User Views Node

The Predict User Views node displays the Predict User Views (PUVs) loaded into the Repository.

The Predict User Views node is a hierarchical structured display controlled by one node:

NODE	DESCRIPTION
Predict User Views	Each Predict User View is listed at this level.

SQL Tables Node

The SQL Tables node displays the SQL Tables e.g., DB2 that have been loaded into the Repository.

The SQL Tables node is a hierarchical structured display controlled by one node:

NODE	DESCRIPTION
SQL Tables	Each type of SQL Tables is listed at this level.

The number of items in the nodes, object types, objects and fields lists can be controlled by the LISTBOXMAX parameter in the NATENG.INI file.

If the number of items in a list exceeds the LISTBOXMAX parameter value, then the lists become scrollable via prev and more icons. The prev icon will scroll the list to the previous page, and, the more icon will scroll the list forward one page.

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

Context menus are available for the various nodes to provide the Natural Engineer functions available for the selected node.

Note: For more information on the context menus refer to the section Context Menus.

SCREEN ITEMS	DESCRIPTION
MDI Child Workspace	All MDI child windows are displayed here.
	The display can be controlled by using standard windows options, for example: cascade or tile the displayed windows. These options are available in the Windows menu in the menu bar.

TAB NAME	DESCRIPTION
The site workspace can list either objects or fields. This display is controlled by the tabs at the foot of the site workspace.	
Objects	Switch the site workspace to show objects.
Fields	Switch the site workspace to show fields.

STATUS BAR ITEM	DESCRIPTION
The Natural Engineer window status bar is divided into 4 individual panes.	
Pane 1	The runtime environment being used. For example: Local or Remote.
Pane 2	The Userid of the current User.
Pane 3	Name of the currently selected application.
Pane 4	Any Natural Engineer processing messages.

Example Natural Engineer Window Screenshots

The following Figure 1-2 illustrates the Natural Engineer window displaying fields.
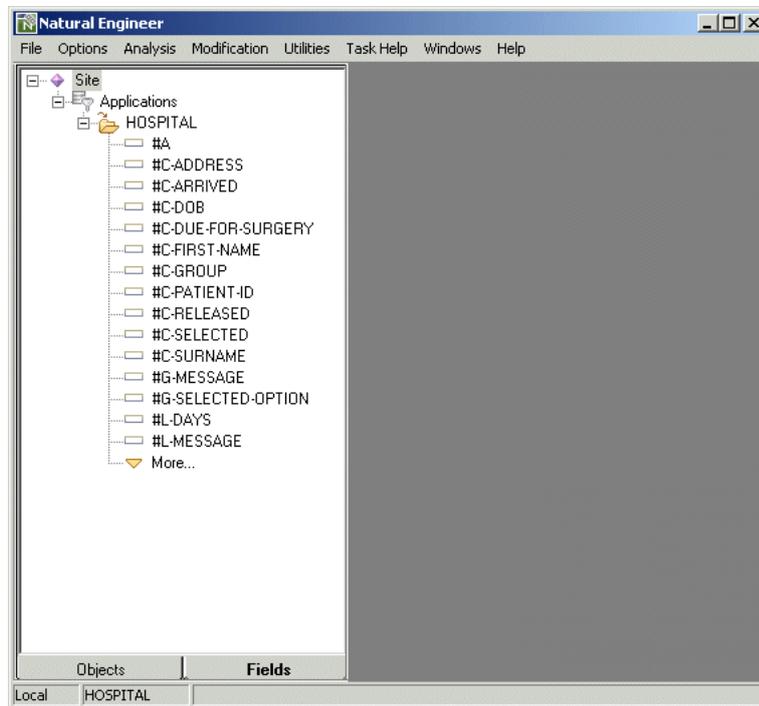
Figure 1-2 Natural Engineer window displaying fields

Context Menus

Context menus are available to the various nodes within the site workspace. These provide the Natural Engineer functions available at the selected node level.

For example, at the application node level, the context menu will show the functions that relate to an application at application level.

To invoke a context menu:

- Select the node for which you want to invoke the context menu for.

- Single click with the right hand mouse button.

- The context menu will appear, choose the option you require.

Note: Some context menu options may expand to further sub-menu options. This will be denoted in the context menu with a solid arrow triangle to the right most extreme of the option. Depending on what type of object you have loaded into the repository the functions available via the context menus may differ.

2

MANAGING APPLICATIONS

Chapter Overview

This chapter describes how to select and manage applications for processing in Natural Engineer.

In the context of Natural Engineer, 'Application' is as described in the Terminology section and is the name Natural Engineer uses to describe a library or set of related libraries.

An Application is a library or group of related libraries that 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.

Open an Application

Applications can be opened by selecting them from the site workspace.

Applications can be expanded and collapsed by clicking on the plus or minus signs in front of the application node.

If an application node is not displaying a plus sign in front of it, this indicates that the application has not yet been loaded into the Repository.

How to Create New Applications

New applications can be created by using the following site workspace navigation:

- Select the top level applications node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **New**.

This will present the New Application screen where the new Application Name may be entered or selected from a list of existing Natural libraries.

Once the new Application Name has been entered or selected the Application Properties screen will be displayed to allow the definition of specific Application information.

Note: User Exit NEEUEX5 has to be available in the SYSNEE library in order for new application names to be created. This user exit may be modified if you wish to generate application names automatically. If it is not present in the SYSNEE library then NEEUEX5X needs to be renamed to NEEUEX5.

Application Filter

The list of applications displayed in the site workspace can be tailored to your requirements by using the Application Filter option.

How to Invoke the Application Filter

Use the following navigation in the site workspace:

- Select the top level applications node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Application Filter**.

Specifying Application Filter

FILTER OPTION	DESCRIPTION
Application Filter	Reposition the list of applications to start from a particular application name.
	The reposition value can be input using either a complete name or part name using an '*' (asterisk) wildcard.
	Possible reposition values are:

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

Display Filter

The list of objects and fields displayed in the site workspace can be tailored to your requirements by using the Display Filter option.

How to Invoke the Display Filter

Use the following navigation in the site workspace:

- Select the application required.
- Single click with the right hand mouse button to invoke the context menu.
- Select the option: **Display Filter**.

Specifying Display Filter

FILTER OPTION	DESCRIPTION

The following options are available when the site workplace Objects tab is active:

Language	Allows you to select the programming language of the objects to be displayed.
	Available selections are:
	▪ **All**
	▪ **Cobol**
	▪ **Natural**
	▪ **JCL**
Object Name	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.
	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.

FILTER OPTION   DESCRIPTION

The following options are available when the site workplace Fields tab is active:

Language

Allows you to select the programming language of the fields to be displayed.

Available selections are:

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

Field Types

Allows you to select the types of fields to be listed. Available selections are:

- **All Fields**
- **Non-DDM Fields**
- **DDM Fields**
- **System Variables**

Field Name

Reposition the list of fields 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.

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 field list from that point.

The following reposition values are for System Variables only:

**	Reposition to the top of system variable list.
*CURS	Reposition to the first system variable that either matches or is greater than '*CURS' and then continue the system variable list from that point.
DAT	Only show system variables that are prefixed by '*DAT'.

Refresh Application

This option will refresh the list of objects in the site workplace for the selected application.

It can be used when you have a large application being loaded into the Repository, as it allows you to start reviewing the objects as soon as they have been loaded, rather than having to wait until the Load process has completed.

Note: In order to use this option, the Load process must be executing in asynchronous mode. This is controlled by the NATENG.INI file parameter ASYNC. For more information refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.

How to Invoke the Refresh Application

Applications can be refreshed by using the following site workplace navigation:

- Select the application required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Refresh Application**.

Delete Object

Individual objects can be deleted by using the following site workplace navigation:

- Select the object to be deleted.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Delete Object**.

The deletion will remove all Application, Impact Analysis and Modification data for the object.

Note: If the object is to be deleted permanently from the application Repository, you must also delete it from the source library, so that it is not re-extracted by error in the future.

Application Properties

The Application Properties option provides details about an application that help to identify it within Natural Engineer.

The Application Properties option provides the facility to define application specific characteristics to be applied during the Extract and Modification processes within Natural Engineer.

Application Properties includes:

- Application description, owner name and contact details.

- Steplib information. This may be applicable where applications make use of standard routines which are held on a separate library rather than including them within the application library.

- The 'real' library name if different to the application name used within Natural Engineer.

- Modification library and Modify to Steplib library.

- File suffixes for Cobol and JCL objects, used to provide selective Extract information.

How to Invoke the Application Properties Option

Use the following navigation in the site workplace:

- Select the application required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Application Properties**.

The Application Properties screen is also automatically presented when a new application is defined.

Application Properties Window

The Application Properties option uses a multi-purpose 'tabbed' screen to control all of the property settings available. Selecting the required tab will result in the display of the appropriate screen content for the properties required.

There are five tab options available:

1. General
2. Natural
3. Cobol
4. JCL
5. CICS

General Tab Screen

The General tab screen provides the facility to specify and review any general information about an application.

The following Figure 2-1 illustrates the Application Properties: General tab screen.
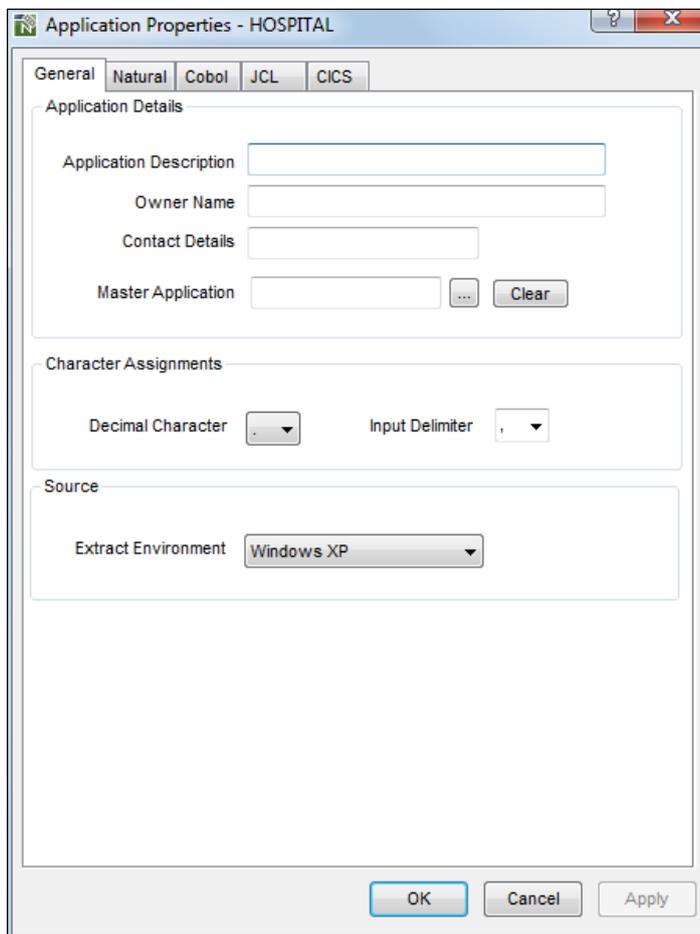
Figure 2-1 Application Properties: General tab screen

SCREEN ITEMS	DESCRIPTION

Application Details group:

Application Description	The application description.
	For example: The HOSPITAL application is used to administer patient details.
	This needs to be input manually up to a maximum of 253 characters.
Owner Name	The name of the owner of the application.
	For example: department name, manager's name, project team.
	This needs to be input manually up to a maximum of 65 characters.
Contact Details	The contact details of the application.
	For example: telephone number, email address.
	This needs to be input manually up to a maximum of 65 characters.
Master Application	If a Master Application is selected then all Application Properties definitions e.g., Steplibs, Source Library and settings will be copied from the Master Application to this application.

Character Assignments group:

Note: These options are used during the Extract process.

Decimal Character	The decimal character used by the application.
	For new applications, the default value will be based on the Natural environment settings in use.
	Selection is from the available list only.
Input Delimiter	The input data delimiter used by the application.
	For new applications, the default value will be based on the Natural environment settings in use.
	Selection is from the available list or a value can be typed in.

Source group:

SCREEN ITEMS	DESCRIPTION
Extract Environment	This is a documentation facility used by Natural Engineer's Reengineering functions. Specifies the application environment from which the Natural source code comes. Available selections are: **Windows 7** **Windows Vista** **Windows 2000** **Windows XP** **Windows 2003 Server** **Windows 2008 Server** **z/OS** **Unix** **VMS** **BS2000** **VSE**

BUTTON NAME	DESCRIPTION
Application Details group:	
Master Application Selection [….]	Invokes the General Selection screen, listing all Natural Engineer Applications in the repository.
Master Application [Clear]	Clears the Master Application selection.
Application Properties screen:	
OK	Save changes and close the current screen.
Cancel	Cancel the Application Properties process and return back to the main Natural Engineer screen.
Apply	Save changes and retain the current screen. *Note: This button is only enabled if any changes have been made.*

Natural Tab Screen

The Natural tab screen provides the facility to specify and review any settings for the Natural objects within an application.

The following Figure 2-2 illustrates the Application Properties: Natural tab screen.
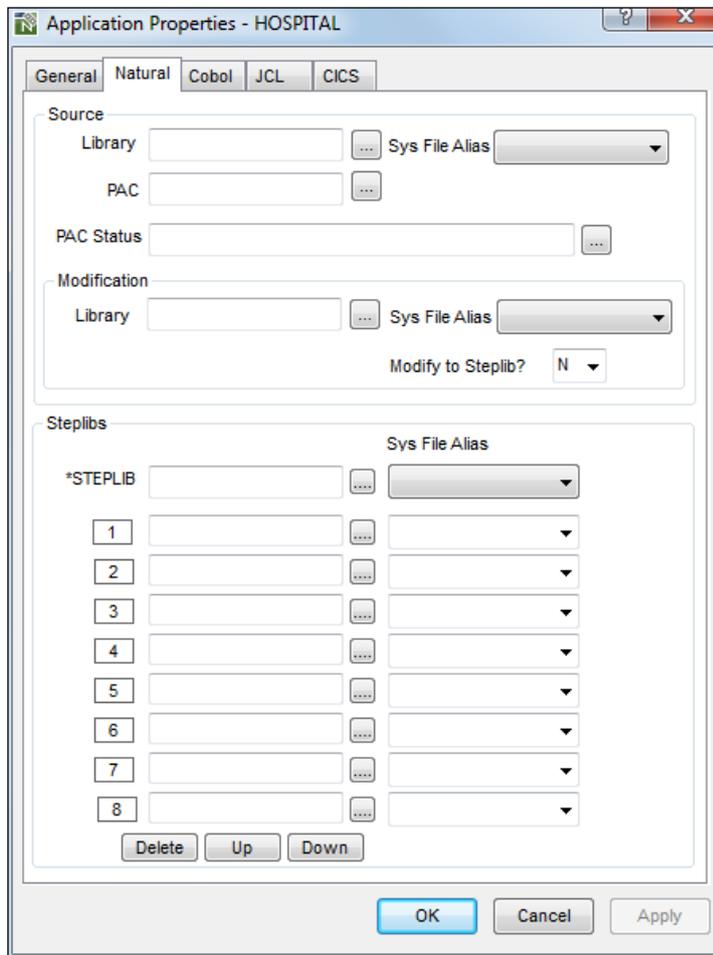
Figure 2-2 Application Properties: Natural tab screen

SCREEN ITEMS	DESCRIPTION
Source group:	
Library	If the Natural Engineer Application name is to be different from the library name in the FUSER, specify the actual FUSER library name here. If a Natural Library is not specified, Natural Engineer assumes that the application name is the same as the FUSER library name.
	Note: If a PAC application is selected, then Source Library selection is not available.
Sys File Alias	The alias for the particular database number/file number combination where the Natural System File for the source library is located.
PAC	The name of the PAC application.
PAC Status	The name of the PAC status related to the PAC application. If no status is selected then Natural Engineer will select the latest version of the objects from the PAC application regardless of status.
	Note: These PAC options are only available if Natural Engineer is executing in a remote development environment and PAC version 2.4.2 or above is installed on the mainframe.
	Note: When Natural Engineer extracts objects from a PAC Application it uses the PAC Used Objects list to determine what objects and versions to extract. If PAC is out of step with the source code then Natural Engineer may not be able to identify all relevant objects.
Modification group:	
Modification Library	Used to specify a library that the modified code will be written to.
	If a Modification Library is not specified Natural Engineer places all modified code in a library name with an 'X' as the last character of the application name. If the name is already 8 characters long, the last character is removed and replaced with the 'X'.
	The Modification Library name can be the same as the base Natural Library name. This allows any modified objects from the modification process to be applied to the base Natural Library. If this is set, a warning message is produced to highlight that the base Natural Library will be updated.
	Note: If a PAC application is selected, then the Modification Library will default to the first maintenance library found within the PAC application.
Sys File Alias	The alias for the particular database number/file number combination where the Natural System File for the modification library is located.
	Note: The aliases shown are those that are identified as Modifiable in Global Properties.

SCREEN ITEMS	DESCRIPTION
Modify to Steplib?	This option allows you to specify where objects that are on steplib libraries are to be modified, either to the Steplib library or the application Modification library.

	N	Modify all objects to the application Modification library.
	Y	Modify steplib objects in the application to the steplib library.

Steplibs group:

*STEPLIB	The master steplib library name assigned to the Natural system variable *STEPLIB. This is normally set to SYSTEM.
Steplibs	This option allows you to define multiple Steplib libraries from which Natural Engineer can retrieve objects referenced from the primary Natural library. You can define up to 8 steplib Natural library names that Natural Engineer will search for the application code.
	Steplib library names can be typed in or retrieved by using the Steplib Selection [….] button.
	Note: A steplib library name cannot be the same as the Application name, the *STEPLIB name, the Source library name or the Modification library.
	Natural Engineer will search the steplib chain for the following items if they do not exist on the base library:

Data Areas	(LDAs, PDAs GDAs)
Copycode	
Subprograms	(invoked via CALLNAT)
Programs	(invoked via FETCH/FETCH RETURN/FETCH REPEAT)
Maps	(invoked by INPUT USING MAP/WRITE USING FORM)
Helproutines	(invoked via HE=)
Objects	(invoked via STACK TOP COMMAND/STACK COMMAND)
DDMs	

Note: For the STACK command, Natural Engineer will attempt to determine if the command that is being stacked is an actual object or not. It does this by interrogating an exclude table that lists common commands that are not objects e.g. STOW, EDIT.

Sys File Alias	The alias for the particular database number/file number combination where the Natural System File for the steplib libraries are located.

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

BUTTON NAME	DESCRIPTION
Source group:	
Source Library Selection [….]	Invokes the General Selection screen, listing all the Natural Libraries.
Source PAC Selection [….]	Invokes the General Selection screen, listing all the PAC Applications.
Source PAC Status Selection [….]	Invokes the General Selection screen, listing all the PAC Status for a PAC Application.. *Note: These PAC options are only available if Natural Engineer is executing in a remote development environment and PAC version 2.4.2 or above is installed on the mainframe.*
Modification group:	
Modification Library Selection [….]	Invokes the General Selection screen, listing all the Natural Libraries.
Steplibs group:	
*STEPLIB Selection [….]	Invokes the General Selection screen, listing all the Natural Libraries.
Steplib Selection [….]	Invokes the General Selection screen, listing all the Natural Libraries.
Delete	Deletes the currently selected Steplibs library name.
Up	Moves the currently selected Steplib library name up the list order.
Down	Moves the currently selected Steplib library name down the list order.
Application Properties screen:	
OK	Save changes and close the current screen.
Cancel	Cancel the Application Properties process and return back to the main Natural Engineer screen.
Apply	Save changes and retain the current screen. *Note: This button is only enabled if any changes have been made.*

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

Cobol Tab Screen

The Cobol tab screen provides the facility to specify and review any settings for the Cobol objects within an application.

The following Figure 2-3 illustrates the Application Properties: Cobol tab screen.
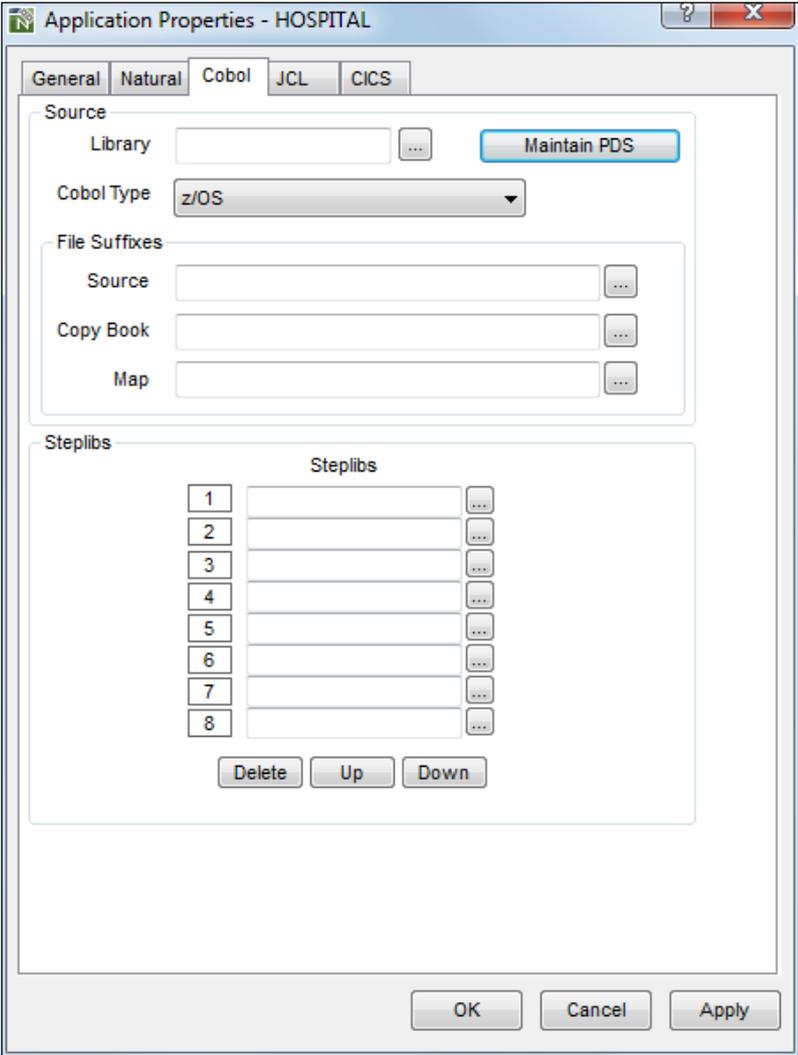

Figure 2-3 Application Properties: Cobol tab screen

SCREEN ITEMS	DESCRIPTION
Source group:	
Library	If the Natural Engineer Application name is to be different from the primary Cobol library name, specify the actual Cobol library name here. If a Cobol library is not specified, Natural Engineer assumes that the application name is the same as the Cobol library name.
Maintain PDS	Opens up the Maintain PDS Screen that allows for the definition of Source, Steplib and Map PDS names for Cobol. If PDS names have been specified then an asterisk ('*') will be displayed on the button name. The extract process will search for the objects in the order that they are specified.
	NB: This is only available if Natural Engineer is running on the PC in a SPoD environment against a mainframe server.
Cobol Type	The type or version of the Cobol programming language used by the application.
File Suffixes group:	
Note: A maximum of 10 suffixes can be specified for each group type. The file suffixes can be specified using the File Suffixes pop-up window. For more information refer to section File Suffixes.	
Source	The file suffixes to be included during the Extract process for source objects.
Copy Book	The file suffixes to be included during the Extract process for copybook objects.
Map	The file suffixes to be included during the Extract process for map objects.
Steplibs group:	
Steplibs	This option allows you to define multiple Steplib libraries from which Natural Engineer can retrieve objects referenced from the primary Cobol library. You can define up to 8 steplib Cobol library names that Natural Engineer will search for the application code.
	Steplib library names can be typed in or retrieved by using the Steplib Selection [….] button.
	Note: A steplib library name cannot be the same as the Application name.

BUTTON NAME	DESCRIPTION
Source group:	
Source Library Selection [….]	Invokes the General Selection screen, listing all the Cobol Libraries.
File Suffixes group:	
Source Selection [….]	Invokes the General Selection screen, listing all the Cobol Libraries.
Copy Book Selection [….]	Invokes the General Selection screen, listing all the Cobol Libraries.
Map Selection [….]	Invokes the General Selection screen, listing all the Cobol Libraries.
Steplibs group:	
Steplib Selection [….]	Invokes the General Selection screen, listing all the Cobol Libraries.
Delete	Deletes the currently selected Steplibs library name.
Up	Moves the currently selected Steplib library name up the list order.
Down	Moves the currently selected Steplib library name down the list order.
Application Properties screen:	
OK	Save changes and close the current screen.
Cancel	Cancel the Application Properties process and return back to the main Natural Engineer screen.
Apply	Save changes and retain the current screen.
	Note: This button is only enabled if any changes have been made.

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

Maintain PDS - Cobol

The Maintain PDS screen is invoked from the Maintain PDS button on the Cobol tab of the Application Properties when Natural Engineer is running in a SPoD environment against a mainframe server.

The following Figure 2-3-1 illustrates the Maintain PDS screen when called from the Cobol tab.

Figure 2-3-1 Maintain PDS - Cobol screen

SCREEN ITEMS	DESCRIPTION
Cobol Source group:	
PDS Alias	The alias for the Source PDS.
PDS Name	The name of the PDS containing the Cobol objects.
Cobol Steplibs group:	
PDS Alias	The alias for the Steplib PDS.
PDS Name	The name of the PDS containing the Cobol steplib objects.
Cobol Maps group:	
PDS Alias	The alias for the Map PDS.
PDS Name	The name of the PDS containing the Cobol Map objects.

BUTTON NAME	DESCRIPTION
PDS Alias and Name Selection [….]	Invokes the General Selection screen to allow the user to select from the list of predefined COBOL PDS Aliases if required. The aliases are specified in Global Properties.
Cobol Source group:	
Delete	Deletes the currently selected Source PDS name.
Up	Moves the currently selected Source PDS name up the list order.
Down	Moves the currently selected Source PDS name down the list order.
Cobol Steplib group:	
Delete	Deletes the currently selected Steplib PDS name.
Up	Moves the currently selected Steplib PDS name up the list order.
Down	Moves the currently selected Steplib PDS name down the list order.
Maintain PDS screen:	
OK	Save changes and close the current screen.
Cancel	Cancel the Maintain PDS process and return back to the Application Properties screen.

JCL Tab Screen

The JCL tab screen provides the facility to specify and review any settings for the JCL objects within an application.

The following Figure 2-4 illustrates the Application Properties: JCL tab screen.
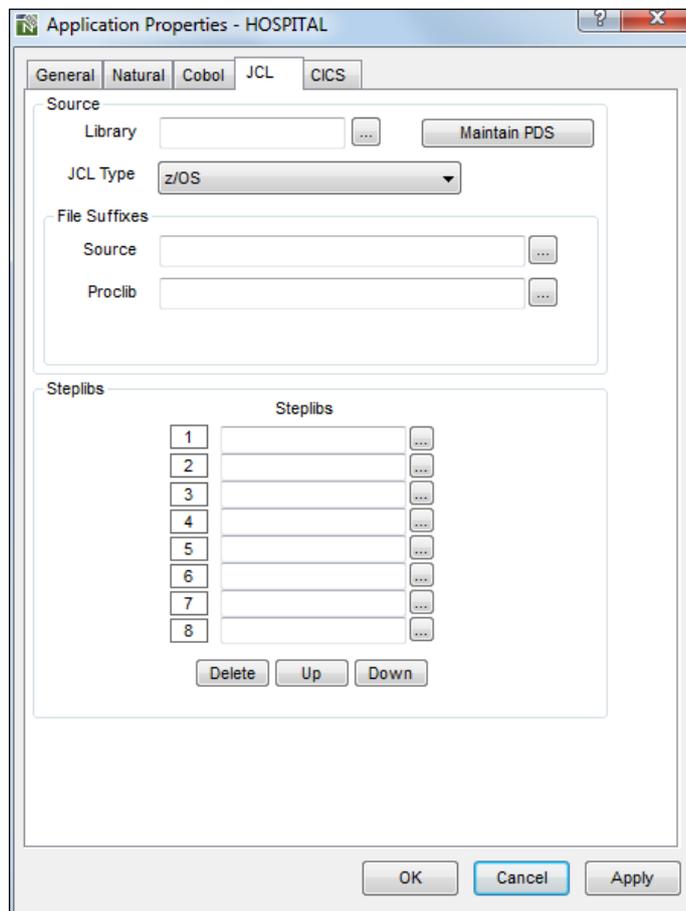
Figure 2-4 Application Properties: JCL tab screen

SCREEN ITEMS	DESCRIPTION
Source group:	
Source Library	If the Natural Engineer Application name is to be different from the primary JCL library name, specify the actual JCL library name here. If a JCL library is not specified, Natural Engineer assumes that the application name is the same as the JCL library name.
Maintain PDS	Opens up the Maintain PDS Screen that allows for the definition of Source and Procedure Steplib PDS names for JCL. If PDS names have been specified then an asterisk ('*') will be displayed on the button name. The extract process will search for the objects in the order that they are specified.
	NB: This is only available if Natural Engineer is running on the PC in a SPoD environment against a mainframe server.
JCL Type	The type or version of the JCL language used by the application.
File Suffixes group:	

Note: A maximum of 10 suffixes can be specified for each group type. The file suffixes can be specified using the File Suffixes pop-up window. For more information refer to section File Suffixes.

Source	The file suffixes to be included during the Extract process for source objects.
Proclib	The file suffixes to be included during the Extract process for proclib objects.
Steplibs group:	
Steplibs	This option allows you to define multiple Steplib libraries from which Natural Engineer can retrieve objects referenced from the primary JCL library. You can define up to 8 steplib JCL library names that Natural Engineer will search for the application code.
	Steplib library names can be typed in or retrieved by using the Steplib Selection [….] button.
	Note: A steplib library name cannot be the same as the Application name.

BUTTON NAME	DESCRIPTION
Source group:	
Source Library Selection [….]	Invokes the General Selection screen, listing all the JCL Libraries.
File Suffixes group:	
Source Selection [….]	Invokes the File Suffixes screen.
Proclib Selection [….]	Invokes the File Suffixes screen.
Steplibs group:	
Steplib Selection [….]	Invokes the General Selection screen, listing all the JCL Libraries.
Delete	Deletes the currently selected Steplibs library name.
Up	Moves the currently selected Steplib library name up the list order.
Down	Moves the currently selected Steplib library name down the list order.
Application Properties screen:	
OK	Save changes and close the current screen.
Cancel	Cancel the Application Properties process and return back to the main Natural Engineer screen.
Apply	Save changes and retain the current screen. *Note: This button is only enabled if any changes have been made.*

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

Maintain PDS - JCL

The Maintain PDS screen is invoked from the Maintain PDS button on the JCL tab of the Application Properties when Natural Engineer is running in a SPoD environment against a mainframe server.

The following Figure 2-4-1 illustrates the Maintain PDS screen when called from the JCL tab.
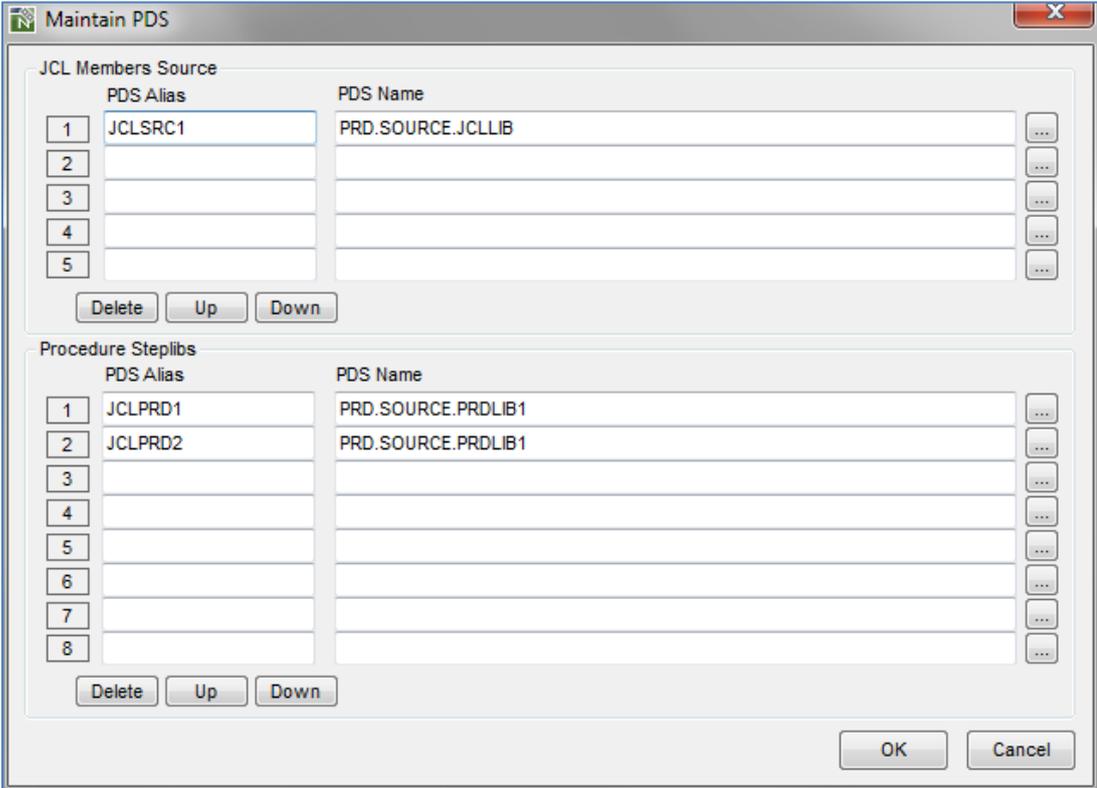
Figure 2-4-1 Maintain PDS - JCL screen

SCREEN ITEMS	DESCRIPTION
JCL Members Source group:	
PDS Alias	The alias for the Source PDS.
PDS Name	The name of the PDS containing the JCL objects.
JCL Procedure Steplibs group:	
PDS Alias	The alias for the Steplib PDS.
PDS Name	The name of the PDS containing the JCL steplib objects.

BUTTON NAME	DESCRIPTION
PDS Alias and Name Selection [….]	Invokes the General Selection screen to allow the user to select from the list of predefined JCL PDS Aliases if required. The aliases are specified in Global Properties.
JCL Members Source group:	
Delete	Deletes the currently selected Source PDS name.
Up	Moves the currently selected Source PDS name up the list order.
Down	Moves the currently selected Source PDS name down the list order.
JCL Procedure Steplibs group:	
Delete	Deletes the currently selected Steplib PDS name.
Up	Moves the currently selected Steplib PDS name up the list order.
Down	Moves the currently selected Steplib PDS name down the list order.
Maintain PDS screen:	
OK	Save changes and close the current screen.
Cancel	Cancel the Maintain PDS process and return back to the Application Properties screen.

CICS Tab Screen

The CICS tab screen provides the facility to link an application to a particular CICS Region and Transaction.

The following Figure 2-4-2 illustrates the Application Properties: CICS tab screen.


Figure 2-4-2 Application Properties: CICS tab screen

SCREEN ITEMS	DESCRIPTION
CICS Region	The name of the CICS Region that is associated with the application.
Transaction	The name of the CICS Transaction that is associated with the application.

BUTTON NAME	DESCRIPTION
CICS Region Selection [….]	Invokes the General Selection screen, listing all the CICS Regions loaded into Natural Engineer.
Transaction Selection [….]	Invokes the General Selection screen, listing all the CICS Transactions loaded into Natural Engineer.
OK	Save changes and close the current screen.
Cancel	Cancel the Application Properties process and return back to the main Natural Engineer screen.
Apply	Save changes and retain the current screen. *Note: This button is only enabled if any changes have been made.*

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

File Suffixes

The File suffixes used by the Application Properties process can be specified using the File Suffixes pop-up window. These will be used during the Extract process to extract only the objects that have the specified suffix as part of their file name.

Note: The file suffixes equate to the standard Windows file extensions that may be being used as part of the object file name.

The File Suffixes pop-up window is invoked by using the selection button adjacent to the File Suffixes group of items on the Application Properties window.

The following Figure 2-5 illustrates the File Suffixes screen.
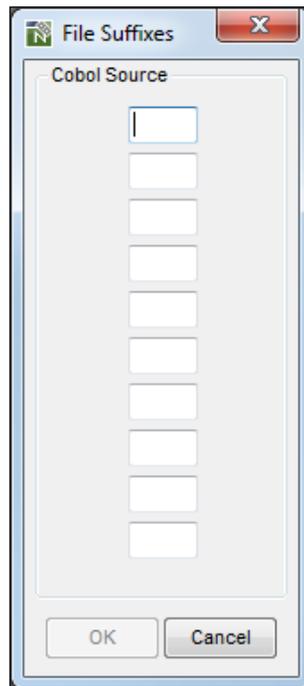
Figure 2-5 File Suffixes screen

SCREEN ITEMS	DESCRIPTION

Source group:

Note: The Source group heading will reflect the name of the item for which the File Suffixes pop-up window was invoked. For example Cobol Source, JCL Proclib etc.

Suffix	The suffix to be used during the Extract process.
	The name can be typed in using any characters except the following:
	" * : \	< > ? /
	Duplicate entries are not permitted within the same File Suffix group item.

BUTTON NAME	DESCRIPTION

File Suffixes screen:

OK	Save changes and close the current screen.
Cancel	Cancel the File Suffixes process and return back to the Application Properties screen.

Extract and Load Selection Criteria

You use this option to select one or more objects from the Natural System File and/or Cobol source and copybook locations or JCL for extraction. This function is optional; it allows you to include selected objects that may have changed as a result of maintenance.

You can specify individual objects, select several objects using wildcards, and ranges of objects using the Extract and Load Selection Criteria screen illustrated below or override default Load settings.

The default for Extract and Load Selection Criteria is to extract all objects from the Natural application library specified in application properties.

It is possible to specify objects or a range of objects to be excluded from the extract process. However if there are data areas, copycodes or DDMs that match the exclusion criteria but are used by another object then they will still be extracted as they are critical to the internal processing of the application.

Note: Refer to the section Application Properties in Chapter 2 for more information on application properties.

How to Invoke the Extract and Load Selection Criteria Option

Use the following navigation in the site workplace:

- Select the application required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Extract & Load**. This will open a sub-menu of further options.

- Select the option: **Extract and Load Selection Criteria**.

Extract and Load Selection Criteria Window

The Extract and Load Selection Criteria window controls all the settings required for this option. It comprises a main window with general settings for language selection and load and tabbed in-set windows for specifying each individual language extract criteria. Not all settings are available for each language.

The following Figure 2-6 illustrates the Extract and Load Selection Criteria screen showing the Natural tab.
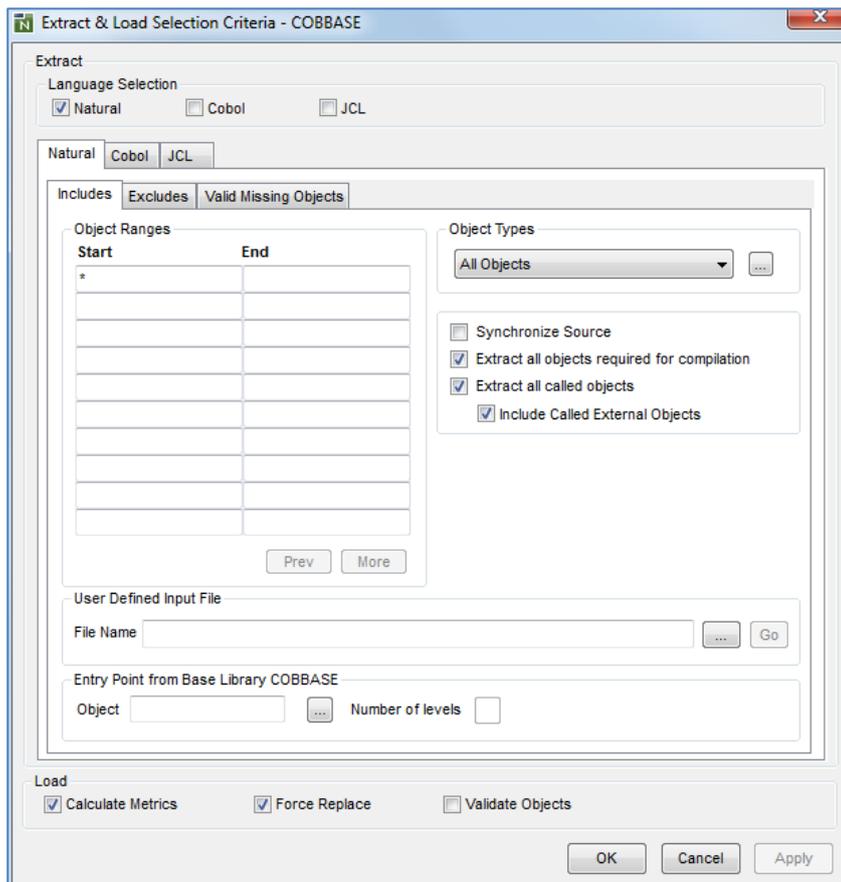
Figure 2-6 Extract and Load Selection Criteria: NATURAL Tab

The following Figure 2-6-1 illustrates the Extract and Load Selection Criteria screen showing the Cobol tab.
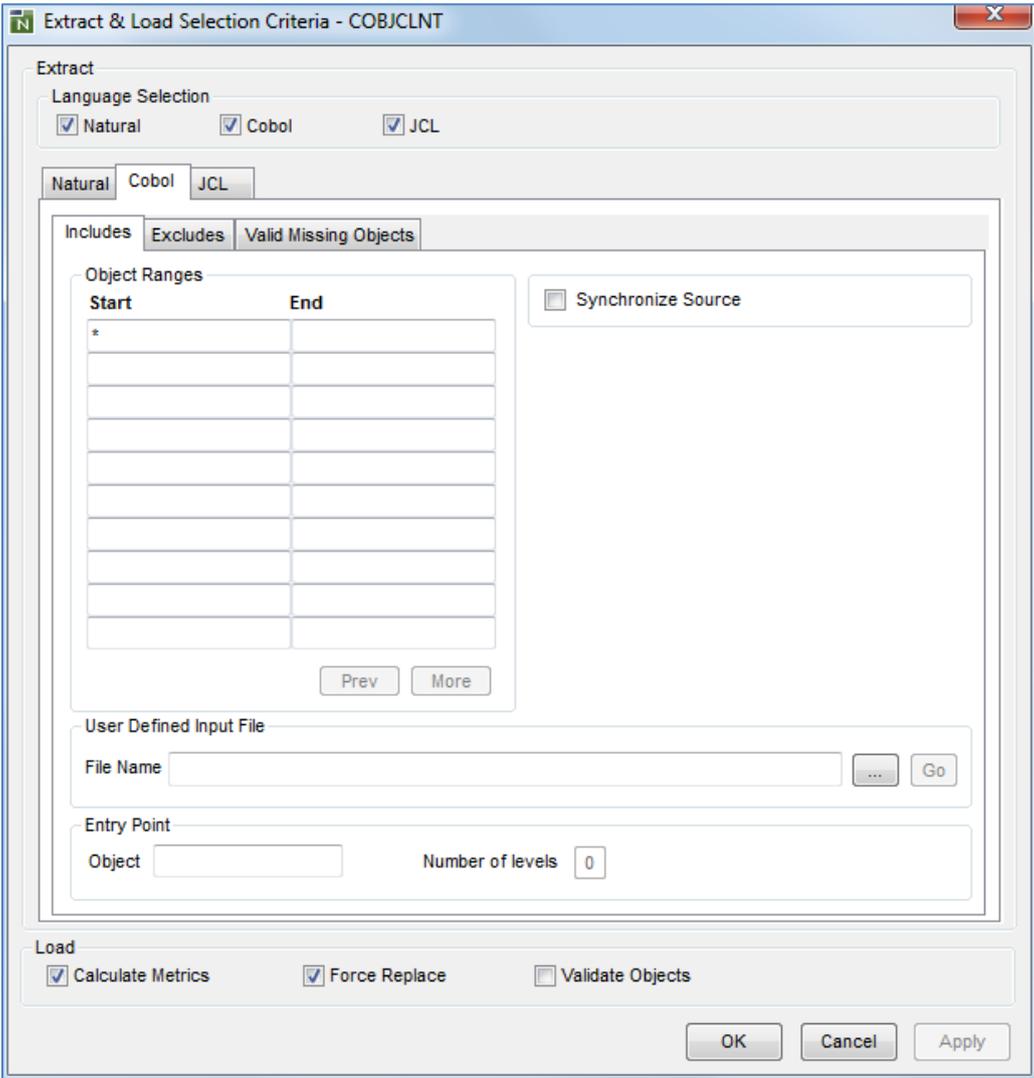
Figure 2-6-1 Extract and Load Selection Criteria: Cobol Tab

The following Figure 2-6-2 illustrates the Extract and Load Selection Criteria screen showing the JCL tab.
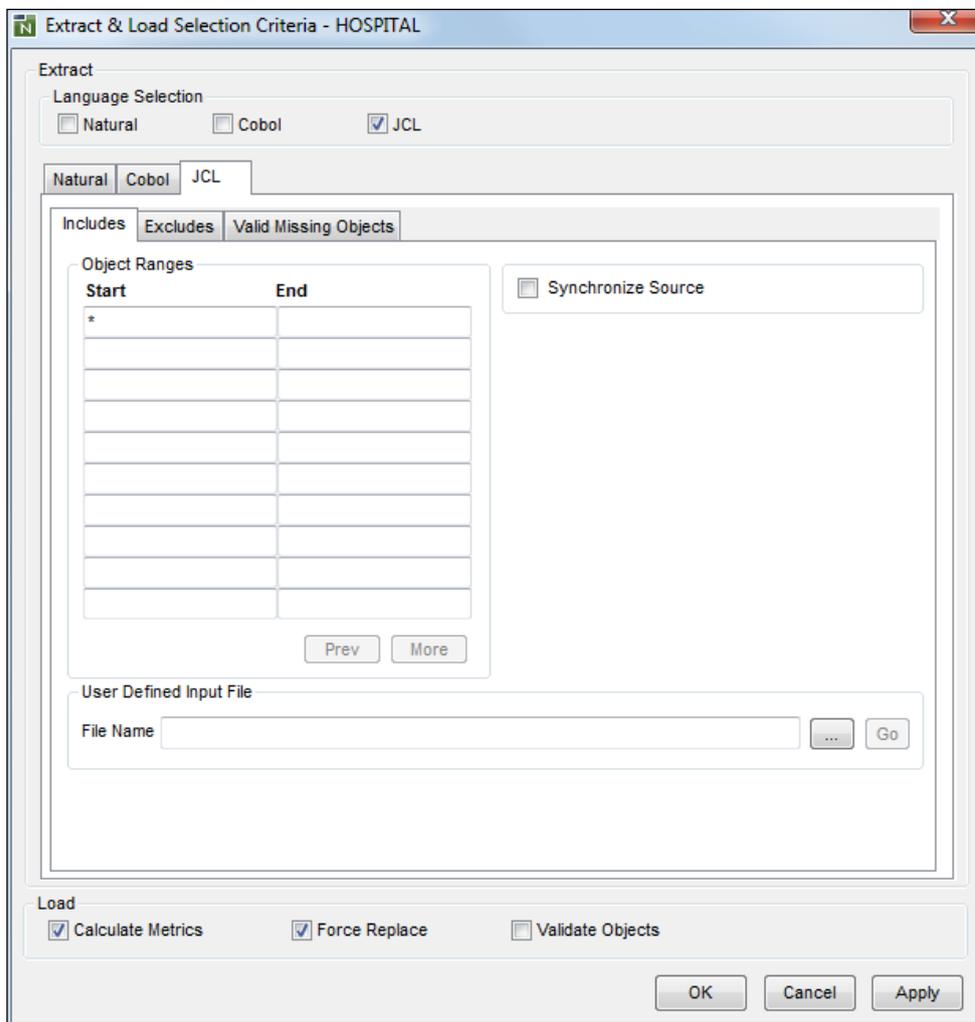
Figure 2-6-2 Extract and Load Selection Criteria: JCL Tab

SCREEN ITEMS	DESCRIPTION

Extract & Load Criteria Screen:

Extract Section:

Language	Allows you to select the programming language of the objects to be extracted.
	Available selections are:
	▪ **Natural**
	▪ **Cobol**
	▪ **JCL**
	Note: Extract and load of COBOL and JCL source code is not available for z/VSE or BS2000 mainframe environments.

Load Section:

Force Replace	If checked this will force the Load process to reload from the start.
	If unchecked, the Load process will check the time stamps of each object, and if the same, will not load that object.
	The default values for this are defined by the REPLACE= setting in the [LOAD] section of the NATENG.INI file.
Validate Objects	If checked this will run the Validate Objects process following a successful Load.
	The default values for this are defined by the VALIDATE= setting in the [LOAD] section of the NATENG.INI file.
Calculate Metrics	If checked the metrics data will be generated during the Load process.
	If unchecked the metrics data will not be generated during the Load process.
	The default values for this are defined by the METRICS= setting in the [LOAD] section of the NATENG.INI file.

Extract Tab:

Includes Tab:

Start Object	The name of the first object to be extracted. This can be a single object name or part of a range of objects if End Object has been specified.
	Note: Refer to the section Specifying Object Names below for more information on how to specify object names and ranges.
End Object	The name of the last object to be extracted. This is only valid if a Start Object has been specified.
	Note: Refer to the section Specifying Object Names below for more information on how to specify object names and ranges.

SCREEN ITEMS	DESCRIPTION
Object Types	You can use the drop-down box to limit the objects selected to one, all or multiple object types.
	Available selections are:
	All Objects **Classes** **Copycodes** **Dialogs** **Functions** **Global Data Areas** **Helproutines** **Local Data Areas** **Maps** **Parameter Data Areas** **Programs** **Subprograms** **Subroutines** **Multiple Object Types**
	Multiple Object Types can be selected by using the Natural Object Type Selection button […].
	NB: This is valid for Natural Objects only.
Synchronize Source	When this option is selected, Natural Engineer compares each object's saved date in the Repository with the saved date of the object in the Natural System File or in the Cobol or JCL dataset where applicable. If the base object has been saved more recently than that in the Repository, Natural Engineer will re-extract that object into the Repository and overwrite the existing object.
Extract All Objects Required for Compilation	When this option is selected, Natural Engineer will extract all objects specified by the criteria. In addition it will extract any other objects, including those that do not match the criteria, that are required by the objects to compile in Natural.
	NB: This is valid for Natural Objects only.
Extract All Called Objects	When this option is selected, Natural Engineer will extract all objects specified by the criteria. In addition it will extract any other objects, including those that do not match the criteria, that are called by the objects to be extracted.
	NB: This may be set on Natural Tab only.

SCREEN ITEMS	DESCRIPTION
Include Called External Objects	This is a sub-option of Extract All Called Objects. When this option is selected, Natural Engineer will additionally extract all external objects e.g., COBOL objects, that are called by the objects to be extracted.
	If any restrictions are to be applied to the COBOL objects identified to be extracted then these need to be set on the COBOL tab. The only applicable settings on the COBOL tab are Valid Missing Objects, Exclusions and User-defined Exclusion file.
	If this option is selected then only a Natural Language extract may be performed.
	NB: This may be set on Natural Tab only.
Entry Point	Specifying an entry point allows a sub-set of an application to be extracted. All objects that the entry point includes/calls are extracted recursively until the number of nested levels is reached.
	The object name can be typed in or selected by using the Entry Point Selection button […]. *NB: This button is only available for Natural objects.*
	Natural Entry Points
	If a Natural entry point is specified then the language can only be Natural and all Object Types must be selected. No other extract criteria are valid except Synchronize (NB: Extract all objects required for compilation and Extract all called objects are automatically selected). If Synchronize is set on, Force Replace must be off to ensure only changed objects within the entry point path are reloaded.
	Optionally the Include Called External Objects flag may be set. If this is selected then any COBOL objects that are called by objects will also be extracted, The nested level setting from the Natural Tab will be applied to the COBOL objects as well as any Natural Objects.
	COBOL Entry Points
	If a COBOL entry point is specified then no other extract criteria are valid except Synchronize.
Number of Levels	Used in conjunction with the Entry Point setting. Specifies how many levels the extract process will identify included/called objects.

SCREEN ITEMS	DESCRIPTION
User Defined Input File	This allows the user to specify a file containing the names of the objects to be extracted. The file should be in the format: Bytes 1-8 – Natural Engineer Application Name Bytes 9-16 –Object Name For example to extract only XX001P01 and XX021P01 from HOSPITAL, the file would contain: HOSPITALXX001P01 HOSPITALXX021P01 The file name can be typed in or selected by using the User Defined Input File Selection button […]. **Natural Tab** If a User Defined Input File is specified then no object ranges or specific object types may be selected. No other extract criteria are valid except Synchronize, Extract all objects required for compilation or Extract all Called Objects/Include Called External Objects. **COBOL Tab** If a User Defined Input File is specified then no other extract criteria are valid except Synchronize.
Excludes Tab:	
Start Object	The name of the first object to be excluded from the extract. This can be a single object name or part of a range of objects if End Object has been specified. *Note: Refer to the section Specifying Object Names below for more information on how to specify object names and ranges.*
End Object	The name of the last object to be excluded from the extract. This is only valid if a Start Object has been specified. *Note: Refer to the section Specifying Object Names below for more information on how to specify object names and ranges.*

SCREEN ITEMS	DESCRIPTION
User Defined Exclude File	This allows the user to specify a file containing the names of the objects to be excluded from the extract. The file should be in the format:
	Bytes 1-8 – Natural Engineer Application Name Bytes 9-16 – Natural Object Name
	For example to exclude only XX002P01 and XX022P01 from HOSPITAL, the file would contain:
	HOSPITALXX002P01 HOSPITALXX022P01
	The file name can be typed in or selected by using the User Defined Input File Selection button […].
	Natural Tab
	If a User Defined Exclude File is specified then the language can only be Natural and all Object Types must be selected. No other extract criteria are valid except Synchronize, Extract all objects required for compilation or Extract all Called Objects/Extract Called External Objects.
	COBOL Tab
	If a User Defined Exclude File is specified no other extract criteria are valid except Synchronize.
Valid Missing Objects Tab:	
Valid Missing Objects	Specify objects that are validly missing from the application, such as System and Construct objects.
	Note: Refer to the section Valid Missing Objects for more information on this option.

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

BUTTON NAME	DESCRIPTION
Includes Tab:	
Object Types group:	
Object Types […]	Invokes an Object Type Selection screen, listing all the objects types available for selection.
	Note: This is only enabled for Natural Objects.
Entry Point group:	
Entry Point Selection […]	Invokes the General Selection screen, listing all the objects available for the currently selected application.
	Note: This is only enabled for Natural Objects.
	Note: For more information on the General Selection screen refer to Chapter 2 in the Concepts and Facilities manual.
User Defined Input File group:	
User Defined Input File Selection […]	Invokes the standard Windows 'Open File' dialog, where the User Defined Input File can be selected.
Go	Will open the specified file using the appropriate program associated with the file extension of the document.
	For example XX001P01_Spec.doc would be opened by MS Word.
	Note: This button is only enabled if a specified file is present.
Extract & Load Selection Screen:	
OK	Save changes and close the current screen.
Cancel	Cancel the Extract and Load Selection Criteria process and close the current screen.
Apply	Save changes and retain the current screen.
	Note: This button is only enabled if any changes have been made.

Excludes Tab:

User Defined Exclude File group:

User Defined Exclude File Selection […]	Invokes the standard Windows 'Open File' dialog, where the User Defined Exclude File can be selected.
Go	Will open the specified file using the appropriate program associated with the file extension of the document. For example XX001P01_Spec.doc would be opened by MS Word. *Note: This button is only enabled if a specified file is present.*

STATUS BAR ITEM	DESCRIPTION
Pane	Any Extract and Load Selection Criteria processing messages.

Specifying Object Names

The object names specified in the Start Object and End Object columns on the Extract and Load Selection Criteria screen use the following standard conventions. These apply to both Included and Excluded objects:

Single Object Name

Enter full object names in Start Object list.

Multiple Object Group

Enter partial object name in Start Object list, with an asterisk (*). This will allow you to process all objects starting with the values before the asterisk.

Multiple Object Range

Enter a Start Object name and an End Object name in the same row. This will process all objects in alphanumeric order starting from the Start Object and ending with the End Object.

Combination Selection Types

You can enter multiple rows with different criteria, including multiple single objects, groups and ranges.

Examples:

Start Object	End Object	Result
*		Process all objects.
XX021P01		Process single object 'XX021P01'.
XX001*		Processes all objects with names prefixed with 'XX001'.
XX001L01	XX001P01	Processes all objects in the alphabetic range starting from 'XX001L01' and ending at 'XX001P01'.
XX001.01		Processes all objects matching the mask where a period (.) is 'any digit'. So, in this case, XX001L01, XX001M01 and XX00P01 would be extracted. *NB: Valid on PC and Mainframe platforms only.*

Valid Missing Objects

It is possible to enter a list of object names with wildcards, to a maximum of 10 that will not be marked as missing during the Extract process.

The Valid Missing Objects option is accessed from the Extract and Load Selection Criteria screen by selecting the Valid Missing Objects Tab from the specific language tab.

The following Figure 2-7 illustrates the Valid Missing Objects screen from the Natural language tab.
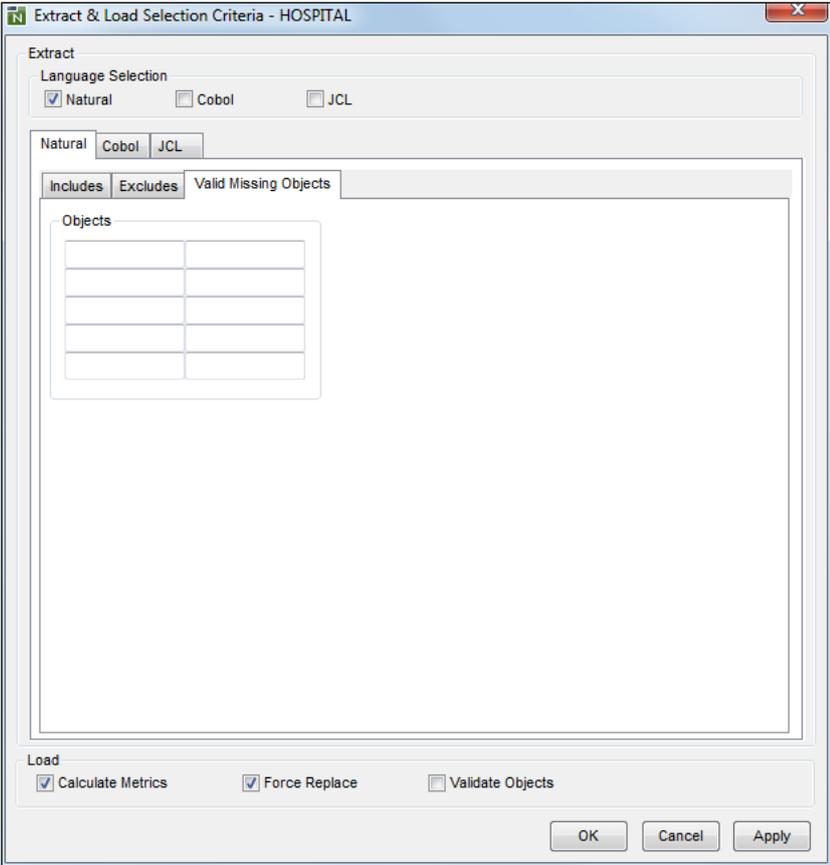
Figure 2-7 Valid Missing Objects

SCREEN ITEMS	DESCRIPTION
Object Name	The object name to be marked as a valid missing object.
	The object name can be input using either a complete name or part name using an '*' (asterisk) wildcard.
	For example:
	XX003P01 Object 'XX003P01' would be marked as a valid missing object.
	XX001* Any objects prefixed with 'XX001' would be marked as valid missing objects.

Extract Source Code

This is the first real processing step in creating the Natural Engineer Repository and extracts the Natural source code for the defined application.

Natural Engineer reads the application code and creates a "neutral" view of the code that is irrespective of the Natural version or the mode used (structured or reporting).

The Extract process writes out files that contain the neutral application records, as well as an error file. If you are executing multiple Extract processes it is advisable to make a copy of the current error file so that is always available. The structure of the file name in the DATA directory, is '*application-name*. EEX'. Save this file as another name.

The Extract function also performs a basic quality check, which identifies any invalid statements or syntax within the objects. If any errors are found, they are logged and displayed on completion of the Extract process.

If a Natural Engineer Extract does not end cleanly because of logic errors or invalid response codes from Natural or Adabas it will issue a return code of 255. If the extract identifies missing objects only then a return code of 254 is returned.

How to Invoke the Extract Source Code Option

Use the following navigation in the site workplace:

- Select the application required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Extract & Load**. This will open a sub-menu of further options.

- Select the option: **Extract Source Code**.

Related Processes

The Extract process allows you to correct errors before building the Repository. It also allows you to include identified missing objects, such as DDMs, Data Areas and Copycode before further processing. Missing objects can be seen in the Missing Objects report, which can be accessed via the Quality Logs option.

Note: For more information on the Missing Objects Report refer to Chapter 3 in the Natural Engineer Reporting manual.

After Extract has executed, any errors can be seen in the Extract Source Code option, which can be accessed via the Quality Logs option.

Note: For more information on the Extract Source Code error log refer to Chapter 3 in the Natural Engineer Reporting manual.

Objects that are no longer required in the Repository are best removed from the source library. If the Repository has been loaded, these can also be selectively deleted from the Repository using the Delete Object option.

Note: See the section Delete Object in Chapter 1 of this manual for more information.

If you require to extract and load multiple applications at the same time then the Bulk Extract & Load facility is available.

Load Application

The next step after Extracting the source code is to Load Natural Engineer's Repository from the output file of the Extract process. All information, cross-references, and relationships are built into the Repository for interrogation, reporting, diagramming and further processing.

How to Invoke the Load Application Option

Use the following navigation in the site workplace:

- Select the application required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Extract & Load**. This will open a sub-menu of further options.

- Select the option: **Load Application**.

Related Processes

After loading of the Repository, check the Missing Objects Report option and selectively Extract and Load those objects after adding them to the application library. Alternatively you can execute the Extract Missing Object option after adding them to the appropriate library.

The Missing Objects report is accessed via the Quality Logs option. You may add new or changed objects to the loaded Repository using the Load Repository option.

Extract Missing Objects

The Extract Missing Objects option extracts the missing called objects as identified in the Missing Objects report. If an object is a data area or copycode, it will also extract the calling object (unless it has been extracted in the same execution).

Note:

- *A maximum of 1000 missing objects will be extracted using this process.*
- *Missing DDMs will not be extracted using this process.*

The process to follow for extracting the most complete application is:

1. Extract and Load an application into Natural Engineer.
2. Check the Missing Objects report to identify any missing objects.
3. Copy those missing objects to the Natural library or Steplib library defined to Natural Engineer.
4. Run the Extract Missing objects option.

If an object is displayed on the Missing Objects report but not copied as part of step 3, then the Extract process will identify this as an error with the message:

- NO SUCH OBJECT EXISTS IN DIRECTORY

If a DDM is identified as missing then the DDM should be located and copied to the application library, a defined steplib or the SYSTEM library. All objects that reference the missing DDM need to be re-extracted. Either identify the missing object by running the DDMs Referenced by Objects report, or selectively extract and load those objects, or re-execute the Extract and Load processes for all objects in the application.

Bulk Extract and Load

Multiple applications may be extracted and loaded using the Bulk Extract and Load function. When running in a pure PC or Windows server environment then the relevant batch files for the extract and load processes need to be configured. These are located in the BAT directory of your Natural Engineer installation.

- Select the main application node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Bulk Extract & Load**.

The following Figure 2-7-1 illustrates the Bulk Extract & Load screen.
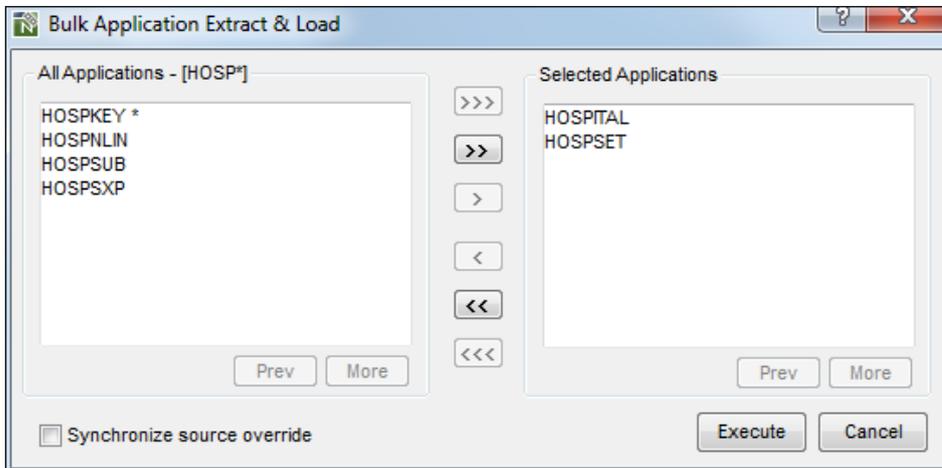
Figure 2-7-1 Bulk Extract & Load

SCREEN ITEMS	DESCRIPTION
All Applications	List of Applications within the Natural Engineer repository. *Note: an '*' (asterisk) next to an application name indicates that the extract selection criteria for the application differs from the default.*
Selected Applications	List of selected Applications to be extracted and loaded.
Synchronize source override	This will set all selected applications to be extracted with the synchronize source option. When this option is selected, Natural Engineer compares each object's saved date in the Repository with the saved date of the object in the Natural System File. If the object in the System File has been saved more recently than that in the Repository, Natural Engineer will re-extract that object into the Repository and overwrite the existing object.

BUTTON NAME	DESCRIPTION

All Applications group:

Prev	Scrolls the Application 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 Application 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 Applications in the Application list (when more than one page is available, as set by the LISTBOXMAX parameter in the NATENG.INI file).
>>	Select all Applications on the current page in the Applications list.
>	Select all selected Applications in the Applications list.
<	De-select all selected Applications in the selected list.
<<	De-select all Applications on the current page in the selected list.
<<<	De-select all Applications in the selected list (when more than one page is available, as set by the LISTBOXMAX parameter in the NATENG.INI file).

Selected Applications 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.

Bulk Application Extract & Load screen:

Execute	Will run the extract & load process for the selected applications.
Cancel	Cancel the Bulk Extract & Load process.

Application Maintenance

The Application Maintenance option contains all the functions that maintain and augment the application information within the repository.

These include:

- Delete Application

- Delete Selected Objects

- Soft Link Maintenance

- Cobol Link Maintenance

- JCL Analysis

- Validate Objects

- Generate Application Metrics

Delete an Application

Applications can be deleted by using the following site workplace navigation:

- Select the application to be deleted.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Application Maintenance**. This will open a sub-menu of further options.

- Select the option: **Delete Application**.

All application data will be removed from the Natural Engineer Repository. This deletes all Application, Analysis and Modification information.

Delete Selected Objects

Objects can be deleted by using the following site workplace navigation:

- Select the application to be deleted.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Application Maintenance**. This will open a sub-menu of further options.

- Select the option: **Delete Selected Objects**.

A further dialog will be presented which allows the user to select one or more objects to be deleted from the repository.

Soft Links

The Soft Links option allows you to manually update the Repository with information regarding the linking between objects. A Soft Link is one where a link between two objects has been defined using an alphanumeric variable rather than a literal constant.

For example:
1) A link to a subprogram using a literal constant: -
   0090 CALLNAT 'SUBPROG1' #PARAMETER-GROUP
2) A link to a subprogram using an alphanumeric variable: -
   0250 MOVE 'SUBPROG1' TO #CALL-NAME
   0260 CALLNAT #CALL-NAME #PARAMETER-GROUP
   This is what Natural Engineer recognizes as a Soft Link.

Natural Engineer will provide a list of objects within an application that contain Soft Links statements. Only objects containing Soft Links will be available for selection from the Soft Link Maintenance screen. That is to say, any objects that use literal constants only will not be shown in the object list on this screen.

A single object may contain one or more Soft Link statements. Each statement can be selected to specify the object name reference for the Soft Link. Up to a maximum of 1008 object names may be specified per statement.

Once all the Soft Links have been specified, they will provide the cross-reference information into the inter-object tracing function within the Analysis process.

Soft Links can be saved / opened using a PC text format file enabling common Soft Links to be applied to a complete application as one single operation. Soft Links can be easily removed either from the complete application, a range of objects, one single object or from a single statement line.

A Soft Links report is available to view instantly all the details of which Soft Links have been specified, for each statement line within each object, within the application.

How to Invoke the Soft Link Maintenance Option

Use the following navigation in the site workplace:

- Select the application required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Application Maintenance**. This will open a sub-menu of further options.

- Select the option: **Soft Link Maintenance**.

Soft Link Maintenance Window

The Soft Link Maintenance screen is accessed by placing the cursor on any of the applications displayed in the site workplace and using the right hand mouse button with a single click to view the context menu.

The following Figure 2-8 illustrates the Soft Link Maintenance screen.
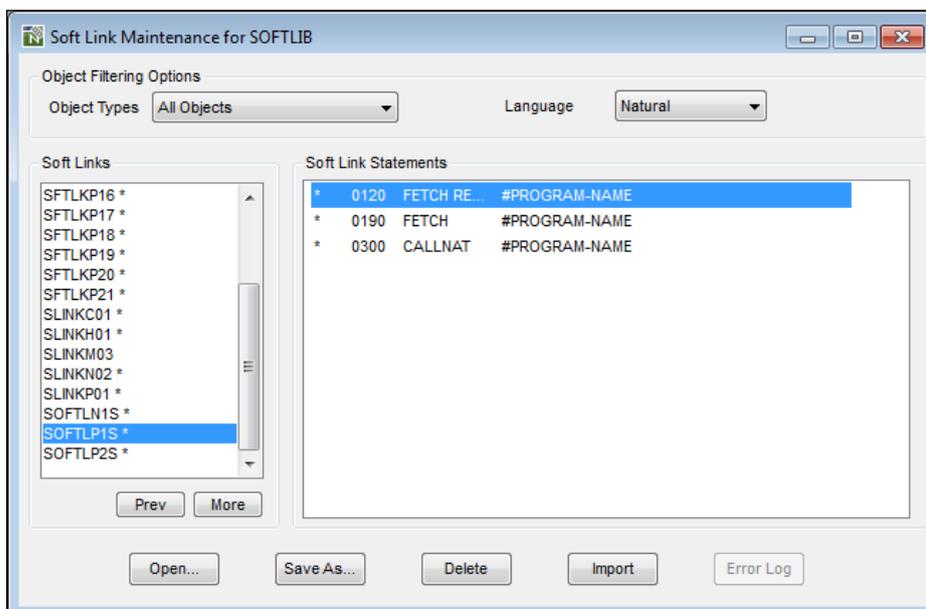
Figure 2-8 Soft Link Maintenance screen

SCREEN ITEMS	DESCRIPTION
Object Types	Allows you to select the types of object to be listed.
	Available selections are: ▪ **All Objects** ▪ **Programs** ▪ **Subprograms** ▪ **Functions** ▪ **Subroutines** ▪ **Copycodes** ▪ **Helproutines** ▪ **Maps**
Language	Allows you to select the programming language of the objects to be listed.
	Available selections are: ▪ **All** ▪ **Cobol** ▪ **Natural**
Object List	List of all the objects used by the currently selected application, where Natural Engineer has recognized that they contain Soft Links.
	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 context menu.
	The Object List title reflects the Object Types being listed and will append any reposition values that may have been specified.
	Objects that have had Soft Links specified for them will be indicated with an '*****' (asterisk) to the right hand side of the Object name.
Soft Link Statements	Displays all the statements within the selected object, for which Soft Links exist.

Column	Description
1	Statement Soft Link indicator showing whether a Soft Link has been specified for this statement line. Possible values: ' ' (blank) No Soft Links specified. '*****' (asterisk) Soft Links specified.
3-10	The statement line number.
12-21	The Natural call type. For example: CALLNAT.
23-54	The name of the alphanumeric variable used to make the call. For example: #CALL-PGM-NAME.

SCREEN ITEMS	DESCRIPTION	
	56-63	The external object name. If the link statement is held in another physical object, for example: Copycode, then the object name of the Copycode is shown here.
	71-76	Sequence number used by Natural Engineer.

BUTTON NAME	DESCRIPTION
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.
Open…	Open and read in an existing Soft Link file. These files will have file extension of '.SFT' and will contain previously saved/modified Soft Link records. When opened, they will apply the contents to the current application.
Save…	Save the current set of Soft Links specified for the current application. The file is saved with a file extension of '.SFT'. By default, this file will be saved to the data folder where Natural Engineer is installed.
Delete	Deletes all Soft Links for the objects available in the Objects list box. The list of objects is controlled by the Object Types menu option. For example: If objects of type 'Program' are listed, then all the Soft Links for program objects only within the application will be deleted. Any copycodes, helproutines, maps, subprograms or subroutines will not have their Soft Links deleted.
Import	Will search the currently selected application for literal string values that could potentially be used as Soft Links. These will be added to all the objects listed. Use of this option will result in the deletion of any existing Soft Links previously specified. *Note: For more information refer to the section Importing Soft Links.*
Error Log	This reports any errors that may have occurred when using the Open Soft Link File option. The details shown will be for the last use of this option for the application.

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

Soft Link Maintenance Context Menu

The Soft Link Maintenance 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.

Add Soft Links Window

To specify the Soft Links for a statement line within an object simply select the statement line from the Soft Link Maintenance screen and the Add Soft Links screen will be presented. On this screen it is possible to specify up to 1008 individual Soft Link names per statement line.

The following Figure 2-9 illustrates the Add Soft Links screen.
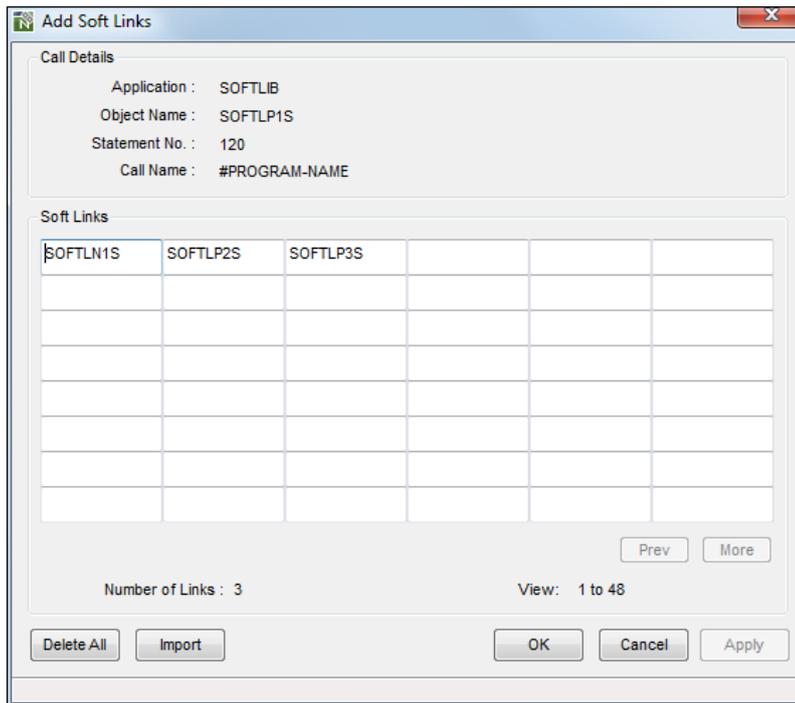
Figure 2-9 Add Soft Links screen

SCREEN ITEMS	DESCRIPTION	
Call Details	**Application**	The name of the application being processed.
	Object Name	The name of the object currently selected.
	Statement No.	The statement line number.
	Call Name	The name of the alphanumeric variable used to make the call. For example: #CALL-PGM-NAME.
Soft Links	This section of the screen allows for the specification of the Soft Links names to be used for a statement line.	
	Soft Links	Soft Link Names can be specified as required. Each page view caters for up to 48 entries, with a maximum of 1008 entries per statement allowed.
	Number of Links	Shows the number of Soft Link names specified for the current statement line.
	View	Shows the range of Soft Link names being displayed. For example: View: 1 to 48 indicates that you are looking at Soft Links 1 to 48.

BUTTON NAME	DESCRIPTION
Prev	Scrolls the Soft Link list to previous page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file and the amount of soft links added.
More	Scrolls the Soft Link list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file and the amount of soft links added.
Delete All	Deletes all the Soft Links for the current statement line number.
Import	Will search the currently selected object for literal string values that could potentially be used as Soft Links. Any duplicates will be suppressed. The names can be further refined by selecting any of the displayed names and removing them. *Note: For more information refer to the section Importing Soft Links.*

BUTTON NAME	DESCRIPTION
OK	Save changes and close the current screen.
Cancel	Exit the Add Soft Links screen and return back to the Soft Link Maintenance 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
Pane	Any Add Soft Links processing messages.

Add Soft Links Context Menu

The Add Soft Links context menu is invoked by placing the cursor on any of the Soft Link listed and using the right hand mouse button with a single click.

CONTEXT MENU ITEM	DESCRIPTION
Search Soft Links	Will search the soft link list for the supplied soft link and reposition the list to it. *NB: This is an absolute soft link name, no wildcard searches are allowed.*

Importing Soft Links

To assist with specifying the Soft Links for a statement line within an object or within all objects an Import Soft Link facility is available. This is available from the Import button on the main Soft Link Maintenance screen which will identify potential soft links for all or a selection of objects or from the Import button on the Add Soft Links screen for a particular object/statement combination. Potential Soft Link names within the objects that apply to the alphanumeric variable being used may be imported.

For example:

```
0100 IF #OPTION = 1
0110   MOVE 'PGM1' TO #CALL-NAME
0120 ELSE
0130   MOVE 'PGM2' TO #CALL-NAME
0140 END-IF
0150 FETCH #CALL-NAME
```

The Soft Link **#CALL-NAME** at statement line number 0110 (or 0130) would display the Soft Link names **PGM1** and **PGM2**.

Importing Soft Links Window

Importing softlinks from the main Soft Link Maintenance screen will present a screen where objects to be processed during the import may be specified.

The following Figure 2-10 illustrates the Importing Soft Links screen.
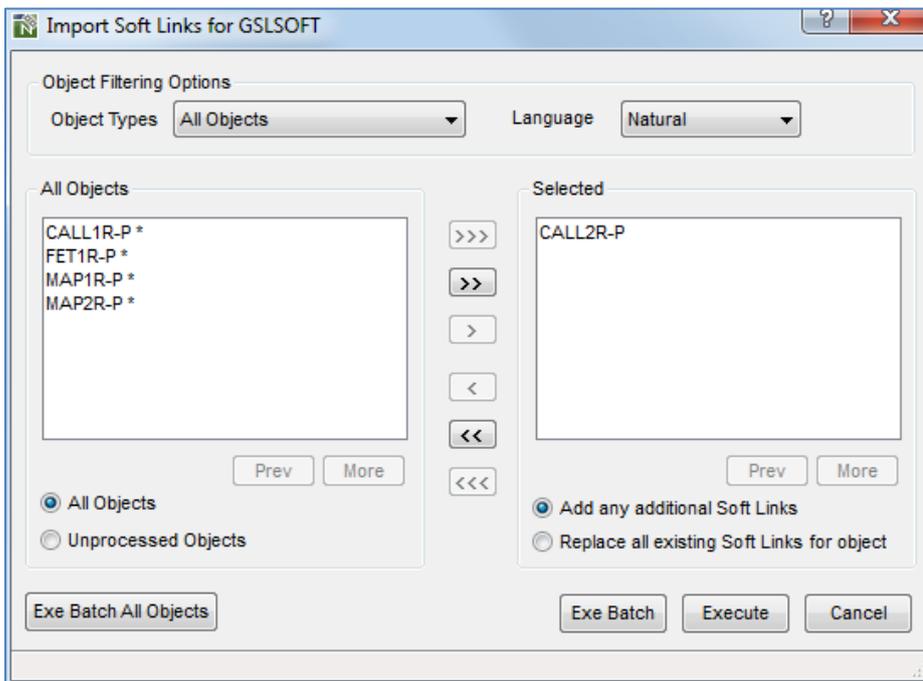
Figure 2-10 Importing Soft Links screen

SCREEN ITEMS	DESCRIPTION
All Objects List	List all the objects that are available for the currently selected application.
	The list of objects can be tailored to your requirements using the options 'Change Start Position of Object List…' from the Object List context menu and 'Unprocessed Objects' button.
	The Object List title reflects the objects being listed and will append any reposition values that may have been specified.
	Oobjects can be selected by using a double click with the left hand mouse button.
	Note: Any objects listed that have already been processed will have an '*' (asterisk) appended to the right hand side of the object name.
Selected	List all the objects that have been selected for the Import Soft Links processing.
	Note: At least one object must be selected to run the import.
	Objects can be de-selected by using a double click with the left hand mouse button.

BUTTON NAME	DESCRIPTION
All Objects 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.
All Objects	Change the list of objects displayed in the list.
	If selected, then all processed and unprocessed objects are listed.
Unprocessed Objects	Change the list of objects displayed in the list.
	If selected, then only the objects that have not yet been processed are listed.
Selection / De-selection buttons:	

BUTTON NAME	DESCRIPTION
>>>	Select all objects in the 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 list.
>	Select all selected objects in the 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.
All Objects	Change the list of objects displayed in the list. If selected, then all processed and unprocessed objects are listed.
Add any additional Soft Links	If selected, then only when the import process is executed only softlinks that have not currently been specified will be imported.
Replace all existing Soft Links for object	If selected, then all existing softlinks for an object will be deleted and then any new softlinks identified will be imported.
Import Softlinks screen:	
Exe Batch All Objects	Will submit the batch Import Soft Links process for all objects. This is only available in a SPod environment when running against a mainframe server.
Exe Batch	Will submit the batch Import Soft Links process for the selected objects. This is only available in a SPod environment when running against a mainframe server.
Execute	Invoke the Import Softlinks process for the selected objects. *Note: This button is only enabled if any changes have been made.*
Cancel	Cancel any object selection 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.

Soft Link File

It is possible to re-use a set of Soft Links across more than one application. This level of flexibility allows quick and easy Soft Links specification, if 'call' processing is common across several applications.

In order to achieve this, Soft Links can be saved to a PC file with a file extension of '.SFT'. By default this file will be saved to the data folder where Natural Engineer is installed.

Once a Soft Link file has been saved it can be modified outside of Natural Engineer and re-used as desired. This can be done using a common text editor such as Notepad.

Each record in the Soft Link PC file is a total of 74 bytes in length. A record is written for each Soft Link name entered per statement number per object selected. To illustrate this, lets assume an application has 2 Soft Link call statements at lines 0230 and 0990 in one single object. If you set up 10 Soft Link objects per statement and then save the Soft Link PC file, you will have 20 records (1 object x 2 statement lines x 10 Soft Link names).

The record format used in the Soft Links PC file:

Field Name	Format / Length	Description
Record Option	A1	Option dictates whether the Soft Link Data for this record is to be added or deleted. Valid values are: **A** – Add **D** – Delete.
Object Name	A8	Name of the object containing the Soft Link call(s). Valid values are: **Full object name up to 8 bytes.** If the object name is less than 8 bytes then the outstanding bytes must be padded out with spaces to maintain position within the record.

Field Name	Format / Length	Description
		Wildcard '*' (asterisk)
		Indicate that this Soft Link record can be applied to all objects. This must be padded out with 7 spaces to maintain position within the record.
Object Type	A1	The object type of the calling object. Valid values are:
		P Programs
		M Maps
		C Copycodes
		N Subprograms
		S Subroutines
		H Helproutines
		* Wildcard for ALL object types.
External Object name	A8	The external object name. If the Soft Link call statement is held in another physical object. For Example: Copycode, then the object name of the Copycode is shown here.
		Valid values are:
		Full external object name up to 8 bytes.
		If the external object name is less than 8 bytes then the outstanding bytes must be padded out with spaces to maintain position within the record.
		Wildcard '*' (asterisk)
		Indicate that this Soft Link Record can be applied to all external objects. This must be padded out with 7 spaces to maintain position within the record.
Statement Number	A8	The statement line number using leading zeroes to pad the number out to 8 bytes.
		Valid values are:
		00000010, 00000130, 00002345 etc.
		This will apply to the exact statement number specified.
		Wildcard '*' (asterisk)
		Indicate that this Soft Link Record can be applied to all statement numbers. This must be padded out with 7 spaces to maintain position within the record.
Sequence Number	A8	Sequence number used by Natural Engineer.
		Valid values are:

Field Name	Format / Length	Description
		00000002, 00000022 etc.
		This will apply to data matching the sequence number within the Repository. If specified it must be padded with zeroes to the full 8 byte length.
		Wildcard '*' (asterisk)
		Indicate that this Soft Link Record can be applied to all sequence numbers. This must be padded out with 7 spaces to maintain position within the record.
Call Variable name	A32	The name of the alphanumeric variable used to make the call. For Example: #CALL-PGM-NAME.
		Valid values are:
		#CALL-PGM-NAME, #PROGRAM etc
		If the call variable name is less than 32 bytes then the outstanding bytes must be padded out with spaces to maintain position within the record.
		Wildcard '*' (asterisk)
		Indicate that this Soft Link Record can be applied to all call variable names. This must be padded out with 31 spaces to maintain position within the record.
Soft Link name	A8	The Soft Link name of the called object. This must be the actual object name up to 8 bytes long.
		Wildcard '*' (asterisk)
		This can be only be used for a record option of 'D' (delete) and will delete all Soft Link object names.

Examples of modified Soft Links PC files and what actions they will perform.

The following examples illustrate the contents of a single Soft Link PC file record required to carry out each requirement.

1. Add the Soft Link object name SOFTLN2S to object SOFTLN1S, which has an object type of subprogram, a Soft Link call at statement line number 0230, sequence number of 21 and uses the alphanumeric variable #PGM in the Soft Link call.

   Soft Link File record:

```
ASOFTLN1SN          0000023000000021#PGM                              SOFTLN2S
```

2. Add the Soft Link object name SOFTLN2S to all objects, which have an object type of subprogram, a Soft Link call at statement line number 0230, any sequence number and uses the alphanumeric variable #PGM in the Soft Link call.

   Soft Link File record:

```
A*        N       00000230*        #PGM                          SOFTLN2S
```

3. Add the Soft Link object name SOFTX to all objects, all object types, Soft Link calls at any statement line number, any sequence number and any alphanumeric variable in the Soft Link call. Basically, add Soft Link object name to all identified Soft Link objects within the application.

   Soft Link File record:

```
A*        **      *        *        *                            SOFTX
```

4. Delete the Soft Link object name SOFTLN2S from object SOFTLN1S, which has an object type of subprogram, a Soft Link call at statement line number 0230, sequence number of 21 and uses the alphanumeric variable #CALL-PROGRAM-NAME in the Soft Link call.

   Soft Link File record:

```
DSOFTLN1SN          0000023000000021#CALL-PROGRAM-NAME           SOFTLN2S
```

5. Delete all Soft Links from the application.

   Soft Link File record:

```
D*        **      *        *        *                                 *
```

Soft Link Error Log

This is available when using the Error Log button on the Soft Link Maintenance screen. When the Open Soft Link PC file is used, it reads in the Soft Link records and applies the Soft Link data to the application. This may be adding Soft Links, deleting Soft Links, or a combination of both.

If the Soft Link process experiences any anomalies within the Soft Link records, it writes out entries to the Soft Link Error Log for each erroneous Soft Link record, and continues with the next one until it gets to the end of the file.

The error log details are written to a work file saved in the data folder where Natural Engineer is installed.

The file name is aaaaaaaa.ESL, where 'aaaaaaaa' is the application name.

Upon completion a pop-up window shows the status of the Soft Link PC file processing that has just been completed.

SCREEN ITEMS	DESCRIPTION
Processing information message	Shows the processing that has been carried out using the Open Soft Link File option.
	It consists of three components:

	Lines:	Shows the number of Soft Link records processed from the opened Soft Link PC file. For example:
		If the Soft Link contains 20 records then 'Lines: 20' would be displayed.
	Errors:	Shows the number of Soft Link records that are in error. These records will not apply any processing to the application data during the process.
	Modifications:	Shows the number of Soft Link records that have successfully been applied to the application.

The number of Lines = number of Errors + number of Modifications.

BUTTON NAME	DESCRIPTION
OK	This button is used to escape the Soft Link PC file processing information screen and will result in one of two actions:
	If No Errors have occurred, i.e., Errors: 0, then the Objects Soft Link Maintenance screen is displayed with the Object List refreshed.
	If Errors have occurred, then the Soft Links Log screen will be displayed showing the details for each error.

The Soft Link Error Log file can be viewed using the Soft Links Log screen accessed from the Soft Link Maintenance screen using menu option View➔Soft Link Error Log.

This screen is automatically presented immediately after an Open Soft Link file run has been executed if there were any errors present, i.e., when '**OK**' button is used from the Soft Link PC file information pop-up screen.

The following Figure 2-12 illustrates the Soft Links Log screen showing the Soft Link PC File errors.
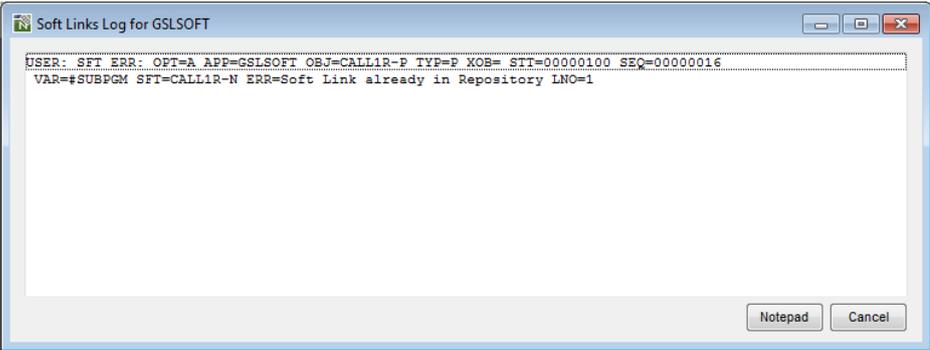
Figure 2-12 Soft Links Log screen showing the Soft Link PC File errors

SCREEN ITEMS	DESCRIPTION
Error details	For each record found to be in error, a two-line entry will be shown in the Soft Links Log error details.

BUTTON NAME	DESCRIPTION
Cancel	Exit the Soft Links Log screen and return back to the Soft Link Maintenance screen.
Notepad	Opens the text editor NOTEPAD using the Soft Link error file aaaaaaaa.ELS, where 'aaaaaaaa' is the application name. From here it is possible to print the error log.

Soft Link Error Types

There are 5 types of error that can occur during the Open Soft Link File option:

Natural Engineer Application Management

1. **Undefined option**

   This error is produced when an invalid Soft Link record option has been specified. Only 'A' (add) or 'D' (delete) are allowed.

   Example: A Soft Link record has been detected where the record option is set to 'Y' (OPT=Y).

   ```
   USER: SFT ERR: OPT=Y APP=SOFTLINK OBJ=SOFTLP1S TYP=P XOB= STT=00000190 SEQ=00000014

    VAR=#PROGRAM-NAME SFT=SOFTLP3S ERR=Undefined Option LNO=3
   ```

2. **Cannot add * as a Softlink**

   This error is produced when a wildcard '*' (asterisk) has been specified for the Soft Link name, when the Soft Link record option is set to 'A' (add).

   Example: A Soft Link record has been detected where the record option is set to 'A' (OPT=A) and the Soft Link name is set to '*' (SFT=*).

   ```
   USER: SFT ERR: OPT=A APP=SOFTLINK OBJ=SOFTLP1S TYP=P XOB= STT=00000120 SEQ=00000007

    VAR=#PROGRAM-NAME SFT=* ERR=Cannot add * as a Softlink LNO=2
   ```

3. **Soft Link already in Repository**

   This error is produced when a Soft Link name is being added when it already exists on the Repository.

   Example: A Soft Link record has been detected where the Soft Link name is set to 'SOFTLN2S' (SFT=SOFTLN2S), for object SOFTLN1S (OBJ=SOFTLN1S), an object type of 'N' (TYPE=N), at statement line number 00000230 (STT=00000230) and with sequence number 00000021 (SEQ=00000021). On the Repository the Soft Link name SOFTLN2S already exists for this criteria.

   ```
   USER: SFT ERR: OPT=A APP=SOFTLINK OBJ=SOFTLN1S TYP=N XOB= STT=00000230 SEQ=00000021

    VAR=#PGM SFT=SOFTLN2S ERR=Soft Link already in Repository LNO=1
   ```

4. **Soft Link Not in Repository**

   This error is produced when a Soft Link name is being deleted, and the Soft Link object is not found in the Repository. This indicates that either no Soft Link name has been specified for the object, object type, statement number, Soft Link variable name in the Soft Link record, or a Soft Link name has been found but does not match the one on the Soft Link record.

   Example: A Soft Link record has been detected to delete a Soft Link, where the Soft Link name is set to 'SOFTLN1S' (SFT=SOFTLN1S), for object SOFTLP1S (OBJ=SOFTLP1S), an object type of 'P' (TYP=P), at statement line number

00000300 (STT=00000300) and with sequence number 00000027 (SEQ=00000027). On the Repository the Soft Link name SOFTLN1S does not exist for this criteria.

```
USER: SFT ERR: OPT=D APP=SOFTLINK OBJ=SOFTLP1S TYP=P XOB= STT=00000300 SEQ=00000027

 VAR=#PROGRAM-NAME SFT=SOFTLN1S ERR=Soft Link Not in Repository LNO=4
```

5. **Object Not Found**

    This error is produced when an object name has been specified for the Soft Link, which does not exist in the Repository for the specified application.

    Example: A Soft Link record has been detected where the object 'SOFTLXXX' (OBJ=SOFTLXXX) has been specified to add a Soft Link name of 'SOFTLN2S' (SFT=SOFTLN2S). The application name used is 'SOFTLINK' (APP=SOFTLINK). Object SOFTLXXX does not exist in this application.

```
USER: SFT ERR: OPT=A APP=SOFTLINK OBJ=SOFTLXXX TYP=P XOB= STT=00000100 SEQ=00000006

 VAR=#PROGRAM-NAME SFT=SOFTLN2S ERR=Object Not Found LNO=5
```

Cobol Links

Cobol Links provides the facility to manually update the Repository with information regarding the Cobol modules that form the linked Cobol program being executed at run time within a JCL.

Batch Cobol programs may consist of more than one module. All the relevant modules are combined into a single executable Cobol program, known as a "Linked Cobol Program".

At batch run time the JCL used to invoke the batch Cobol processing will execute the Linked Cobol Program.

After the Extract and Load processes have been run, the Repository will have the JCL and Cobol modules loaded, but will not have any information available regarding the Linked Cobol Program and the Cobol modules. This information can be specified using the Cobol Links option.

For example:

An application contains JCL object JCLCOB10 which executes the Linked Cobol Program COB10.

```
//JCLCOB10 JOB MSGLEVEL=(1,1),MSGCLASS=X,CLASS=V
//*
//* ------------------------------------------------------------
//* Run COBOL Program = COB10
//* ------------------------------------------------------------
//COBOL010 EXEC PGM=COB10,
//               REGION=8M,
//               COND=(0,NE),
//               PARM='PJN20050905'
//*
```

Cobol Modules COB10P01, COB10P02 and COB10P03 have been loaded into the Repository.

The Repository will have all the Cobol modules loaded but will not know which modules form the Cobol program. For the Linked Cobol Program COB10, you would need to specify the Cobol modules COB10P01, COB10P02 and COB10P03.

This will provide the cross-reference information between the JCL and Cobol modules.

How to Invoke the Cobol Link Maintenance Option

Use the following navigation in the site workplace:

- Select the application required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Application Maintenance**. This will open a sub-menu of further options

- Select the option: **Cobol Link Maintenance**.

Cobol Link Maintenance Window

The Cobol Link Maintenance window controls all the settings required for this option.

The following Figure 2-13 illustrates the Cobol Link Maintenance screen.
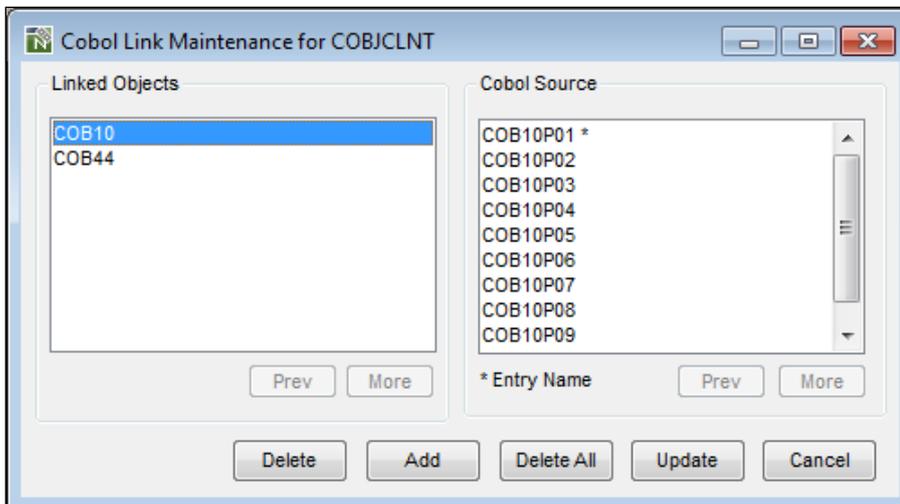
Figure 2-13 Cobol Link Maintenance screen

SCREEN ITEMS	DESCRIPTION
Linked Object List	List all the linked objects that have been specified for the currently selected application.
	The list of linked objects can be tailored to your requirements using the option 'Change Start Position of Linked Object List…' from the Linked Object List context menu.
	The Linked Object List title reflects the linked objects being listed and will append any reposition values that may have been specified.
Cobol Source List	List all the Cobol Source that have been specified for the selected Linked Object. If a Cobol Source has a * next to it then it has been specified as the entry name for the linked object. This may be specified on the Add Cobol Links Window.

BUTTON NAME	DESCRIPTION
Linked Object group:	
Prev	Scrolls the linked 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 linked 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.
Cobol Module group:	
Prev	Scrolls the Cobol module 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 Cobol module list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
Cobol Link Maintenance screen:	
Delete	Deletes the currently selected Linked Object.
Add	Add Cobol Links.
	Note: For more information refer to the section Add Cobol Links Window.
Delete All	Deletes all the Cobol links on the current page in the Linked Objects list box.

BUTTON NAME	DESCRIPTION
Update	Update existing Cobol Links.
	Note: For more information refer to the section <u>Add Cobol Links Window</u>.
Cancel	Cancel the Cobol Link Maintenance 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.

Cobol Link Maintenance Context Menu

The Cobol Link Maintenance context menu is invoked by placing the cursor on any of the items listed in the Linked Object list and using the right hand mouse button with a single click.

CONTEXT MENU ITEM	DESCRIPTION
Delete Linked Object	Deletes the currently selected Linked Object.
Change Start Position of Linked Object List…	Reposition the list of linked objects to start from a particular linked 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 linked object list title to highlight the type of repositioning being applied.
	Possible reposition values are:

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

Add Cobol Links Window

The Add Cobol Links screen is accessed from the Cobol Link Maintenance screen by using either the '**Add**' or '**Update**' buttons.

The Add Cobol Links screen is a dual purpose screen that can be used to add new or update existing Cobol Links.

The following Figure 2-14 illustrates the Add Cobol Links screen.
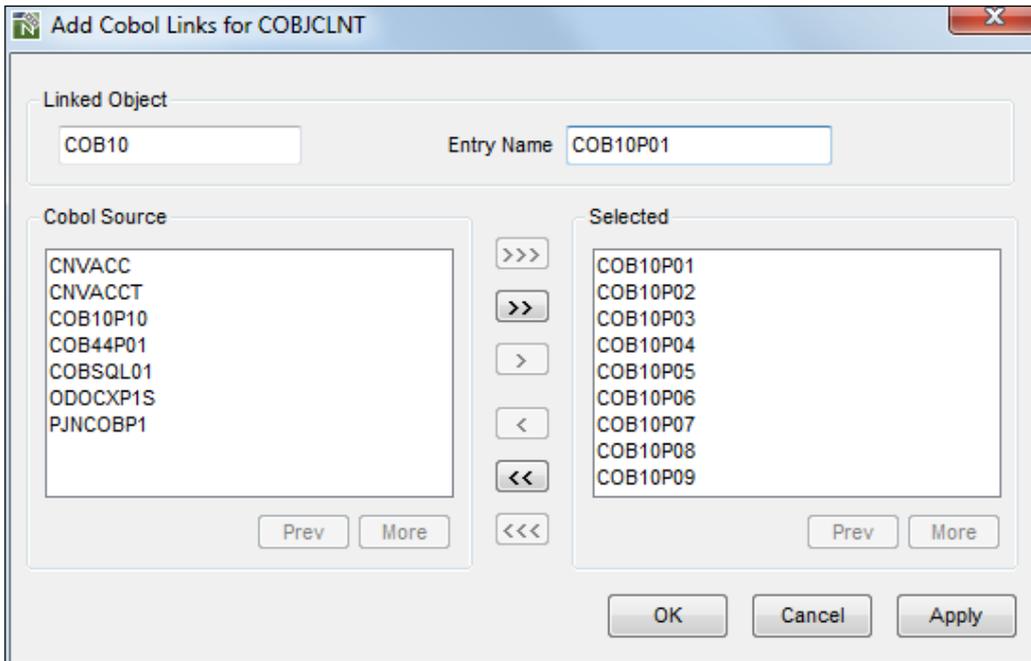
Figure 2-14 Add Cobol Links screen

MENU ITEMS	OPTIONS	DESCRIPTION
File	Exit	Exit the Add Cobol Links screen and return back to the Cobol Link Maintenance screen.
View	Change Start Position of Cobol Source List…	Reposition the list of Cobol sources to start from a particular Cobol source name. The reposition value can be input using either a complete name or part name using an '*' (asterisk) wildcard.

MENU ITEMS	OPTIONS	DESCRIPTION
		The reposition value is appended to the Cobol source list title to highlight the type of repositioning being applied.
		Possible reposition values are:

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

MENU ITEMS	OPTIONS	DESCRIPTION
Help		Invoke the Add Cobol Links help.

SCREEN ITEMS	DESCRIPTION
Linked Object	The name of the Linked Object.
	This will be enabled / disabled depending on the option selected in the Cobol Link Maintenance screen.
	For '**Add**', the input will be enabled and a new Linked Object name can be typed in.
	For '**Update**', the input will be disabled and only Cobol source can be selected / de-selected.
Entry Name	The name of the source that is to be specified as the entry point for the Linked Cobol Object. The source name may be typed in directly or by the context menu option, Set as Entry Name which is invoked by a click on the right-hand mouse button when on a source name.
	This will be enabled / disabled depending on the option selected in the Cobol Link Maintenance screen.

SCREEN ITEMS	DESCRIPTION
Cobol Source List	List all the Cobol source that are available for the currently selected application.
	Cobol source can be selected / de-selected by using a double click with the **left hand mouse button**.
Selected	List all the Cobol source that have been selected for the Linked Object.
	Cobol source can be de-selected by using a double click with the **left hand mouse button**.

BUTTON NAME	DESCRIPTION
Cobol Source group:	
Prev	Scrolls the Cobol source 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 Cobol source 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 Cobol source in the Cobol source list (when more than one page is available, as set by the LISTBOXMAX parameter in the NATENG.INI file).
>>	Select all Cobol source on the current page in the Cobol Source list.
>	Select all selected Cobol source in the Cobol Source list.
<	De-select all selected Cobol source in the selected list.
<<	De-select all Cobol source on the current page in the selected list.
<<<	De-select all Cobol source 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.

BUTTON NAME	DESCRIPTION
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.

Add Cobol Links screen:

OK	Save the specified Cobol Links and close the current screen.
	Note: This button is only enabled if any changes have been made.
Cancel	Cancel the Add Cobol Links process and return back to the Cobol Link Maintenance screen.
Apply	Save specified Cobol Links and retain the current screen.
	Note: This button is only enabled if any changes have been made.

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

JCL Analysis

The JCL Analysis option provides the facility to generate cross-reference data for work file and database access record layouts, for any JCL objects executing Natural or COBOL programs.

The JCL Analysis process will analyze all the work file and database accesses within the objects, starting from the program referenced in the JCL. If the JCL contains a LOGON to a Natural library that is different from the Natural Engineer Application library then if the Natural object is not found in the LOGON library it will be assumed that it resides in the base Natural Engineer Application library.

Note: The JCL Analysis process duration depends on the complexity of the objects involved. For high levels of complexity, this may take a while to complete.

The cross-reference data is used in the JCL Diagram, where work files and database access definitions (e.g., DDMs, SQL Tables or Predict User Views) can be selected and their respective record layouts viewed.

How to Invoke the JCL Analysis Option

Use the following navigation in the site workplace:

- Select the application required.
- Single click with the right hand mouse button to invoke the context menu.
- Select the option: **Application Maintenance**.
- Select the option: **JCL Analysis**.

Note: The JCL Analysis option is only available for applications with JCL objects loaded in the Repository.

JCL Analysis Window

The JCL Analysis window controls all the settings required for this option. It is accessed from the JCL Analysis option of the Application Maintenance menu.

The following Figure 2-15 illustrates the JCL Analysis screen.
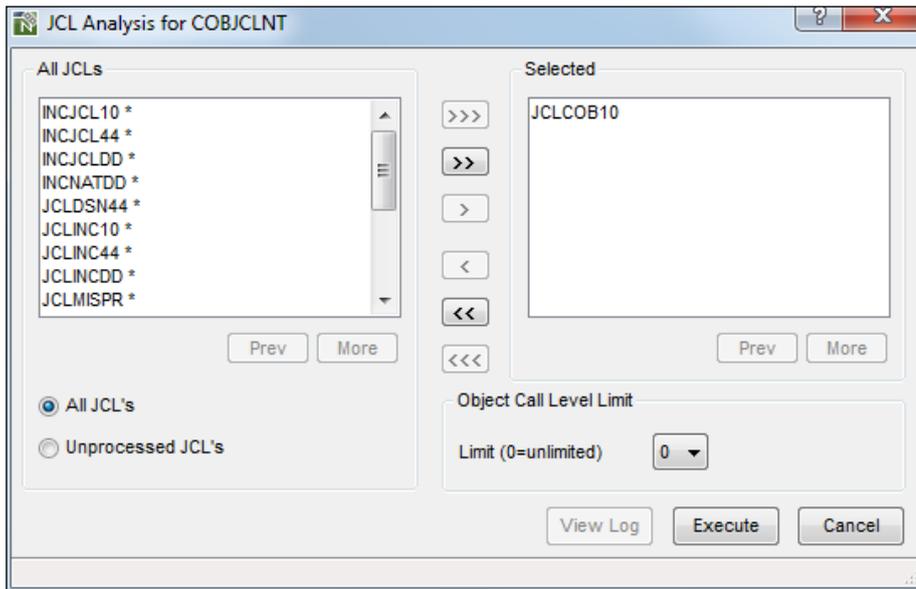
Figure 2-15 JCL Analysis screen

SCREEN ITEMS	DESCRIPTION
JCL List	List all the JCL objects that are available for the currently selected application.
	The list of JCL objects can be tailored to your requirements using the options 'Change Start Position of JCL List…' and 'View Unprocessed JCLs Only' from the JCL List context menu.
	The JCL List title reflects the JCL objects being listed and will append any reposition values that may have been specified.
	JCL objects can be selected by using a double click with the **left hand mouse button**.
	Note: Any JCL objects listed that have already been processed will have

SCREEN ITEMS	DESCRIPTION
	an '' (asterisk) appended to the right hand side of the JCL object name.*
Selected	List all the JCL objects that have been selected for JCL Analysis processing.
	Note: At least one JCL object must be selected to run the analysis.
	JCL objects can be de-selected by using a double click with the **left hand mouse button**.
Object Call Level Limit	Specifies the amount of levels to be checked by the JCL Analysis process. Setting this value to 0 (default) will mean no level limit will be used.
	The default value may be changed by setting the value in the ANALYSIS-LEVEL-LIMIT parameter in the JCL section of the NATENG.INI file.

BUTTON NAME	DESCRIPTION
JCL List group:	
Prev	Scrolls the JCL 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 JCL 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.
All JCL's	Change the list of JCL objects displayed in the JCL List.
	If selected, then all processed and unprocessed JCL objects are listed.
Unprocessed JCL's	Change the list of JCL objects displayed in the JCL List.
	If selected, then only the JCL objects that have not yet been processed are listed.
Selection / De-selection buttons:	
>>>	Select all JCL objects in the JCL list (when more than one page is available, as set by the LISTBOXMAX parameter in the NATENG.INI file).
>>	Select all JCL objects on the current page in the JCL list.
>	Select all selected JCL objects in the JCL list.
<	De-select all selected JCL objects in the selected list.

BUTTON NAME	DESCRIPTION
<<	De-select all JCL objects on the current page in the selected list.
<<<	De-select all JCL 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.
JCL Analysis screen:	
Exe Batch	Will submit the batch JCL Analysis process for the selected JCL objects. This is only available in a SPod environment when running against a mainframe server.
	Note: This button is only enabled if any changes have been made.
View Log	Will show the JCL Analysis Log File which details the Jobs and Steps that have been processed along with any exception messages.
Execute	Invoke the JCL Analysis process for the selected JCL objects.
	Note: This button is only enabled if any changes have been made.
Cancel	Cancel any JCL object selection 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.

Validate Objects

The Validate Objects option allows you to validate the objects loaded in the Repository against the objects in the application library.

Application objects that are no longer present on the application library can be selected and removed from the Repository. This results in a synchronized Repository and application library, providing a correct up to date view of the application.

How to Invoke the Validate Objects

Use the following navigation in the site workplace:

- Select the application required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Application Maintenance**. This will open a sub-menu of further options.

- Select the option: **Validate Objects**.

NB: The Validate Objects option may be run automatically after the load process by specifying VALIDATE=Y in the [LOAD] section of the NATENG.INI file or by checking the Validate Objects box in the Extract & Load Selection Criteria window for a selected application.

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

Validate Objects Window

For the selected application, a list of the objects not found in the application library is displayed in the object list box.

From the Validate Objects screen, objects can be selected and deleted from the Repository.

The following Figure 2-17 illustrates the Validate Objects screen.
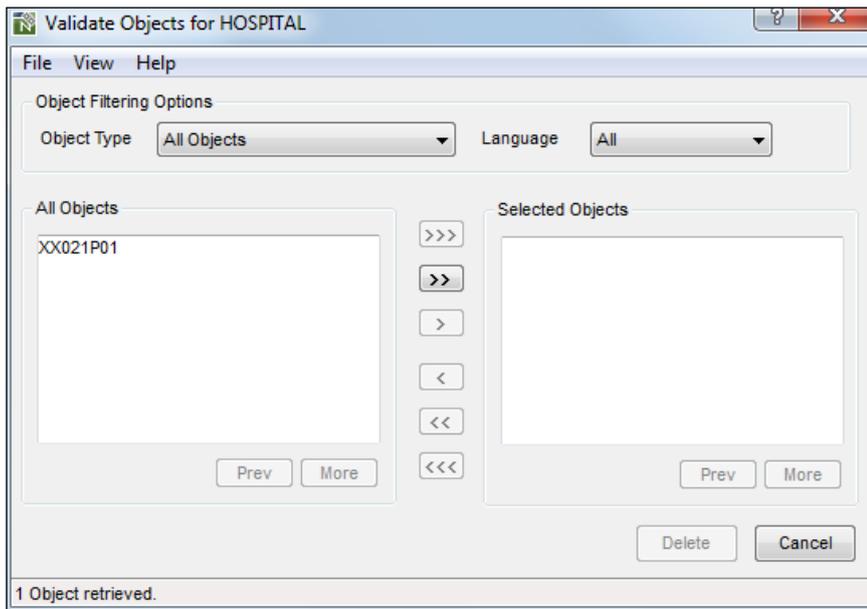
Figure 2-17 Validate Objects screen

MENU ITEMS	OPTIONS	DESCRIPTION
File	**Exit**	Exit the Validate Objects 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.

MENU ITEMS	OPTIONS	DESCRIPTION
		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.

MENU ITEMS	OPTIONS	DESCRIPTION
Help		Invoke the Validate Objects help.

SCREEN ITEMS	DESCRIPTION
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**
- **Adapters**

SCREEN ITEMS	DESCRIPTION
Language	Allows you to select the programming language of the objects to be listed.
	Available selections are:
	▪ **All**
	▪ **Natural**
	▪ **Cobol**
	▪ **JCL**
Object List	List of all the objects used by the currently selected application.
	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 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 Objects	Lists all the objects that have been selected for the current function.
	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.
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.

BUTTON NAME	DESCRIPTION
<<<	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 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.
Validate Objects screen:	
Delete	Deletes the selected objects from the Repository. *Note: This button is only enabled if any selections have been made.*
Cancel	Cancel the Validate Objects 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.

STATUS BAR ITEM	DESCRIPTION
Pane	Any Validate Objects processing messages.

Generate Application Metrics

The Generate Application Metrics option allows you to generate missing metrics data for your application without the need to rerun the Load process.

The Load process will generate the metrics data as the application is loaded into the Repository. This can be controlled by the value specified in the METRICS parameter in the NATENG.INI file. If the METRICS parameter has been set to "N", then no metrics data will be generated during the Load process.

Note: Setting the METRICS parameter to "N" can be used to improve the performance of the Load process for a large application. For more information on the NATENG.INI file parameter METRICS refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.

How to Invoke the Generate Application Metrics

Use the following navigation in the site workplace:

- Select the application required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Application Maintenance**. This will open a sub-menu of further options.

- Select the option: **Generate Application Metrics**.

Related Processes

The metrics data is used by the Application Metrics report: Object Statistics, which provides structural statistics for an application. For example, Halstead and McCabe.

Note: For more information on the Object Statistics report refer to Chapter 3 in the Natural Engineer Reporting manual.

Decision Table Analysis

The Decision Tables Analysis option provides the facility to generate cross-reference data for conditional statements e.g. IF and DECIDE, for any Natural or COBOL objects and the actions that are dependent on the conditions.

Note: The Decision Table Analysis process duration depends on the complexity of the objects involved. For high levels of complexity, this may take a while to complete.

The cross-reference data is used in the [Decision Tables](#) options.

How to Invoke the Decision Table Analysis Option

Use the following navigation in the site workplace:

- Select the application required.
- Single click with the right hand mouse button to invoke the context menu.
- Select the option: **Application Maintenance**.
- Select the option: **Decision Table Analysis**.

Decision Table Analysis Window

The Decision Table Analysis window controls all the settings required for this option. It is accessed from the Decision Table Analysis option of the Application Maintenance menu.

The following Figure 2-18 illustrates the Decision Table Analysis screen.
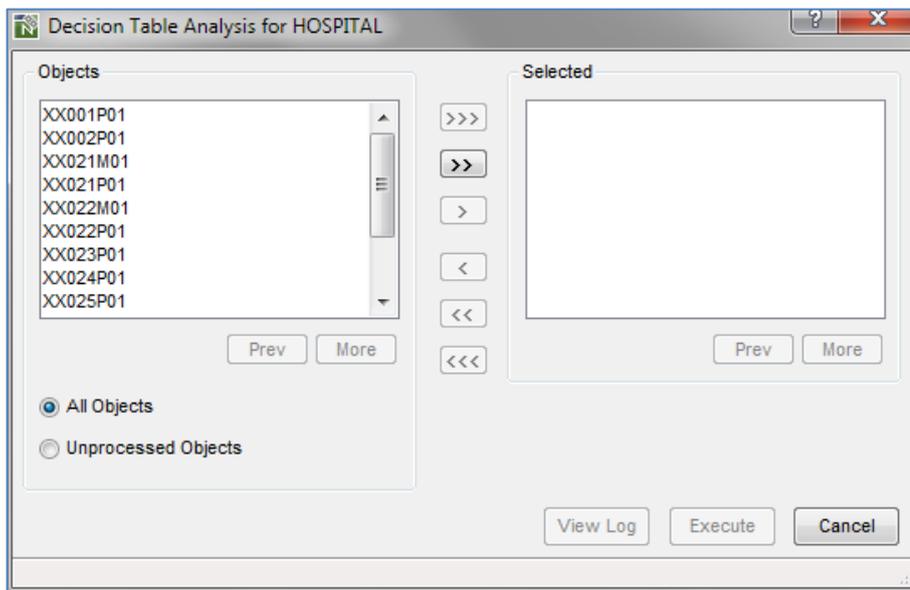
Figure 2-18 Decision Table Analysis screen

SCREEN ITEMS	DESCRIPTION
Object List	List all the objects that are available for the currently selected application.
	The list of objects can be tailored to your requirements using the options 'Change Start Position of Object List… from the Object List context menu.
	The Object List title reflects the objects 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**.
	Note: Any objects listed that have already been processed will have an '' (asterisk) appended to the right hand side of the object name.*

SCREEN ITEMS	DESCRIPTION
Selected	List all the objects that have been selected for Decision Table Analysis processing.
	Note: At least one object must be selected to run the analysis.
	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.
All Objects	Change the list of objects displayed in the Object List.
	If selected, then all processed and unprocessed objects are listed.
Unprocessed Objects	Change the list of objects displayed in the Object List.
	If selected, then only the objects that have not yet been processed are listed.
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.

BUTTON NAME	DESCRIPTION
<<<	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.
Decision Table Analysis screen:	
View Log	Will show the Decision Table Analysis Log File which details the objects that have been processed along with any exception messages.
Execute	Invoke the Decision Table Analysis process for the selected objects.
	Note: This button is only enabled if any changes have been made.
Cancel	Cancel any object selection 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.

APPLICATION MANAGEMENT

Chapter Overview

This chapter describes the Application Management options available to review and manage your applications, once they are loaded into the Repository.

Field Viewer

The Field Viewer option allows you to select and review information for individual data items within an object.

The data items can be listed in the site workplace by selecting the Fields tab. This will list all the data items available within each application loaded into the Repository.

How to Invoke the Field Viewer Option

Use the following navigation in the site workplace:

- Select the fields tab in the site workplace.

- Select the field required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Field Viewer**.

Field Viewer Window

For the selected data item, a list of the objects referencing the selected data item is displayed in the object list box.

If you select one of the objects, all the statement details for the selected data item are displayed in the source code list box. The context of the selected data item within the data definition of the selected object and the relative offsets are displayed in the context list box.

The following Figure 3-1 illustrates the Field Viewer screen.
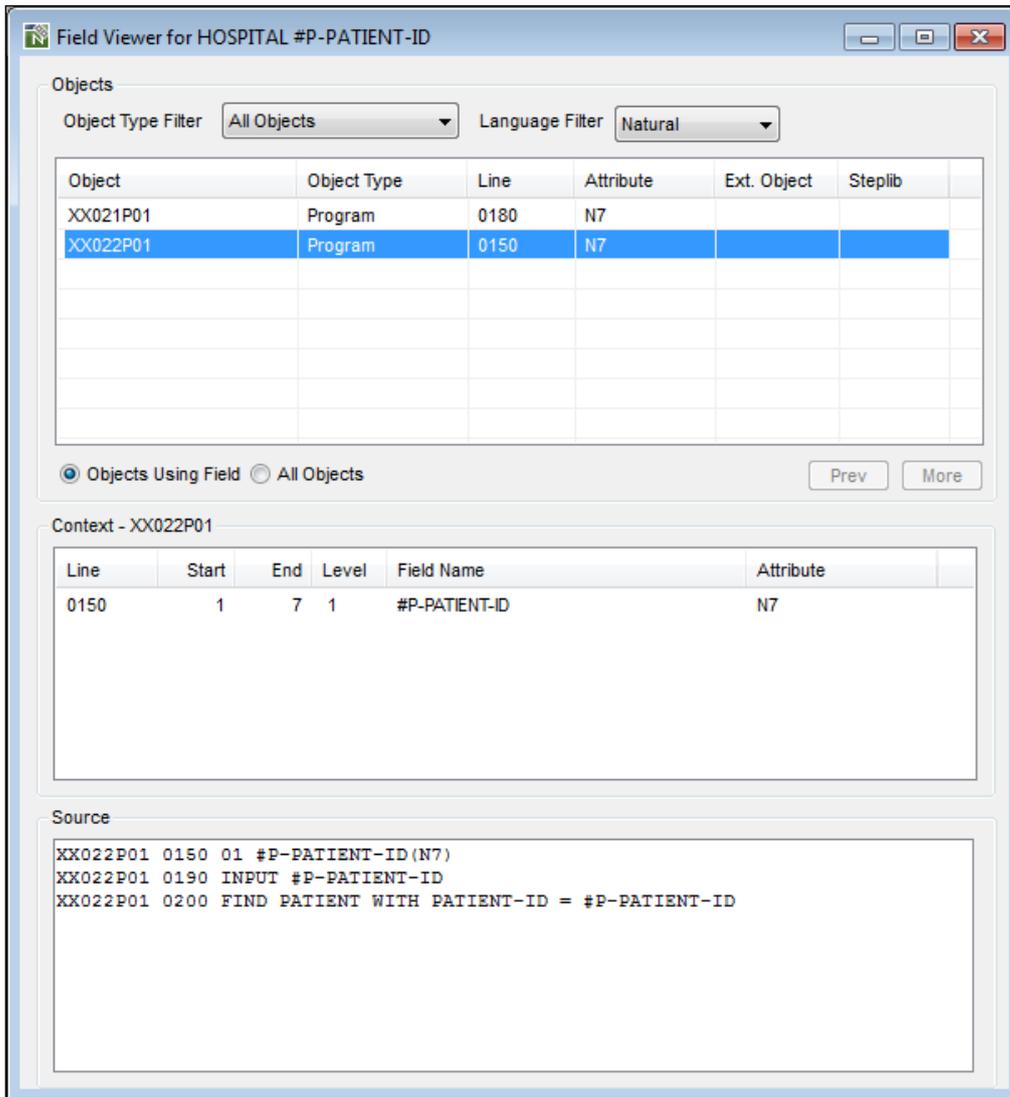
Figure 3-1 Field Viewer screen

SCREEN ITEMS	DESCRIPTION
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**
	▪ **DDMs**
	▪ **Adaptors**
Language	Allows you to select the programming language of the objects to be listed.
	Available selections are:
	▪ **All**
	▪ **Cobol**
	▪ **Natural**
Object List	Lists all the objects referencing the selected field.
	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 View 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 navigate between the Field Viewer screen and the Object Viewer or Object Documentation screens, or use the View Source Code option by using the **right hand mouse button** on a selected object.
	The columns available are:

	Object	The name of the object referencing the selected data item.
	Object Type	The type of object, for example Map, Program, Local Data Area.
	Line	The statement line number fo the data item within the selected object.

SCREEN ITEMS	DESCRIPTION	
	Attribute	The format and length of the data item.
	Ext. Object	The name of the object that contains the definition if the data item is defined externally, such as in a GDA or an LDA.
	Steplib	The steplib library name of the object. Only applicable if the object referencing the data item is on a steplib library.
Context List		Displays the context of the selected data item within the data definition of the selected object and the relative offsets if applicable.

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    1   10  02 #ALPHA          A10
```

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

```
0020            01 #GROUP          G
0030    1   10  02 #ALPHA          A10
0040            02 REDEFINE #ALPHA
0050    1    6  03 #NUMERIC        N6
```

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

```
0030    1   10  02 #ALPHA          A10
0040            02 REDEFINE #ALPHA
0050    1    6  03 #NUMERIC        N6
```

Source Code — Displays all the statement references for the selected data item and object including the object, the line number and the line of code.

Note: For more information on the Object List context menu, refer to section Field Viewer Context Menu.

BUTTON NAME	DESCRIPTION	
Objects Using Field/All Objects	This option provides additional refinement of the objects listed in the Object List box.	
	All Objects	The default for the screen is to list all objects that the field is in whether they are used in the object or defined only.
	Objects Using Field	Only objects that actually use the field as part of a programming statement are shown.
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.	

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

Field Viewer Context Menu

The Field Viewer context menu is invoked by placing the cursor on any of the items listed in the Object List box and using the right hand mouse button with a single click.

Object List Context Menu

The Object List context menu allows you to navigate between the Field Viewer screen and the Object Viewer or Object Documentation screens, or use the View Source Code option.

Note: The Object List context menu is not available when displaying DDM objects.

The following Figure 3-2 illustrates the Object List context menu
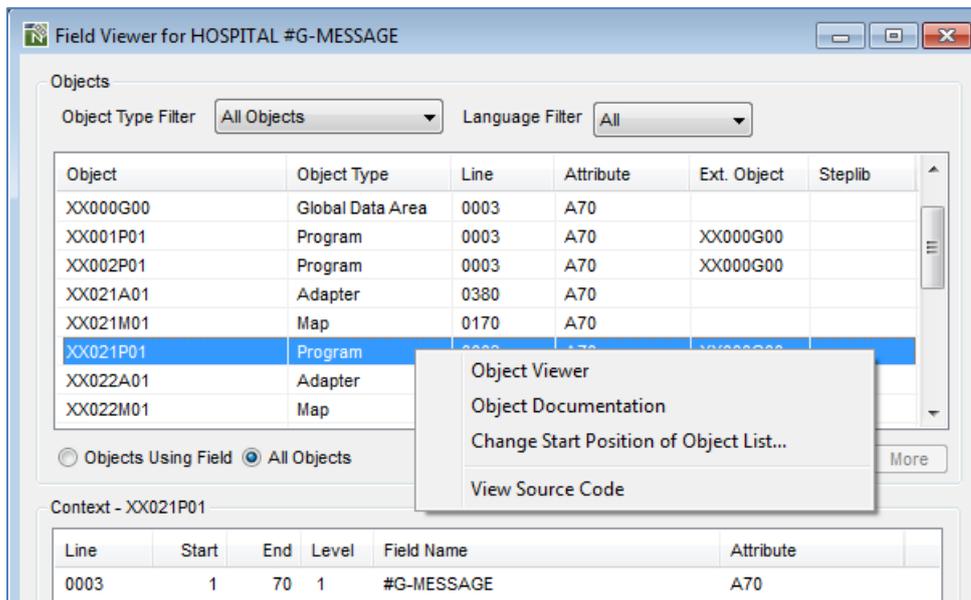
Figure 3-2 Object List context menu

CONTEXT MENU ITEM	DESCRIPTION
Object Viewer	Invoke the Object Viewer screen.
Object Documentation	Invoke the Object Documentation screen.
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.

View Source Code	Display the selected object source code in a browser.

Object Viewer

The Object Viewer option allows you to select and review data item information for individual objects. Information will be displayed to show the data items referenced within the object and the statements using those data items.

The information is presented on screen and GenTree is utilized to provide a diagrammatic tree view of the objects referenced by the selected object (object structure). If any Object Documentation is present for a particular object then the Object Title will be displayed next to the Object Name within the GenTree diagram.

How to Invoke the Object Viewer Option

Use the following navigation in the site workplace:

- Select the object required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Object Viewer**.

Object Viewer Window

For the selected object, a list of the data items referenced by the object is listed in the field list box.

If you select one of the data items, all the statement details for the selected data item are displayed in the source code list box. The context of the selected data item within the data definition of the selected object is displayed in the context list box.

The GenTree Structure Analyzer will display the object structure for the selected object.

Note: GenTree is not available if the Object is a Predict User View.

Note: For more information on GenTree Structure Analyzer refer to section Object Viewer GenTree Structure Analyzer.

The following Figure 3-3 illustrates the Object Viewer screen.
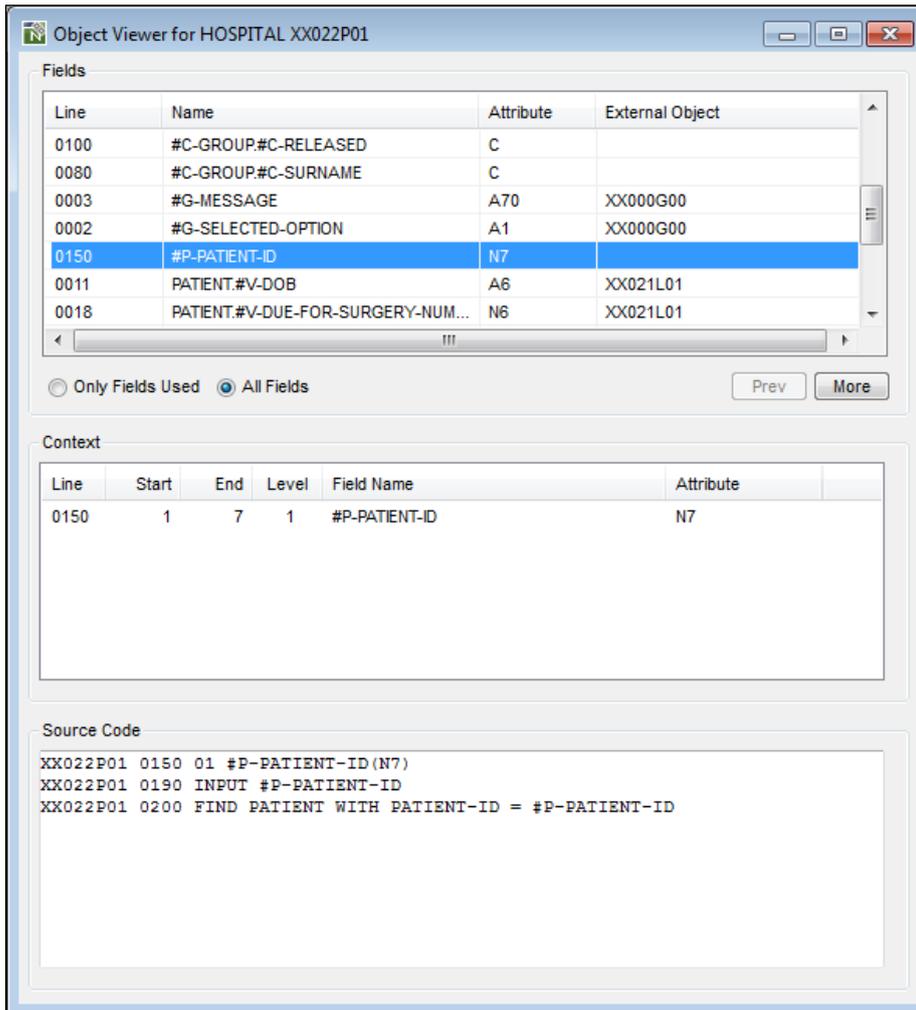
Figure 3-3 Object Viewer screen

SCREEN ITEMS	DESCRIPTION
Field List	Lists all the fields referenced by the selected object.

The list of fields can be tailored to your requirements using the option 'Change Start Position of Field List…' from the context menu.

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

A context menu is available to navigate between the Object Viewer screen and the <u>Field Viewer</u> screen by using the **right hand mouse button** on a selected data item. If the selected item is a DDM Field than it is also possible to navigate to the <u>Database Field Access (CRUD) by Object</u> or <u>Predict Field Information</u> screens. If the selected item is not a system variable or a DDM then it is also possible to display the <u>Field Tracking</u> diagram for the item.

Note: The Predict Field Information option is only available if Natural Engineer is executing in a remote development environment, Natural version 4.2 or above is installed on the mainframe and the Predict file is mapped in the remote environment setting.

The columns available are:

Line	The statement line number for the data item within the selected object.
Name	The name of the data item.
Attribute	The format and length of the data item.
External. Object	The name of the object that contains the definition if the data item is defined externally, such as in a GDA or an LDA.

Note: This column is not displayed for DDM objects.

The following columns are only displayed for DDM objects:

Short Name	The Adabas short name for the DDM field.

SCREEN ITEMS	DESCRIPTION

Type   The type of DDM field. May be:

- **Descriptor**
- **Super Descriptor**
- **Phonetic Descriptor**
- **Hyper Descriptor**
- **Non Descriptor**

And/or

- **Periodic Group**
- **Multiple Value field**

And/or

- **Long Alpha**
- **Large Object**

Context List   Displays the context of the selected data item within the data definition of the selected object and the relative offsets where applicable.

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    1  10  02 #ALPHA              A10
```

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

```
0020            01 #GROUP              G
0030    1  10  02 #ALPHA              A10
0040            02 REDEFINE #ALPHA
0050    1   6  03 #NUMERIC            N6
```

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

```
0030    1  10  02 #ALPHA              A10
0040            02 REDEFINE #ALPHA
0050    1   6  03 #NUMERIC            N6
```

SCREEN ITEMS	DESCRIPTION
Source Code / Object List	Displays all the statement references for the selected data item including the object, the line number and the line of code.
	For DDM objects, displays a list of objects that reference the selected DDM field.
	Note: Source Code is not available if the object is a Predict User View.

Note: For more information on the Field List context menu, refer to section <u>Object Viewer Context Menus</u>.

BUTTON NAME	DESCRIPTION	
Only Fields Used/All Fields	This option provides additional refinement of the fields listed in the Field List box.	
	All Fields	The default for the screen is to list all fields whether they are used in the object or defined only.
	Only Fields Used	Only fields that are actually used within the object as part of a programming statement are shown.
	NB: This option is unavailable if the object is a DDM or a Data Area.	
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.

Object Viewer Context Menu

The Object Viewer context menu is invoked by placing the cursor on any of the items listed in the Field list and using the right hand mouse button with a single click.

Field List Context Menu

The Field List context menu allows you to navigate between the Object Viewer screen, the Field Viewer screen, the Field Tracking Diagram or the Database Access (CRUD) by Object or Predict Field Information screens if a DDM field has been selected. For a DDM or Predict User View if the field is a descriptor then there is also the option to view the Database Key Usage for that field. It also provides an option to reposition the field list.

The following Figure 3-4 illustrates the Field List context menu for a DDM.
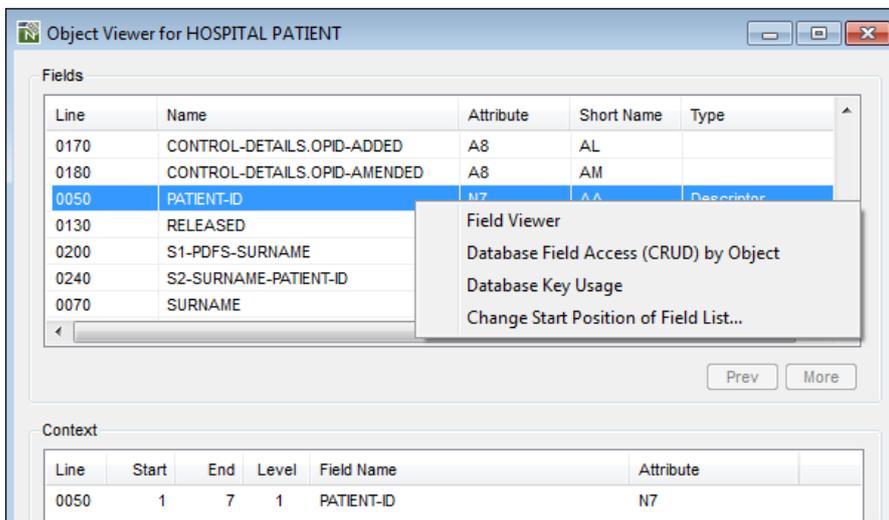
Figure 3-4 Field List context menu

CONTEXT MENU ITEM	DESCRIPTION	
Field Viewer	Invoke the Field Viewer screen.	
Field Tracking		
	Forward	Invoke the Field Tracking Diagram for the selected item showing details that the item is moved to.
	Backward	Invoke the Field Tracking Diagram for the selected item showing details that gets moved to the item.
	NB: Field Tracking is not available for DDMs or System Variables.	
Database Access (CRUD) by Object	Invoke the Database Access (CRUD) by Object screen for the selected DDM/DDM field combination.	
	Note: This is only available if the field is a DDM Field	
Predict Field Information	Invoke the Predict Field Information screen for the selected DDM/DDM Field combination.	
	Note: This is only available for a DDM/Predict User View and if Natural Engineer is executing in a remote development environment, Natural version 4.2 or above is installed on the mainframe and the Predict file is mapped in the remote environment setting.	
Database Key Usage	Invoke the Database Key Usage screen for the selected key.	
	Note: This is only available for a DDM/Predict User View and the field has to be a key e.g., Descriptor/Super-Descriptor	
Change Start Position of Field List…	Reposition the list of fields 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 field 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'.

CONTEXT MENU ITEM	DESCRIPTION	
	XYZ	Reposition to the first field that either matches or is greater than 'XYZ' and then continue the field list from that point.
	The following reposition values are for System Variables only:	
	**	Reposition to the top of system variable list.
	*CURS	Reposition to the first system variable that either matches or is greater than '*CURS' and then continue the system variable list from that point.
	DAT	Only show system variables that are prefixed by '*DAT'.
Edit Object 'object-name'	Closes Natural Engineer, logs onto the application library and opens the appropriate Natural editor for the selected object.	
	The 'object-name' will be the object that has been selected in the site workplace.	
	This is not available for a DDM.	

Object Viewer GenTree Structure Analyzer

Object Viewer makes use of the GenTree Structure Analyzer to display all the object references within a selected object. The GenTree Structure Analyzer is automatically invoked when the Object Viewer screen is displayed.

For DDMs, GenTree will display all the objects that reference the selected DDM and list the type of access being made (e.g., READ, DELETE, STORE).

For DDM fields, GenTree will display all the objects that reference the selected DDM field, list the type of access (and the key being used if applicable) and the view names being used.

Note: A DDM (data definition module) is a set of field definitions for a database file. A DDM can be created from a database file or from other DDMs. DDMs are used to describe any type of database file, and are not restricted to Adabas database files.

Note: The amount of DDMs shown may be limited by the DDM-OBJECT-LIMIT setting in the [TREEVIEW] section of the NATENG.INI file.

For all other objects, GenTree displays the information on external references within the object selected, including data areas, include code, maps, Natural interfaces and subroutines.

If any Object Documentation is present for a particular object then the Object Title will be displayed next to the Object Name within the GenTree diagram.

Note: For more information on GenTree Structure Analyzer refer to Chapter 2 in the Natural Engineer Reporting manual.

The following Figure 3-5 illustrates a sample Object Viewer GenTree Structure Analyzer diagram for an object.
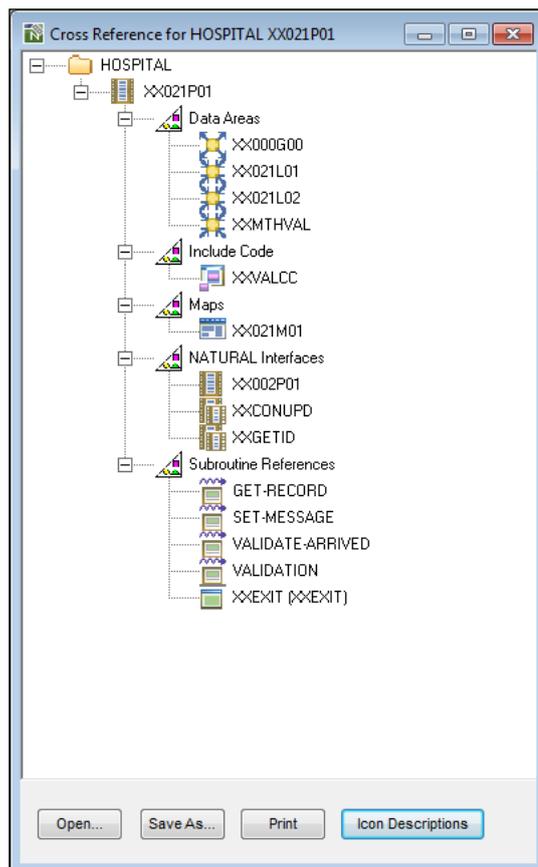
Figure 3-5 Object Viewer GenTree Structure Analyzer diagram for an object

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The following Figure 3-6 illustrates a sample Object Viewer GenTree Structure Analyzer diagram for a DDM.
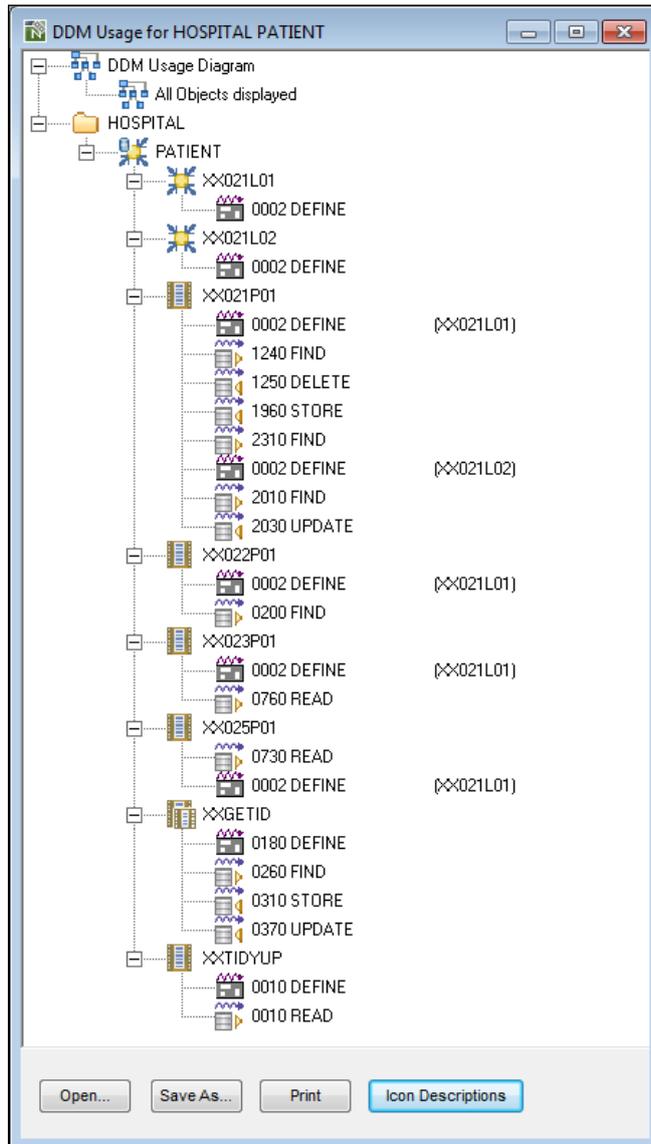
Figure 3-6 Object Viewer GenTree Structure Analyzer diagram for a DDM

The following Figure 3-7 illustrates a sample Object Viewer GenTree Structure Analyzer diagram for a DDM field.
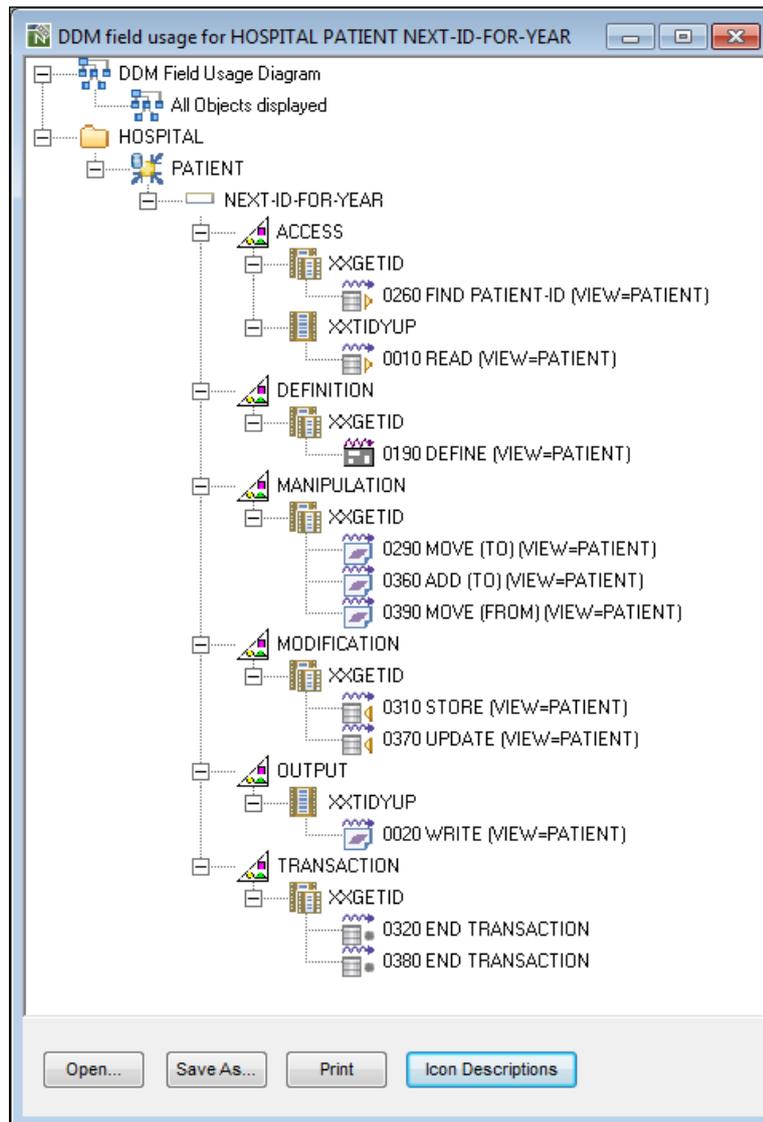
Figure 3-7 Object Viewer GenTree Structure Analyzer diagram for a DDM field

Object Reference

The Object Reference option allows you to review the relationships between objects, both those used by the object and those using the object.

How to Invoke the Object Reference Option

Use the following navigation in the site workplace:

- Select the object required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Object Reference**.

Object Reference Window

For the selected object, the Object Reference window displays a list of objects used by the selected objects, and, a list of objects using the selected objects.

Further object references can be reviewed by selecting objects within the used by and using lists.

The following Figure 3-8 illustrates the Object Reference screen.
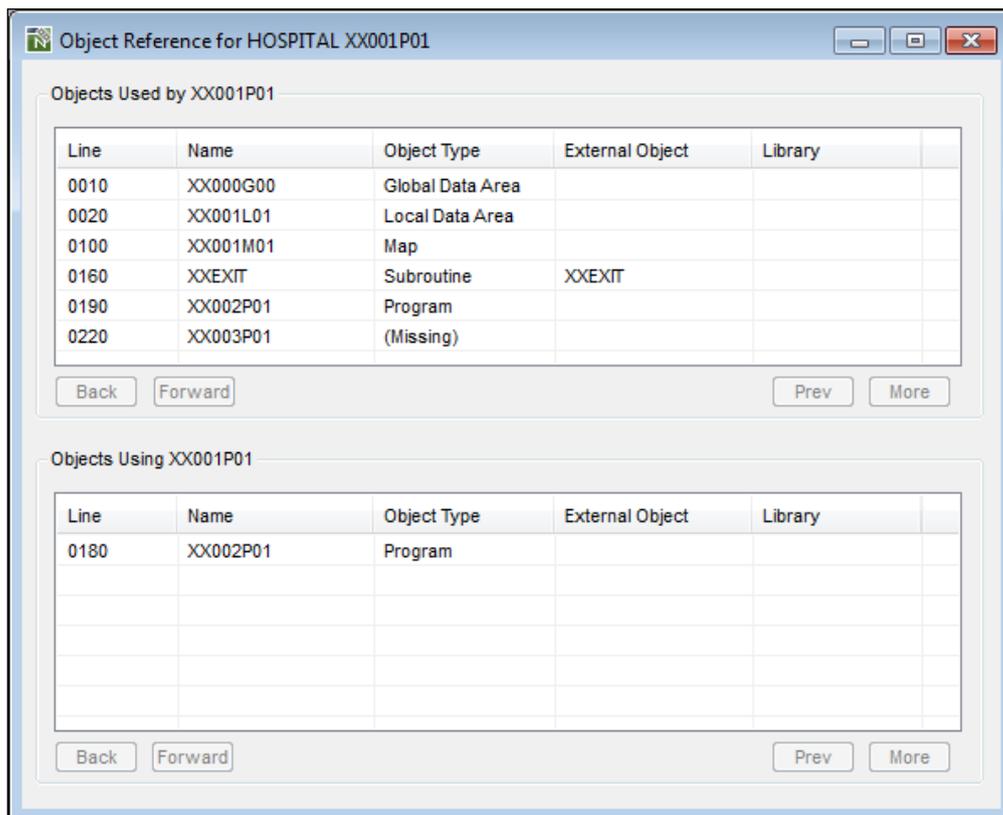
Figure 3-8 Object Reference screen

SCREEN ITEMS	DESCRIPTION	
Objects Used by List	Displays all the objects that are used by the selected object. For example Maps, Programs, Subprograms. The columns available are:	
	Line	The statement line number for the referenced by/ referencing object.
	Name	The name of the object referenced by/referencing.
	Object Type	The type of object referenced by/referencing.
	External Object	If the call name is contained in another physical object then the name of that object is also listed. For example, the PERFORM statement can have a name up to 32 bytes long and the code can exist in an external object that has a name of only 8 bytes, i.e., a Natural programming object in its own right.
	Library	The name of the actual library that the object resides in.
Objects Using List	Displays all the objects that use the selected object. For example Maps, Programs, Subprograms. The columns available are:	
	Line	The statement line number for the referenced by/ referencing object.
	Name	The name of the object referenced by/referencing.
	Object Type	The type of object referenced by/referencing.
	External Object	If the call name is contained in another physical object then the name of that object is also listed. For example, the PERFORM statement can have a name up to 32 bytes long and the code can exist in an external object that has a name of only 8 bytes, i.e., a Natural programming object in its own right.
	Library	The name of the actual library that the object resides in.

BUTTON NAME	DESCRIPTION

Objects Used by List group:

Back	Scrolls the objects used list to previous object selection. This button will be available/unavailable depending on whether any selections have been made from the object reference list.
Forward	Scrolls the objects used list to the next object selection. This button will be available/unavailable depending on whether any selections have been made from the object reference list.
Prev	Scrolls the objects used 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 objects used list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.

Objects Using List group:

Back	Scrolls the objects using list to previous object selection. This button will be available/unavailable depending on whether any selections have been made from the object reference list.
Forward	Scrolls the objects using list to the next object selection. This button will be available/unavailable depending on whether any selections have been made from the object reference list.
Prev	Scrolls the objects using 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 objects using 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.

Object Overview

The Object Overview option allows you to view a concise overview of the major characteristics of an object.

The characteristics can be viewed using PDF, HTML (browser), a spreadsheet e.g., Excel or Word, where the Object Overview can be obtained in hardcopy format.

Object Overview

How to Invoke the Object Overview Option

There are two methods of invoking the Object Overview.

For a Single Object

Use the following navigation in the site workplace:

- Select the object required.
- Single click with the right hand mouse button to invoke the context menu.
- Select the option: **Object Overview**.

For an Application

Use the following navigation in the site workplace:

- Select the application required.
- Single click with the right hand mouse button to invoke the context menu.
- Select the option: **Reports**. This will open a sub-menu of further options.
- Select the option: **Object Overview**.

Object Overview Reports Window

The Object Overview Reports window allows you to select objects and object characteristics for multiple objects within an application to be reviewed using any one of four reporting options. If the Object Overview option has been invoked for a single object the object name will be prefilled with the selected object name.

The following Figure 3-10 illustrates the Object Overview Reports screen.
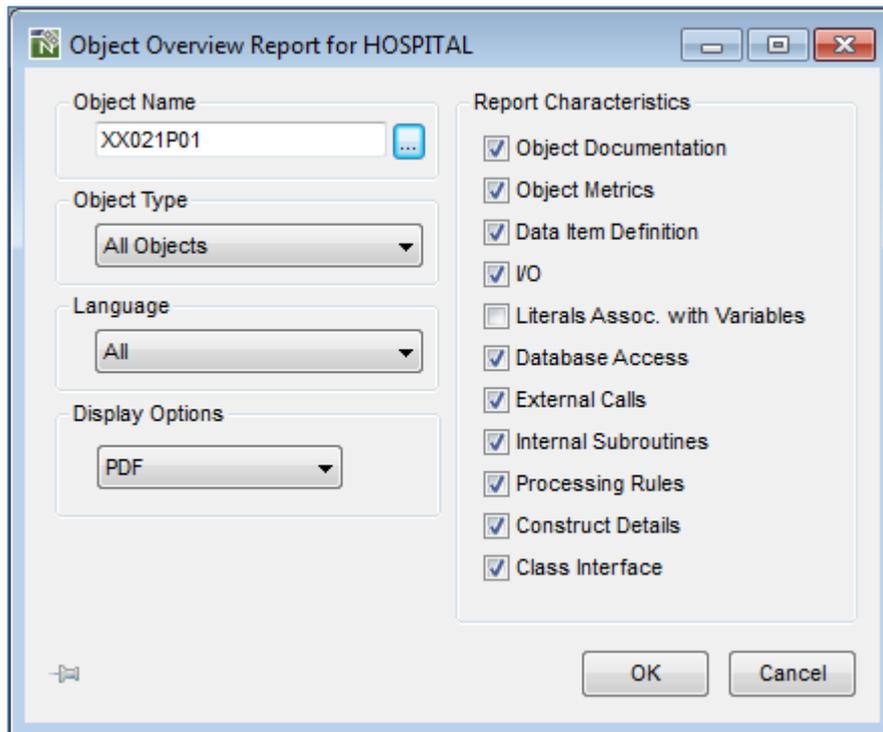
Figure 3-10 Object Overview Reports screen

SCREEN ITEMS	DESCRIPTION	
Object Name	The name of the object to be used in the report.	
	The object name can be typed in or selected by using the Object Name Selection button [….].	
	A group of objects can be selected by typing in a part name using an '*' (asterisk) wildcard. For example 'XX001*' will include all objects that are prefixed with 'XX001'.	
	All Objects can be selected by typing in a single '*' (asterisk).	
Object Type	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** ▪ **Adapters**	
Language	Allows you to select the programming language of the objects to be listed.	
	Available selections are:	
	▪ **All** ▪ **Cobol** ▪ **JCL** ▪ **Natural**	
Display Options	**HTML**	Display the report for the selected object(s) using a browser.
	Spreadsheet	Display the report for the selected object(s) using a spreadsheet.
	Word	Display the report for the selected object(s) using Word.
	PDF	Display the report for the selected object(s) using PDF.

Report Characteristics	Allows you to select, which sections are to be displayed in the reports. Sections that are displayed are indicated by a 'tick' mark. There are some system defaults which will override any user selection:

1. Header Details are always shown.

2. Data Area and Text objects will show header details only.

3. Processing Rules will be shown on Map objects only.

4. Construct Details will be shown for objects generated using Natural Construct only.

Available sections are:

Object Documentation
User specified comments for an object created via the Object Documentation option. If no User specified comments are present in the repository then any comments at the top of the object will be shown directly from the source.

For Natural Objects this will be until the first programming statement is encountered.

Note: Natural Construct 'control' statements prefixed **SAG are ignored. Natural Map Objects are also not processed.

For COBOL Objects comments are read until the ENVIRONMENT DIVISION statement is encountered.

Note: COBOL Copybooks are not processed.

No JCL Members or Procedures are processed.

Note: For more information on the Object Documentation option, refer to Chapter 3 in the Natural Engineer Application Management for Windows manual.

Object Metrics
Shows Application metrics e.g., Halstead and McCabe as shown in the Application Metrics, Object Statistics Report.

Note: If no Metrics have been generated this will be shown as "Not Available".

Note: For more information on the Object Statistics report refer to Chapter 3 in the Natural Engineer Reporting manual.

Data Item Definitions

Globals; Independents; Parameters and Locals for Natural Objects.

Note: Where parameters are within a PDA the PDA will be expanded to show all parameter definitions.

Linkage Section and Copybook Usage for COBOL Objects.

Note: Copybooks are expanded for COBOL Objects and Copybooks are sorted into their location e.g., Working Storage Division or Linkage Section.

I/O

All input and output type statements**.**

Literals Assoc. with Variables

Shows data items that are used that have literals moved to them.

If this option is selected and a single object name is shown then a further screen will be presented allowing the selection of fields to filter the resulting output. If no fields are selected then all parameter data that have literals associated with them will be shown.

Note: The heading in the report may change depending on the type of selection. For example when showing parameters and the object is COBOL then the heading in the report will be changed to Literals Associated with Linkage Section Variables.

Note: This option is not selected as default.

Database Access

All statements related to database access.

External Calls

Any statements that result in processing to be invoked in objects outside the current object. Also COBOL copybooks in the Procedure division and Natural copycodes are listed.

Internal Subroutines

Any statements that invoke internal subroutines within an object.

Processing Rules

Processing rules within a map.

Construct Details

Any Construct Model and User Exit details.

Class Interface

Any Class Property and Method details.

Pin/Unpin
If 'pinned' then the dialog will stay on the Natural Engineer workspace following the invocation of the report to allow for further selection. If 'unpinned' then the dialog will exit after the report is invoked.

BUTTON NAME	DESCRIPTION
Object Name Selection [….]	Invokes the General Selection screen, listing all the objects available for the currently selected application. *Note: For more information on the General Selection screen refer to Chapter 2 in the Concepts and Facilities manual.*
OK	Accept the selections made and invoke the Object Overview report process. If the dialog is 'pinned' then it will stay on the Natural Engineer workspace following the invocation of the report to allow for further selection. If 'unpinned' then the dialog will exit after the report is invoked.
Cancel	Cancel the Object Overview report process and close the current screen regardless of pin state.

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

Object Header Details Overview

This will show the object header details for the selected object. This information is always shown on every report.

The details shown are:

- Application.
- Object Name.
- Object Language.
- Object Type.
- Object Mode. (only for Natural objects)
- Object Save Date. (only for Natural objects)
- Object Catalog Date. (only for Natural objects)
- Total Statement Lines.
- Total Comment Lines.
- Code Generated by: Construct. (only for Natural Construct objects):

Object Characteristic Details Overview

The object characteristics that are displayed fall into three main categories:

1. **Object Documentation.**

Object Documentation	This section will always be shown for each object. It will detail any comments that have been specified using the Object Documentation function in Natural Engineer.
	For example:
	Object Documentation
	Title: XX001P01 – HOSPITAL system main menu
	Comments : This program is the main executable for the HOSPITAL system. It will display the main menu showing the main functions available.
	If no Object Documentation has been defined within Natural Engineer for an object then comments will be shown directly from the source up to the first programming statement.
	Note: For more information on the Object Documentation option, refer to Chapter 4 in the Natural Engineer Application Management for Windows manual.

Object Metrics	Shows Application metrics e.g., Halstead and McCabe as shown in the Application Metrics, Object Statistics Report.
	Note: If no Metrics have been generated this will be shown as "Not Available".
	Note: For more information on the Object Statistics report refer to Chapter 3 in the Natural Engineer Reporting manual.
	Object Metrics
	• HalLen: 51
	• HalVoc: 26
	• HalDiff: 12.47
	• HalVol: 239.72
	• HalLvl: 0.08
	• HalEff: 2988.54
	• HalTime: 166.03
	• McCabe: 2

2. **Data Item Definition.**

For Natural Objects

Globals	All external Global Data Area (GDA) objects used within the selected object will be listed. No individual global data items are shown. For example:
	DEFINE DATA
	GLOBAL USING XX000G00.
	Would be displayed as:
	Globals
	XX000G00
Independents	All Application Independent Variables (AIV) will be shown. These will be the actual data items that have been defined using the INDEPENDENT clause. For example:
	DEFINE DATA INDEPENDENT
	01 +AIV-NAME (A25).
	Would be displayed as:
	Independents
	+AIV-NAME

Parameters	Both the external Parameter Data Area (PDA) objects and/or any internally defined parameter data items specified in an object under the PARAMETER clause. The external PDA objects will be expanded to show the fields and their definitions.
	For example:
	DEFINE DATA
	PARAMETER USING XXCONPDA
	PARAMETER
	01 #EXTRA-PARM1 (A10)
	Would be displayed as:
	Parameters
	Using XXCONPDA
	01 #P-CONFIRM-UPDATE (A1)
	01 #P-OPTION (A1)
	01 #EXTRA-PARM(A10)
Local Using	All external Local Area (LDA) objects used within the selected object will be listed. No individual local data items are shown. For example:
	DEFINE DATA
	LOCAL USING XX001L01.
	Would be displayed as:
	Local Using
	XX001L01

For COBOL Objects

Linkage Section	All parameter data defined within the Linkage Section is shown. For example:
	Linkage Section
	01 TWA
	05 TWA-1ST-WORD PIC S9(8)
	05 TWA-2ND-WORD PIC S9(8)
	05 TWA-3RD-WORD PIC S9(8)
	05 TWA-4TH-WORD PIC S9(8)
	05 TWA-5TH-WORD PIC S9(8)
	05 TWA-6TH-WORD PIC S9(8)

Copybook Usage	All external copybook objects used within the working storage section and the linkage section within the selected object will be listed.
	For example:
	Copybook Usage
	Working-Storage Section
	COPYB1
	Linkage Section
	COPYB2

3. Object Procedural code details.

I/O	All input and output statements are reported. For example:
	I/O
	0020 INPUT #PARM-1 #PARM-2
	0100 INPUT USING MAP 'XX021M01'
	0190 REINPUT 'PLEASE ENTER A VALID ID'
	0330 WRITE 'FINANCIAL REPORT'
	0340 DISPLAY #EXPENDITURE 15T #TAX-VAL
	0590 PRINT 'END OF BATCH RUN'
Literals Assoc. with Variables	All data items are shown if they have literals moved to them.
	For example:
	Literals Associated with Variables
	• **#P-NUMBER**
	0250 MOVE 99999 TO #P-NUMBER
	0330 MOVE 1 TO #P-NUMBER
	If this option is selected and a single object name is shown then a further screen will be presented allowing the selection of fields to filter the resulting output. If no fields are selected then all parameter data that have literals associated with them will be shown
	Note: The heading in the report may change depending on the type of selection. For example when showing parameters and the object is COBOL then the heading in the report will be changed to Literals Associated with Linkage Section Variables.
	Note: This option is not selected as default.

Database Access	All database access statements are reported. The order is by ascending statement line number within each view name. The primary key used will also be shown. For example:
	
	Database Access
	
	    EMP1 at 0520 by FIND (Key=NAME)(EMPLOYEES)
	
	    EMP2 at 0990 by UPDATE (EMPLOYEES)
	
	    VEH1 at 0700 by STORE (VEHICLES)
	
	    VEH1 at 0740 by FIND (Key=PERSONNEL-ID)
	    (VEHICLES)
	
	    VEH1 at 0810 by READ (VEHICLES)
	
	    VEH1 at 0840 by GET (VEHICLES)

External Calls	All references to external objects, such as programs, subprograms and subroutines. Also COBOL copybooks in the Procedure division and Natural copycodes are listed.
	
	The order is by ascending statement line number within each external object. For example:
	
	External Calls
	
	    XX002P01 by FETCH at 1100
	
	    XX002P01 by FETCH at 1980
	
	    XXVALCC by INCLUDE at 2170

Internal Subroutines	Any references to internal subroutines within an object. The order is by ascending statement line number for each internal subroutine. For example:
	
	Internal Subroutines
	
	    ##DATE-FORMAT by PERFORM at 0550
	
	    ##DATE-FORMAT by PERFORM at 1020
	
	    ##TAX-CALC by PERFORM at 0700

Processing Rules	Any processing rules found within maps. Both 'Free' and 'Automatic' rules are catered for. For example:
	
	Processing Rules
	
	    Automatic Rule Rank 1 PERSONNEL-ID
	
	    Automatic Rule Rank 1 BIRTH
	
	    Free Rule Rank 0 *PF-KEY
	
	    Free Rule Rank 0 #INPUT-NAME

Construct Details	This section is only available for objects that have been generated using CONSTRUCT. It will show any Construct Model and User Exit information. For example: **Construct Details** **Model: XX-BROWSE** **User Exit LOCAL-DATA from 0300 to 0500** **User Exit START-OF-PROGRAM from 0750 to 1000** **User Exit SET-PF-KEYS from 1995 to 2115**
Class Interfaces	This section is only available for objects that are Natural class modules. It will show any Class Property and Method information. For example: **Class Interfaces** **Property O_APPLICATION** **Property O_OBJECT** **Method GET_OBJECT_PROPERTIES is C-GT011N** **Method GET_OBJECT_DEFINITIONS is C-GT012N**

Steplib Object Usage

The Steplib Object Usage option provides the facility to review object usage from steplibs across all applications loaded in the Repository.

This can be used to highlight the repercussions if you plan to modify any objects from steplibs.

For example, changing some business logic within a sub-program to suit one business application might have an adverse affect on a different business application, if the sub-program is on a steplib library and utilized by both business applications.

The Steplib Object Usage option is only available for objects that are located on a steplib library. It will be available from an application library using the steplib library and the steplib library itself, if it has been loaded into the Repository.

The Steplib Object Reference report gives more comprehensive details on where an object on a steplib has been used. This is available from the object node of an object that resides on a steplib application.

Note: When dealing with steplibbed applications, any steplib library objects referenced by the application will be automatically extracted and loaded for that application. To ensure that the Repository has a more complete picture of all your applications the steplib library should be extracted and loaded either before or after the steplibbed application.

How to Invoke the Steplib Object Usage Option

Use the following navigation in the site workplace:

- Select the object required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Steplib Object Usage**.

Steplib Object Usage Window

For the selected object, the Steplib Object Usage window displays a list of applications that use the selected steplib library object

The following Figure 3-16 illustrates the Steplib Object Usage screen.
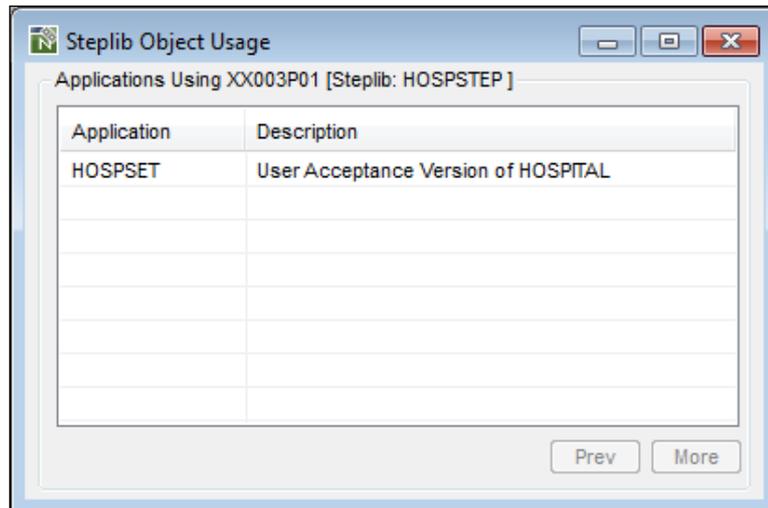
Figure 3-16 Steplib Object Usage screen

SCREEN ITEMS	DESCRIPTION
Application List	The name of the application using the selected steplib library object.
Description List	The application description.
	Note: The application description will appear only if it has been specified in the Application Properties screen. For more information refer to Chapter 2 in the Natural Engineer Application Management for windows manual.

BUTTON NAME	DESCRIPTION
Prev	Scrolls the application 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 application 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.

Entry Point Structure Diagram

The Entry Point Structure Diagram option will draw a structured diagram of an application.

This diagram will provide a pictorial view of an application showing the various inter-object activity, adding value to existing systems documentation for both development and production support tasks.

The process is initiated by defining entry points into an application, or into a technical or business function within an application, for documentation purposes, that will then be graphed in either a GenTree tree view structure, Visio or a spreadsheet e.g., EXCEL when executed.

Tree View Graphing in GenTree

The diagram starts with the entry point object and displays all other objects referenced by that object, and the objects referenced by those, and so on. The expansion of the object levels is controlled by using interactive expand [+] and collapse [-] icons on the diagram. The number of object levels is infinite.

Once an object has already been processed for an entry point and the same object is found within other entry point chains, then no further processing will be made for that object. The diagram will show the object name and be suffixed with a comment of '(Recursive)'.

Any missing objects (i.e., objects not loaded into the Repository) are shown in red with a suffix comment of '(Missing)' for Natural objects or '(Non-Natural Objects Missing)' for non-Natural objects.

Any objects that are from a steplib library are shown with a suffix comment of '(Steplib: "steplib library name")'.

Any objects referenced by objects using alphanumeric variables rather then a literal constant (known as Soft Links) are shown with a suffix comment depending on the value of the SOFTLINK-DETS setting in the TREEVIEW section of the NATENG.INI file. If set to 'Y' detailed information will be shown e.g., '(**Softlink** "variable-name")'. If set to 'N' concise information will be shown e.g., (SL).

Any objects controlled by language code functionality are shown with a suffix comment of '(**Language Obj**"variable-name").

Any external subroutines are shown with a suffix comment of the actual subroutine name used by the PERFORM statement.

It is possible to specify exclusions to prevent expansion of specified objects. Exclusions can be specified at object name and/or object type levels. Any object matching the exclusion criteria specified will be shown in red with a suffix comment of '(Excluded Object)' for object name exclusions, and '(Excluded Object Type)' for object type exclusions. Excluded objects will show no further entry point chains.

Further viewing refinements are available to display or omit any Object Documentation object titles and whether exclusions are to be displayed or omitted from the diagram.

For each Entry Point Structure Diagram, a legend of the selected options used for the diagram is shown at the top.

The Entry Point Structure Diagrams can be saved, retaining any expansions as they are being displayed at the time the save is issued. The saved diagrams can be opened in GenTree and the diagram will appear the same as it was when it was saved, with all the interactive expand and collapse options once again available.

The Entry Point Structure Diagrams can be printed and provide a 'what you see is what you get' image of what is being displayed in GenTree at the time of the print.

The complete details for an Entry Point Structure Diagram may be exported to a spreadsheet e.g., Microsoft Excel by selecting the 'Export' button.

Note: For more information on GenTree refer to Chapter 2 in the Natural Engineer Reporting manual.

Graphing in Visio

The Entry Point Structure Diagram may be displayed in a structured format in Microsoft Visio. The diagram starts with the entry point object and displays all other objects referenced by that object, and the objects referenced by those, and so on up to the number of levels specified..

If the number of levels has been reached but an object has further references then the relevant box on the diagram will be shown in blue.

Once an object has already been processed for an entry point and the same object is found within other entry point chains, then no further processing will be made for that object. The diagram will show the object name and be suffixed with a comment of '(Recursive)'.

Any missing objects (i.e., objects not loaded into the Repository) are shown in red with a suffix comment of '(Missing)'.

Any objects that are from a steplib library are shown with a suffix comment of '(Steplib: "steplib library name")'.

Any objects referenced by objects using alphanumeric variables rather then a literal constant (known as Soft Links) are shown e.g., SL: "variable-name")'.

Any objects controlled by language code functionality are shown with a suffix comment of '(Lang Obj:"variable-name").

Any external subroutines are shown with a suffix comment of the actual subroutine name used by the PERFORM statement.

Double clicking on a box will activate GenSource to display the actual source code for the object selected alongside the diagram.

It is possible to specify exclusions to prevent the further display of specified objects. Exclusions can be specified at object name and/or object type levels. Any object matching the exclusion criteria specified will not be shown on the diagram.

When graphing to VISIO there is a maximum amount of 1000 objects that may be displayed.

Note: For more information on GenSource refer to Chapter 2 in the Natural Engineer Reporting manual.

Graphing in a Spreadsheet

The Entry Point Structure Diagram may be displayed in a comma delimited format ina spreadsheet e.g., Microsoft EXCEL or OpenOffice Calc. The output starts with the entry point object and displays all other objects referenced by that object, and the objects referenced by those, and so on up to the number of levels specified.

Once an object has already been processed for an entry point and the same object is found within other entry point chains, then no further processing will be made for that object. The diagram will show the object name and be suffixed with a comment of '(Recursive)'.

Any missing objects (i.e., objects not loaded into the Repository) are shown with a suffix comment of '(Missing)'.

Any objects that are from a steplib library are shown with a comment of '(Steplib: "steplib library name")'.

Any objects referenced by objects using alphanumeric variables rather then a literal constant (known as Soft Links) are shown e.g., SL: "variable-name")'.

Any objects controlled by language code functionality are shown with a comment of '(Lang Obj:"variable-name").

Any external subroutines are shown with a comment of the actual subroutine name used by the PERFORM statement.

It is possible to specify exclusions to prevent the further display of specified objects. Exclusions can be specified at object name and/or object type levels. Any object matching the exclusion criteria specified will not be shown on the diagram.

How to Invoke the Entry Point Structure Diagram

The Entry Point Structure Diagram can be invoked in different ways:

1. Application Level or main JCL node

Use the following navigation in the site workplace:

- Select the application or main JCL node required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Entry Point Structure Diagram**.

Note: This will display the Entry Point Structure Diagram window where refinement options may be entered.

2. Object or JCL Object Level

Use the following navigation in the site workplace:

- Select the application object or JCL object required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Entry Point Structure Diagram**.

- Choose the output destination: **Tree View, Visio or Spreadsheet**.

Note: This will result in the immediate display of the Entry Point Structure Diagram for the selected object. It will bypass the Entry Point Structure Diagram window.

3. Other Options

The Entry Point Structure Diagram may also be invoked from the following Natural Engineer options:

- JCL Viewer

- Global Object Usage.

- Service Viewer.

Entry Point Structure Diagram Window

The Entry Point Structure Diagram window allows you to select the main entry points within an application.

The following Figure 3-17 illustrates the Entry Point Structure Diagram screen.
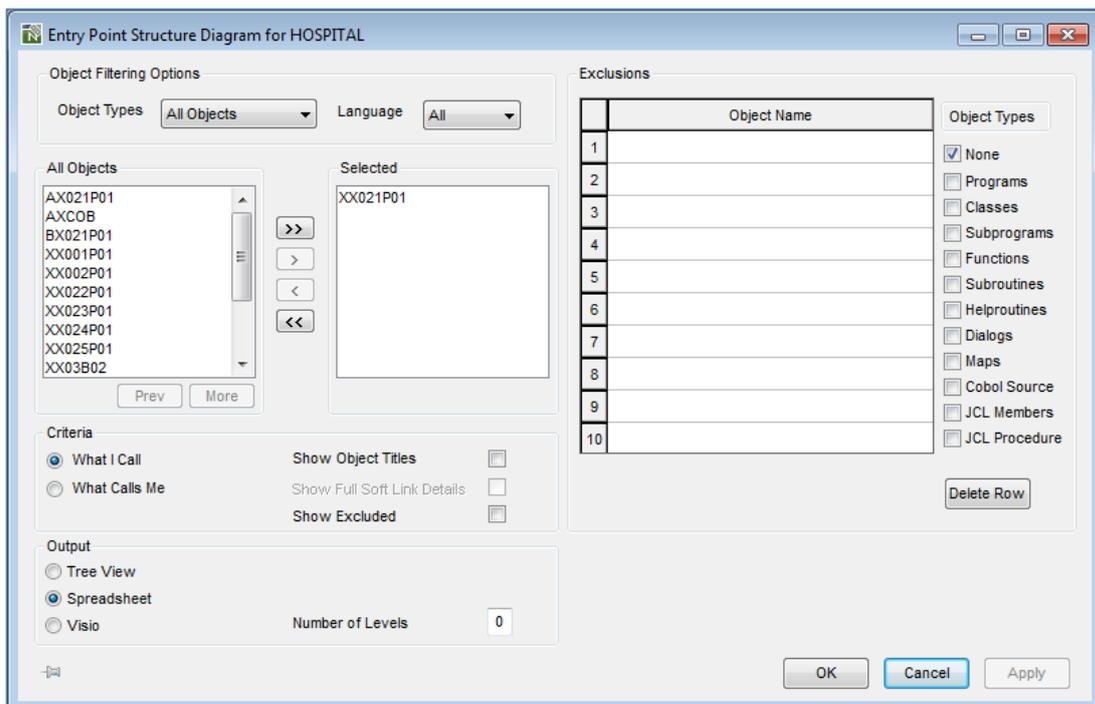
Figure 3-17 Entry Point Structure Diagram screen

SCREEN ITEMS	DESCRIPTION
Object Filtering group:	
Object Types	Allows you to select the types of object to be listed.
	Available selections are:
	▪ **All Objects**
	▪ **Programs**
	▪ **Subprograms**
	▪ **Functions**
	▪ **Subroutines**
	▪ **Dialogs**
Language	Allows you to select the programming language of the objects to be listed.
	Available selections are:
	▪ **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: There is a maximum limit of 29 objects allowed.
	Objects can be de-selected by using a double click with the **left hand mouse button**.
Criteria Options group:	
What I Call	Will display all objects that the selected entry points reference.
What Calls Me	Will display all objects that reference the selected entry points.
Show Object Titles	Controls the display of Object Documentation object titles. Available selections are:

SCREEN ITEMS	DESCRIPTION	
	'Tick'	Will display any available Object Documentation object title for each object.
		Note: Will not display if it is the default value of object name. For more information refer to Chapter 3 in the Natural Engineer Application Management manual
	' '	The Object Documentation object title will not appear on the diagram.
Show Full Soft Link Details	Controls the detail of Softlink Information to be displayed if softlinks are present. Available selections are:	
	'Tick'	Will display (**Softlink** "variable-name") if the object is a soft link.
	' '	Will display (SL) if the object is a soft link.
Show Excluded	Controls the display of Entry Point Structure Diagram exclusions. Available selections are:	
	'Tick'	Will display the excluded object on the diagram but no further relationship chain information for that object will be displayed. The object will be marked as '(Excluded Object)' for object name exclusions, and '(Excluded Object Type)' for object type exclusions.
	' '	The excluded object will not appear on the diagram.
	Note: This option is only available if exclusions have been specified.	

Note: The criteria options are only available if the output destination is Treeview or Spreadsheet.

Output group:

Tree View	Will display the report in GenTree structure.
Visio	Will display the report in Microsoft Visio.
Spreadsheet	Will display the report in a spreadsheet.
Number of Levels	If the selected output destination is Visio or Spreadsheet then the amount of levels displayed will be limited by this setting.

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:

SCREEN ITEMS	DESCRIPTION
	XX021P01 Object 'XX021P01' will be excluded. The diagram would show 'XX021P01 (Excluded Object)' and be highlighted in red.
	XX001* Any objects prefixed with 'XX001' will be excluded. The diagram would show the object name followed by the '(Excluded Object)' suffix and be highlighted in red.
Object Types	Allows you to select the types of object to be excluded.

Object type exclusions will exclude all objects for a selected object type. Selections are made using the Exclude Object Types drop-menu on the Entry Point Exclusions screen. For example:

If object type **Maps** has been selected, then any map objects found in the entry point chain will show the map object name followed by the '(Excluded Object Type)' suffix and be highlighted in red.

Note: Objects that are excluded can be displayed or omitted from the Entry Point Structure Diagram using the 'Show Excluded' option on the Entry Points screen.

Available selections are:

- **None**
- **Programs**
- **Classes**
- **Subprograms**
- **Functions**
- **Subroutines**
- **Helproutines**
- **Dialogs**
- **Maps**
- **Cobol Source**
- **JCL Members**
- **JCL Procedures**

Entry Point Structure Diagram Screen:

Pin/Unpin	If 'pinned' then the dialog will stay on the Natural Engineer workspace following the invocation of the report to allow for further selection. If 'unpinned' then the dialog will exit after the report is invoked.

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 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.
Exclusions group:	
Delete Row	Delete the object name from the selected row.
Entry Point Structure Diagram screen:	
OK	Save the selections made and invoke the Entry Point Structure Diagram process.
	If the dialog is 'pinned' then it will stay on the Natural Engineer workspace following the invocation of the report to allow for further selection. If 'unpinned' then the dialog will exit after the report is invoked.
Cancel	Cancel the Entry Point Structure Diagram process and close the current screen regardless of pin state.
Apply	Save the selections made and retain the current screen. The Entry Point Structure Diagram process is not invoked.
	Note: This button is only enabled if any changes have been made.

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

Entry Point Structure Diagram Context Menu

The Entry Point Structure Diagram 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.

Object Cross Reference Diagram

The Object Cross Reference Diagram option provides a mechanism to draw a structured diagram representing the relationships between objects, both those used by the object and those using the object.

The process is initiated by selecting an object within an application. All references of external objects are shown on the Object Cross Reference Diagram, these can include data areas, copycodes, maps, helproutines, programs, subprograms, external subroutines and dialogs. A link chain is used within the diagram to map the inter-object relationships.

The complexity of the diagram can be controlled by specifying the number of levels to be applied and/or specifying objects to be excluded.

The Object Cross Reference Diagrams are drawn and displayed using Microsoft Visio. From the diagram it is possible to view the source code of any object on the diagram using GenSource. This is invoked by simply selecting any object on the diagram.

Note: For more information on GenSource refer to Chapter 2 in the Natural Engineer Reporting manual.

The diagrams can be printed and/or saved using the functions found within Microsoft Visio, providing useful additional systems documentation that will complement existing systems specifications.

Object Cross Reference Diagram Filter Options

There are three main controlling options that will determine the content and complexity of the Object Cross Reference Diagram produced for a selected object.

1. Type of Object Relationship

There are two types of object relationship available:

1. Objects Referenced by the Object

This will start at the selected object and shows all the objects referenced by that object, and the objects referenced by those, and so on. This can be said to represent the 'Forward' relationship chain for an object

2. Objects Referencing the Object

This will start at the selected object and shows all the objects referencing that object and any respective inter-object relationship links. This can be said to represent the 'Reverse' relationship chain for an object.

Note: This relationship view will only show objects that issue calls to other objects, i.e., no data areas will be shown (unless they are the selected starting object).

2. The Number of Processing Levels

The number of processing levels will control the 'Forward' or 'Reverse' relationship chains for each object included in the diagram. The process is limited to a range of 1 to 9 levels.

To help illustrate this, the following 4 objects show their inter-object relationships within their source code.

```
PROG1                 PROG2                 PROG3                 PROG4
::::                  ::::                  ::::                  ::::
0100 FETCH 'PROG2'    0100 FETCH 'PROG4'    0100 WRITE 'HELLO     0100 FETCH 'PROG1'
::::                  ::::                  WORLD'                ::::
0300 FETCH 'PROG3                           ::::
::::
```

Using PROG1 as the starting object, the 4 objects have the following processing levels:

Level 0	PROG1
Level 1	PROG2 (called by PROG1) + PROG3 (called by PROG1)
Level 2	PROG4 (called by PROG2)

Based on this information, the Object Cross Reference Diagram content can be controlled by setting the number of levels.

The following Figure 3-18 illustrates the Object Cross Reference Diagram starting at object PROG1 with number of levels set to 1.
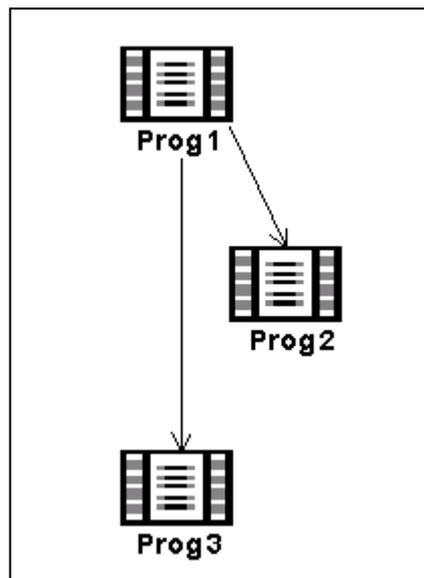
Figure 3-18 Object Cross Reference Diagram with number of levels set to 1

The Object Cross Reference Diagram shows the inter-object relationships between PROG1, PROG2 and PROG3. PROG4 is not shown as it is at the next processing level (level 2).

The following Figure 3-19 illustrates the Object Cross Reference Diagram starting at object PROG1 with number of levels set to 2.
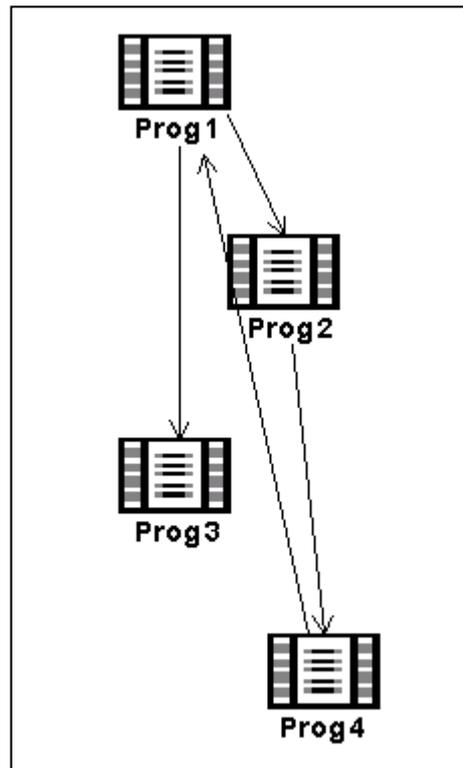
Figure 3-19 Object Cross Reference Diagram with number of levels set to 2

The Object Cross Reference Diagram shows the same inter-object relationships between PROG1, PROG2 and PROG3 as Figure 3-18. Additionally, PROG4 is now shown which also includes the relationship between PROG4 and PROG1.

3. Excluding objects

Objects can be excluded from the Object Cross Reference Diagram to help reduce the complexity and remove any inter-object relationships that may not be of any interest for the diagram being requested.

The following Figure 3-20 illustrates the Object Cross Reference Diagram starting at object PROG1 with number of levels set to 2 and Object PROG2 marked as excluded.
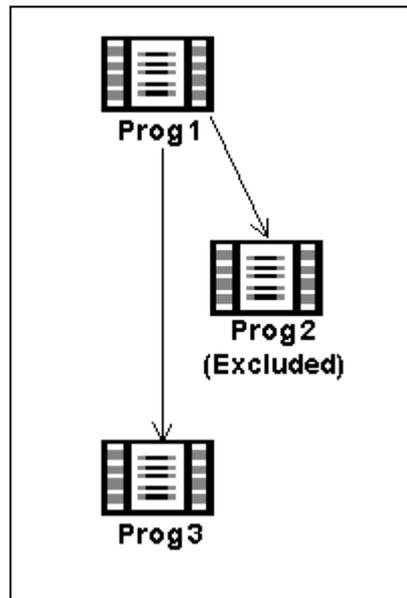
Figure 3-20 Object Cross Reference Diagram with object PROG2 marked as excluded

The Object Cross Reference Diagram does not show any processing levels from PROG2 as this has been marked for exclusion.

How to Invoke the Object Cross Reference Diagram

The Object Cross Reference Diagram can be invoked in two different ways:

1. Application Level

Use the following navigation in the site workplace:

- Select the application required.
- Single click with the right hand mouse button to invoke the context menu.
- Select the option: **Object Cross Reference Diagram**.

2. Object Level

Use the following navigation in the site workplace:

- Select the object required.
- Single click with the right hand mouse button to invoke the context menu.
- Select the option: **Object Cross Reference Diagram**.

Note: This will result in the immediate display of the Object Cross Reference Diagram for the selected object. It will bypass the Object Cross Reference Diagram window.

Object Cross Reference Diagram Window

This will invoke the Object Cross Reference Diagram screen, which controls all the diagram selection options.

The following Figure 3-21 illustrates the Object Cross Reference Diagram screen.
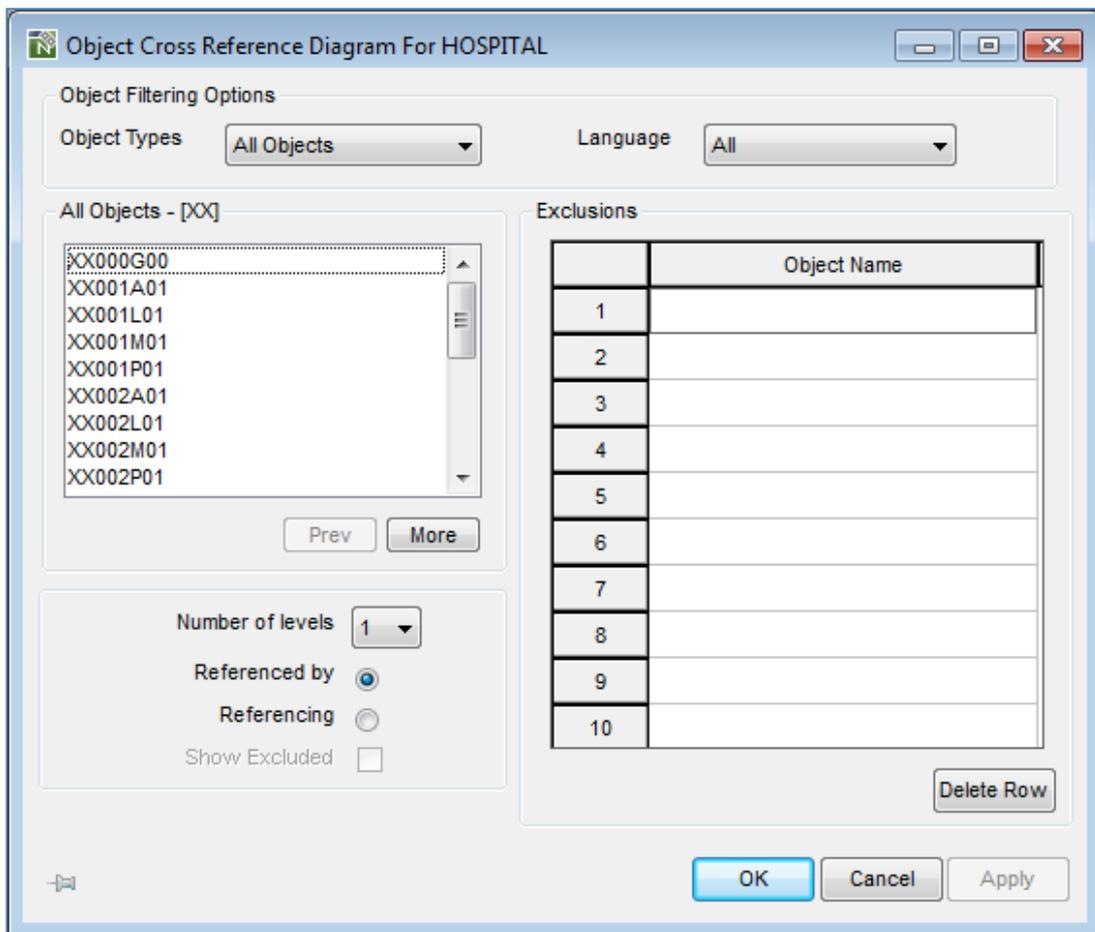
Figure 3-21 Object Cross Reference Diagram screen

SCREEN ITEMS	DESCRIPTION

Object Filtering Options group:

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

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

Available selections are:

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

Object Selection group:

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

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.

Exclusions group:

Object Name   The object name to be marked for exclusion.

The object name can be input using either a complete name or part name using an '*' (asterisk) wildcard. For example:

XX003P01   Object 'XX003P01' will be excluded.

XX001*   Any objects prefixed with 'XX001' will be excluded.

Diagram Filter Options group:

Number of levels	This will set the number of levels to be processed. Valid selections are 1 to 9.
Referenced by	This will produce a diagram displaying a forward relationship chain of all the objects being referenced starting from the selected object. The number of forward relationships is controlled by the Number of levels value.
	Note: This option is not available for object types Global Data Areas, Local Data Areas and Parameter Data Areas.
Referencing	This will produce a diagram displaying a reverse relationship chain of all the objects referencing the selected object and their respective inter-object relationship links. The number of reverse relationships is controlled by the Number of levels value.
Show Excluded	Controls the display of Object Cross Reference Exclusions. Valid selections in the check box are:

'**Tick**'	Display the excluded object on the diagram but no further relationship chain information for that object will be displayed. The object will be marked as '(Excluded)'.
' '	The excluded object will not appear on the diagram.

Note: This option is only available if exclusions have been specified.

Object Cross Reference Diagram Screen:

Pin/Unpin	If 'pinned' then the dialog will stay on the Natural Engineer workspace following the invocation of the report to allow for further selection. If 'unpinned' then the dialog will exit after the report is invoked.

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.
Exclusions group:	
Delete Row	Delete the object name from the selected row.
Object Cross Reference Diagram screen:	
OK	Save the selections made and invoke the Object Cross Reference Diagram process.
Cancel	Cancel the Object Cross Reference Diagram process and close the current screen.
Apply	Save the selections made and retain the current screen. The Object Cross Reference Diagram process is not invoked.
	Note: This button is only enabled if any changes have been made.

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

Object Cross Reference Diagram Context Menu

The Object Cross Reference Diagram 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.

Example Object Cross Reference Diagram

The following Figure 3-22 illustrates the Object Cross Reference Diagram for object XX001P01 from the HOSPITAL system.
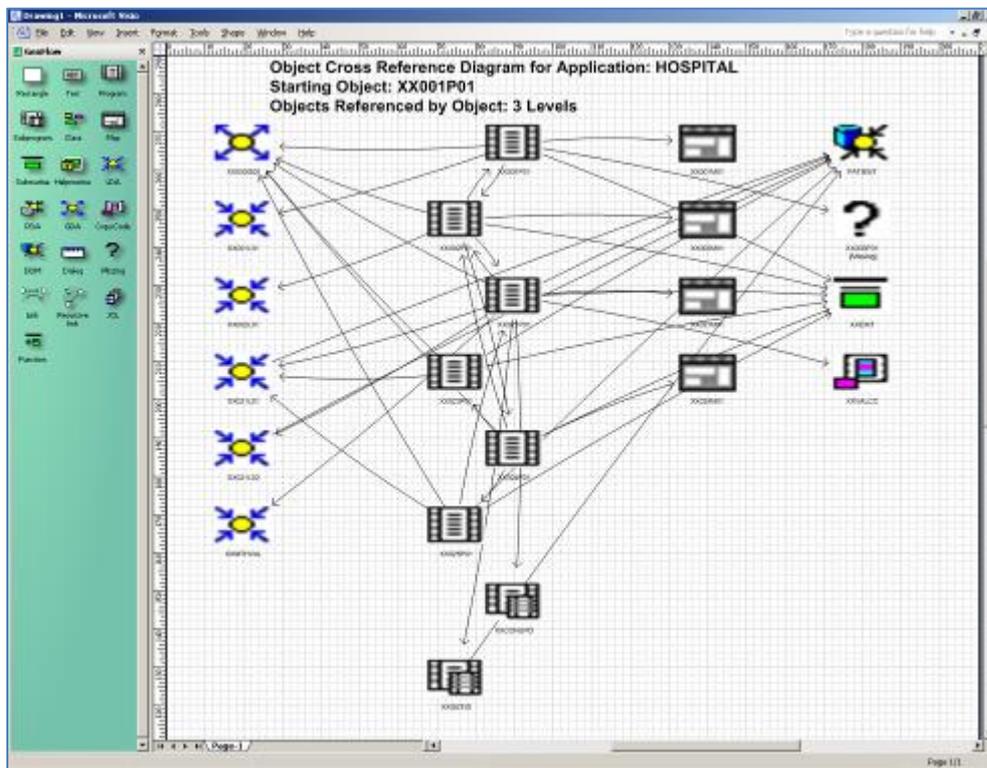
Figure 3-22 Object Cross Reference Diagram

The Object Cross Reference Diagram shows the objects referenced by object, starting from object XX001P01 for 3 levels. To the left of the diagram is the GenFlow.vss stencil showing all the shapes available for each object within a diagram.

The GenFlow.vss stencil can be located in the DATA\VSD folder of the Natural Engineer installation.

3 Natural Engineer Application Management

The source code for an object can be viewed using GenSource, which is invoked by selecting any object on the diagram and using a double-click of the left-hand mouse button.

Note: For complex diagrams where link lines and object texts are difficult to distinguish, the diagrams can be re-organized by dragging and dropping selected objects.

Internal Object Logic (JSP) Diagram

The Internal Object Logic (JSP) Diagram option provides a mechanism to document the internal processing logic of an object in a structured diagram.

The diagrams produced can provide useful additional systems documentation that will complement existing systems specifications and can be viewed either on-line or as hardcopy by printing the diagrams.

The Internal Object Logic (JSP) Diagram option uses the standards laid down by the Jackson Structured Programming technique (JSP) to handle the three main processing constructs within a programming object:

1. Sequential

Standard statements that can stand alone within an object. Examples of these for Natural would be:

> MOVE #A TO #B
>
> RESET #CALL-PROGRAM
>
> MULTIPLY #NET-AMOUNT BY #TAX-RATE GIVING #GROSS-AMOUNT

2. Conditional

Conditional statements that will execute sequential statements based on the condition controlling them. Examples of these for Natural would be:

> IF / END-IF AND IF / ELSE blocks
>
> DECIDE ON FIRST/EVERY CONDITION
>
> DECIDE FOR FIRST/EVERY VALUE

3. Iteration

Repeating statements that are in a controlled loop and execute until the loop control condition has been satisfied. Examples of these for Natural would be:

> READ, FIND, HISTOGRAM
>
> REPEAT WHILE / UNTIL
>
> FOR /END-FOR statement blocks

The Internal Object Logic (JSP) Diagrams are drawn and displayed using Microsoft Visio. When the diagram has been completed, GenSource is activated to display the actual source code for the object alongside the diagram.

3 **Natural Engineer Application Management**

There is a Navigation link between the Internal Object Logic (JSP) Diagram and the source code shown in GenSource, whereby selecting any box within the diagram will position at the respective source code within GenSource. Alternatively, selecting any source code line within GenSource will position you to the respective box within the Internal Object Logic (JSP) Diagram. This assists in maintaining position within either a simple or complex diagram far more productive and makes the understanding of the logic flow easier to follow.

Note: For more information on GenSource refer to Chapter 2 in the Natural Engineer Reporting manual.

Within the Microsoft Visio, a page can be found for the object that has been selected and drawn. The object name will be shown in a tab at the foot of the page. If the selected object uses any internal subroutines or paragraphs, then a page for each internal subroutine/paragraph referenced will also be drawn. For these, the name placed in the tab will be the name referenced within the object prefixed by 'SR:' for a section or 'PR:' for a paragraph.

How to Invoke the Internal Object Logic (JSP) Diagram

The Internal Object Logic (JSP) Diagram can be invoked in two different ways:

1. Application Level

Use the following navigation in the site workplace:

- Select the application required.
- Single click with the right hand mouse button to invoke the context menu.
- Select the option: **Internal Object Logic (JSP) Diagram**.

2. Object Level

Use the following navigation in the site workplace:

- Select the object required.
- Single click with the right hand mouse button to invoke the context menu.
- Select the option: **Internal Object Logic (JSP) Diagram**.

Note: This will result in the immediate display of the Internal Object Logic (JSP) Diagram for the selected object. It will bypass the Internal Object Logic (JSP) Diagram window.

Internal Object Logic (JSP) Diagram Window

This will invoke the Internal Object Logic (JSP) Diagram screen, which controls all the diagram selection options.

The following Figure 3-23 illustrates the Internal Object Logic (JSP) Diagram screen.
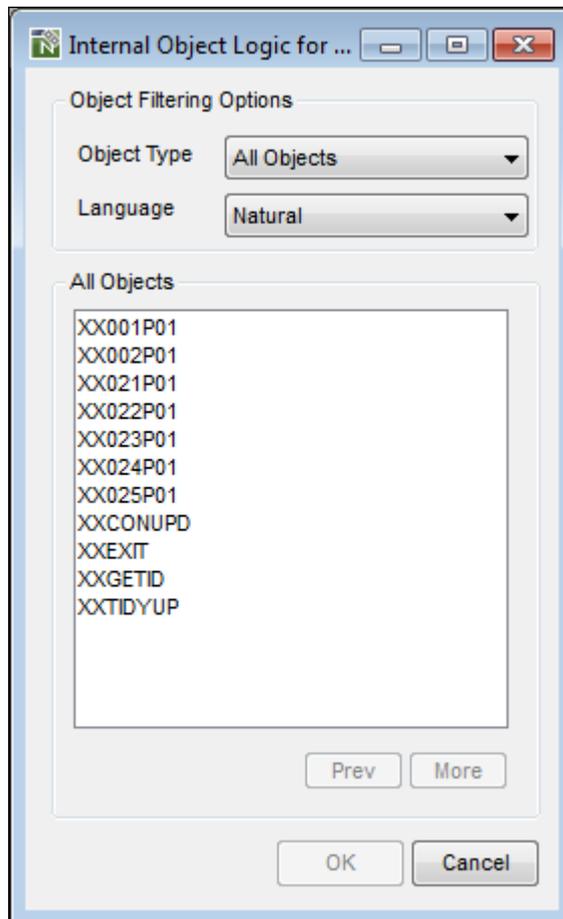
Figure 3-23 Internal Object Logic (JSP) Diagram screen

SCREEN ITEMS	DESCRIPTION

Object Filtering group:

Object Types

Allows you to select the types of object to be listed. Available selections are:

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

Language

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

Available selections are:

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

Object Selection group:

Object List

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

Note: Only object types of Dialog, Helproutine, 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.

BUTTON NAME	DESCRIPTION

Object Selection 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.

Internal Object Logic (JSP) Diagram screen:

BUTTON NAME	DESCRIPTION
OK	Accept the selections made and invoke the Internal Object Logic (JSP) Diagram process.
Cancel	Cancel the Internal Object Logic (JSP) Diagram 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.

Internal Object Logic (JSP) Diagram Context Menu

The Internal Object Logic (JSP) Diagram 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.

Viewing the Internal Object Logic (JSP) Diagram

Once an object has been selected from the Internal Object Logic (JSP) Diagram screen, Natural Engineer will proceed to invoke Microsoft Visio. A progress status window will open to show how Natural Engineer is progressing in creating the diagram. Once completed, the diagram will appear as a page in Microsoft Visio and the source code for the object will be displayed in a GenSource window.

The following Figure 3-25 illustrates the completed Internal Object Logic (JSP) Diagram in Microsoft Visio and the source code in GenSource window.
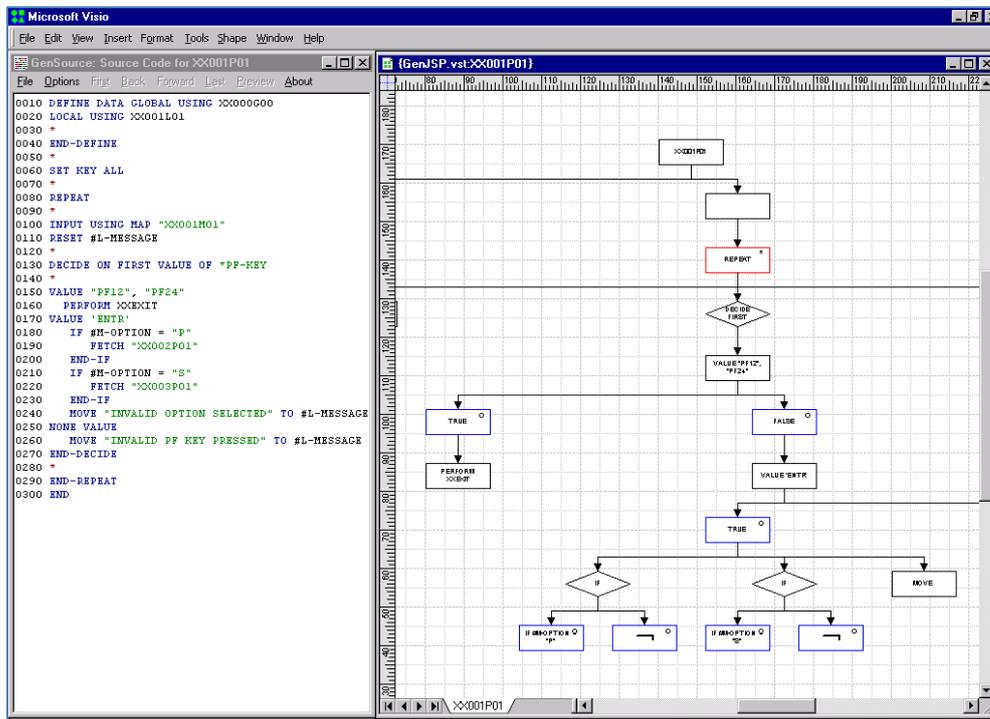
Figure 3-25 Completed Internal Object Logic (JSP) Diagram and GenSource window

Stencils and Shapes

The Internal Object Logic (JSP) Diagram is drawn in Microsoft Visio using the shapes found in the GenJSP.vss stencil. This can be located in the DATA\VSD folder of the Natural Engineer installation.

Each shape depicts the JSP standard representation for the main processing constructs within a programming object.

The following describes the shapes used based on the three main processing constructs.

1. Sequential

Sequential statements that can stand alone within an object use a rectangle shape.

Example statement:

MOVE #A TO #B

The following Figure 3-26 illustrates the shape used for sequential code.

Figure 3-26 Shape for sequential code

2. Conditional

Conditional statements will execute sequential statements based on the condition controlling them. These will use a series of shapes to show the conditional statement and the conditional branches (TRUE for when the condition has been matched and FALSE for when the condition has not been matched). A diamond shape is used for the conditional statement. A blue rectangle shape is shown for the TRUE branch and a blue rectangle shape with a logical not symbol ($\neg$) is shown for the FALSE branch. Both blue rectangles will have a circle in top right hand corner.

 Example statements:

IF #OPTION = 1

DECIDE ON FIRST VALUE OF #OPTION

The following Figure 3-27 illustrates the shape used for the conditional statement.
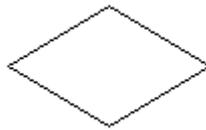
Figure 3-27 Shape for conditional statement

The following Figure 3-28 illustrates the shape used for the TRUE branch of a conditional statement.

Figure 3-28 Shape for TRUE branch of a conditional statement

The following Figure 3-29 illustrates the shape used for the FALSE branch of a conditional statement.
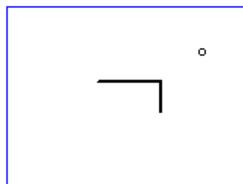
Figure 3-29 Shape for FALSE branch of a conditional statement

3. Iteration

Repeating statements that are in a controlled loop use a red rectangle and will have an asterisk in top right hand corner.

Example statements:

REPEAT UNTIL #INDEX GT 99

READ EMPLOYEES

FOR #LOOP-START EQ 1 TO 10

The following Figure 3-30 illustrates the shape used for iteration statements.

Figure 3-30 Shape for iteration statements

Object Documentation

The Object Documentation option allows users to specify and save information on each object within an Application. This provides useful system documentation within Natural Engineer, complementing the source code information stored on the Repository. The information that can be stored for each object falls into three main categories:

1. **Object Title**

   An object title can be specified. The default is the object name and in the case of CONSTRUCT or PREDICT generated objects, an indication of the code generator. The input is in free format style allowing a maximum of 70 characters to be input. Standard PC Copy, Paste and Cut functions are available.

2. **Comments**

   These comments can be specified as required to provide detailed information on the object, such as: the function or functions performed, any database or flat file access, runtime considerations etc. The input is in free format style allowing a maximum of 250 lines of 70 characters per line. It is possible to import the 'real' object comments found at the top of an object (i.e., or Natural Objects before the first Natural statement or for COBOL Objects before the Environment Division). Standard PC Copy, Paste and Cut functions are available.

3. **Extended Documentation**

   External documents can be attached to an object to provide further information on the object. This is done by specifying the path name for the document. The path name may point to an external file or a URL (if prefixed by http://).

   It is also possible to specify a default common path name within Global Properties. This may be of unlimited length and may be referenced by DP.

Keywords can be added to each object, to help group related objects together, providing easier reviewing and maintenance. For example: the program, map and subprogram used for adding an employee record could all have the keywords ADD EMPLOYEE specified. A search with these keywords would result in the 3 objects being listed together.

The Object Documentation for each object within an Application is stored on the Repository. It is also possible to save the Object Documentation as a PC text format file, enabling common Object Documentation to be applied across many Applications using the same objects, or re-applied in the event of a re-extract and re-load of an Application.

Object Documentation can be removed from the complete Application, a range of objects or a single object.

There are two versions of the Object Documentation window available:

1. Application level

This version of the Object Documentation window handles all the objects within an application.

2. Object level

This version of the Object Documentation window handles one single object within an application.

Application Level Object Documentation Window

How to Invoke the Application Level Object Documentation Window

Use the following navigation in the site workplace:

- Select the application required.
- Single click with the right hand mouse button to invoke the context menu.
- Select the option: **Object Documentation**.

Application Level Object Documentation Window

All the available Object Documentation functions are controlled from the Object Documentation screen.

The following Figure 3-37 illustrates the application level Object Documentation screen.
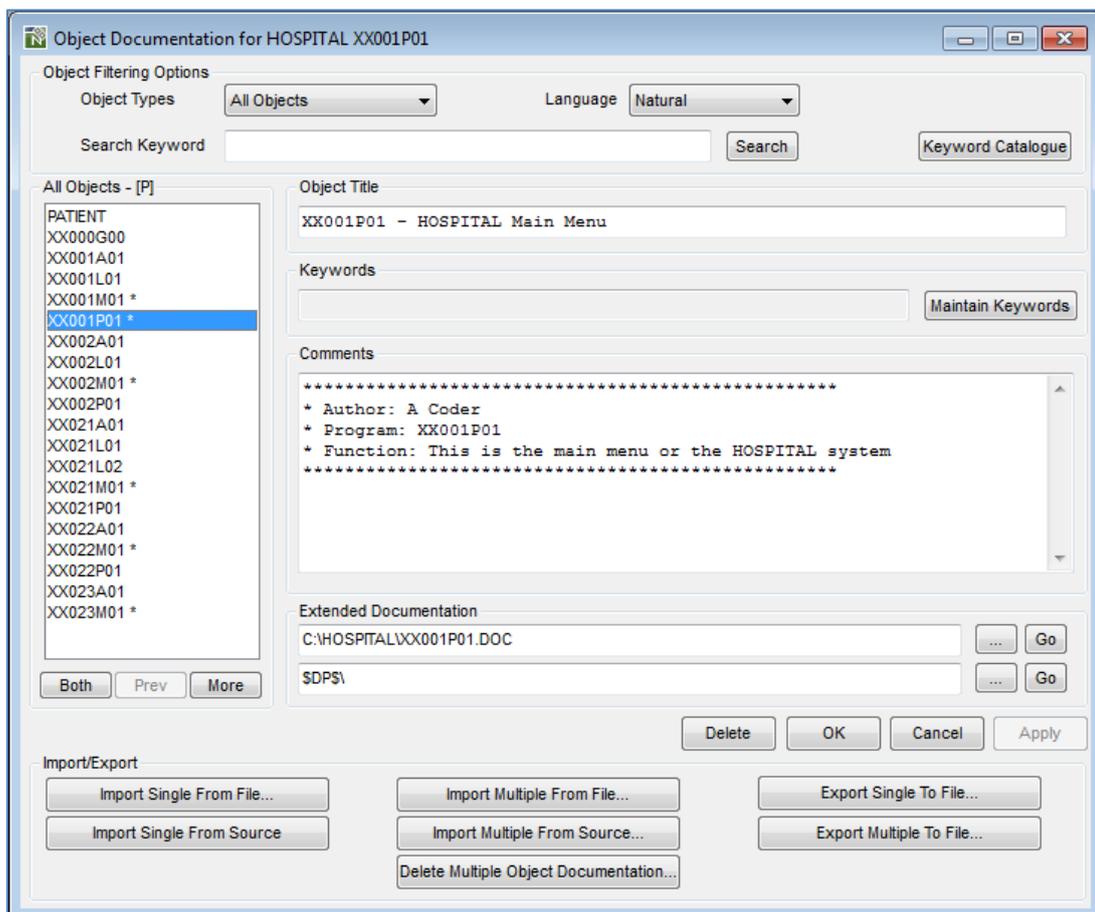
Figure 3-37 Application level Object Documentation screen

SCREEN ITEMS	DESCRIPTION
Object Types	Allows you to select the types of object to be listed.
Language	Allows you to select the programming language of the objects to be listed. Available selections are: • **All** • **Cobol** • **JCL** • **Natural**
Search Keyword	Allows you to input search keywords to refine the list of objects displayed in the Object list. The search keywords associated with an object need to be manually added by using the Maintain Keywords button.
Object List	List of all the objects used by the currently selected application. 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 View menu and the Search Keyword function found in the Object Filtering Options group. The Object List title reflects the Object Types being listed and will append any reposition values that may have been specified. It is possible to navigate between the Object Documentation screen and the Object Viewer or Object Reference screens by using the **right hand mouse button** on a selected object. Any objects that have search keywords specified will have an asterisk (*) after the object name.
Object Title	Provides the input of an object title. The default is the object name and in the case of CONSTRUCT or PREDICT generated objects, an indication of the code generator. The input is in free format style allowing a maximum of 70 characters to be input. Standard PC Copy, Paste and Cut functions are available. Some examples: **XX001P01** **CON001P1 (Generated by Construct)** **PREDP01 (Generated by Predict)** **ABC00G01 – Global Data Area**

SCREEN ITEMS	DESCRIPTION
Keywords	List of search keywords that have been specified for the object.
	Up to 20 search keywords may be added by using the Maintain Keywords button.
	NB: When Object Documentation is saved a default *ALL* keyword is added. This allows any 'orphaned' documentation to be identified by using the Keyword Catalogue.
Comments	Provides the ability to input any required object comments to document the object. The input is in free format style allowing a maximum of 250 lines, each of which can have a maximum of 70 characters to be input. Standard PC Copy, Paste and Cut functions are available. For example:
	This program calculates the Tax value required for each sale based on a table of tax rates. The base rate is 12.25%.
Extended Documentation	Provides the ability to specify a location of any supporting documentation that you wish to associate with the object. For example: Program specification, execution instructions.
	The location can be typed in, or selected by the Extended Description Selection button [….]. It may point to a file or a URL (if prefixed by http://).
	Specifying DP will substitute the value of the Object Documentation Common Path which may be specified in Global Properties.

BUTTON NAME	DESCRIPTION
Object Filter group:	
Search	Invoke a search of all the objects within the selected application to find any objects that have matching search keywords.
Keyword Catalogue	Invokes the Keyword Catalogue screen to search for related objects.
	Note: For more information on the Keyword Catalogue refer to Chapter 6 in the Natural Engineer Utilities for Windows manual.
Keywords group:	
Maintain Keywords	Invokes a screen to add/maintain up to 20 search keywords. These keywords may be used to group related objects which can then be identified via the Keyword Catalogue.

BUTTON NAME	DESCRIPTION
Object List group:	
Both	This button enables the object list to be refined to either show all objects whether they have Object Documentation saved or not. The default for the screen is 'Both'. Once selected it rotates through the next 2 options described below.
N Doc	The object list shows only the objects that have no Object Documentation saved.
Doc O	The object list shows only the objects that have Object Documentation saved.
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.

Extended Description group:

Extended Documentation Selection [….]	Invokes the standard Windows 'Open File' dialog, where the documentation can be selected.
Go	Will open the specified file using the appropriate program associated with the file extension of the document.
	For example XX001P01_Spec.doc would be opened by MS Word.
	Note: This button is only enabled if a specified file is present.

Object Documentation screen:

Data Model Relationships	Will invoke the <u>Data Model Relationships</u> screen to allow the definition of relationships between DDMs.
	Note: This is only available if a DDM has been selected.
Delete	Delete the Object Documentation comments for the current selected object only.
OK	Save changes and close the current screen.
Cancel	Cancel the Object Documentation process and close the current screen.
Apply	Save changes and retain the current screen.
	Note: This button is only enabled if any changes have been made.

Import/Export group:

Import Single from File…	Any previously saved Object Documentation comments held in PC text format files with file extension .CMT that can be imported for the currently selected object. This option will only perform the import for one single object and is only available when an object has been selected.
Import Single from Source	Provides the ability to import the object comments from the selected object source code. The object comments are for Natural Objects any comments found before the first Natural statement within an object and for COBOL Objects any comments found before the Environment Division. This option will only perform the import for one single object and is only available when an object has been selected.
Import Multiple from File…	Provides the same function as Import Single from File, except that it can be applied to a range of selected objects.
Import Multiple from Source…	Provides the same function as Import Single from Object Source, except that it can be applied to a range of selected objects.
Delete Multiple Object Documentation…	Delete multiple Object Documentation comments from within an application. Objects can be selected as required and deletion is executed in a single operation.

Export Single to File…	Provides the ability to export (save) Object Documentation comments to a PC text format file with a file extension of .CMT. This option will only perform the export for one single object.
Export Multiple to File…	Provides the same function as Export Single to File, except that it can be applied to a range of selected objects.

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

Application Level Object Documentation Context Menus

The context menus are invoked by placing the cursor within the Object list, Object Title or Comments screen items and using the right hand mouse button with a single click.

CONTEXT MENU ITEM	DESCRIPTION
Object List:	
Object Reference	Invoke the Object Reference screen.
Object Viewer	Invoke the Object Viewer screen.
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 Title / Comments group:	
Undo	Undo last action.
Cut	Copy the selected data to the clipboard.
Copy	'Cut' out selected data (delete) to the clipboard.
Paste	Paste clipboard data to selected input position.
Delete	Delete selected data.
Select All	Select all the available data.

Object Level Object Documentation Window

How to Invoke the Object Level Object Documentation Window

Use the following navigation in the site workplace:

- Select the object required.
- Single click with the right hand mouse button to invoke the context menu.
- Select the option: **Object Documentation**.

Object Level Object Documentation Window

All the available Object Documentation functions are controlled from the Object Documentation screen.

The following Figure 3-38 illustrates the object level Object Documentation screen.
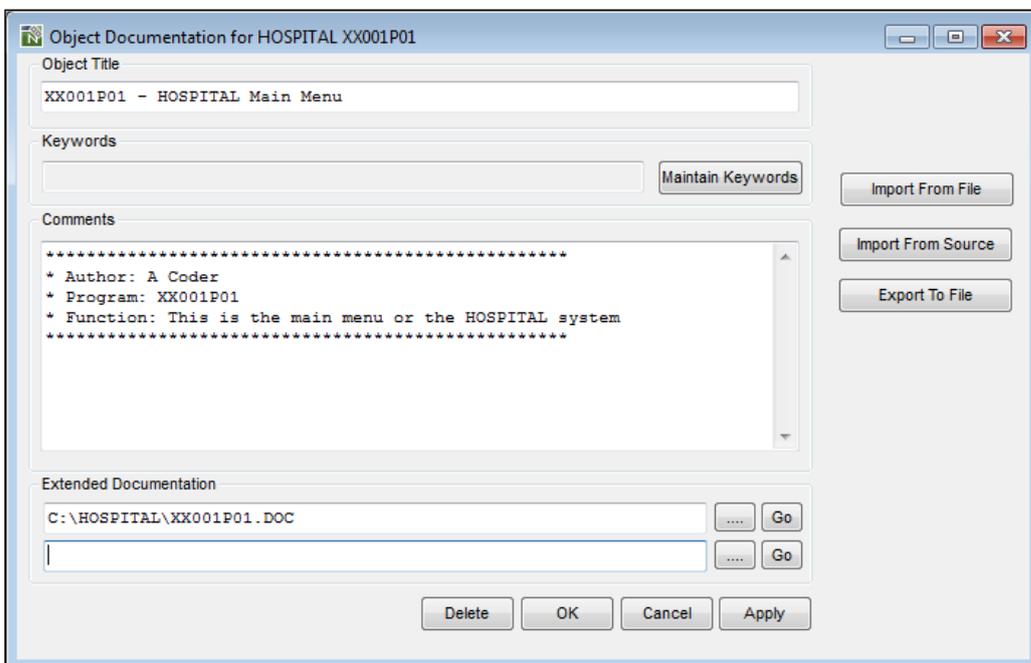
Figure 3-38 Object level Object Documentation screen

SCREEN ITEMS	DESCRIPTION
Object Title	Provides the input of an object title. The default is the object name and in the case of CONSTRUCT or PREDICT generated objects, an indication of the code generator. The input is in free format style allowing a maximum of 70 characters to be input. Standard PC Copy, Paste and Cut functions are available. Some examples: **XX001P01** **CON001P1 (Generated by Construct)** **PREDP01 (Generated by Predict)** **ABC00G01 – Global Data Area**
Keywords	List of search keywords that have been specified for the object. The search keywords need to be input manually by using the Maintain Keywords button.
Comments	Provides the ability to input any required object comments to document the object. The input is in free format style allowing a maximum of 250 lines, each of which can have a maximum of 70 characters to be input. Standard PC Copy, Paste and Cut functions are available. For example: **This program calculates the Tax value required for each sale based on a table of tax rates. The base rate is 12.25%.**
Extended Documentation	Provides the ability to specify a location of any supporting documentation that you wish to associate with the object. For example: Program specification, execution instructions. The location can be typed in, or selected by the Extended Description Selection button [….]. Specifying DP will substitute the value of the Object Documentation Common Path which may be specified in Global Properties.

BUTTON NAME	DESCRIPTION
Extended Documentation group:	
Extended Documentation Selection […]	Invokes the standard Windows 'Open File' dialog, where the documentation can be selected.
Go	Will open the specified file using the appropriate program associated with the file extension of the document.
	For example XX001P01_Spec.doc would be opened by MS Word.
	Note: This button is only enabled if a specified file is present.
Keywords group:	
Maintain Keywords	Invokes a screen to add/maintain up to 20 search keywords. These keywords may be used to group related entities which can then be identified via the Keyword Catalogue.
	NB: For further information on the Keyword Catalogue please refer to Chapter 6 of the Natural Engineer Utilities Manual.
Object Documentation screen:	
Data Model Relationships	Will invoke the <u>Data Model Relationships</u> screen to allow the definition of relationships between DDMs.
	Note: This is only available if a DDM has been selected.
Delete	Delete the Object Documentation comments for the current selected object only.
OK	Save changes and close the current screen.
Cancel	Cancel the Object Documentation process and close the current screen.
Apply	Save changes and retain the current screen.
	Note: This button is only enabled if any changes have been made.
Import / Export group:	
Import from File…	Any previously saved Object Documentation comments held in PC text format files with file extension .CMT that can be imported for the currently selected object. This option will only perform the import for one single object and is only available when an object has been selected.
Import from Source	Provides the ability to import the object comments from the selected object source code. The object comments are for Natural Objects any comments found before the first Natural statement within an object or for COBOL Objects any comments found before the Environment Division. This option will only perform the import for one single object and is only available when an object has been selected.

BUTTON NAME	DESCRIPTION
Export to File…	Provides the ability to export (save) Object Documentation comments to a PC text format file with a file extension of .CMT. This option will only perform the export for one single object.

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

Object Level Object Documentation Context Menus

The context menus are invoked by placing the cursor within the Object Title or Comments screen items and using the right hand mouse button with a single click.

CONTEXT MENU ITEM	DESCRIPTION
Object Title / Comments group:	
Undo	Undo last action.
Cut	Copy the selected data to the clipboard.
Copy	'Cut' out selected data (delete) to the clipboard.
Paste	Paste clipboard data to selected input position.
Delete	Delete selected data.
Select All	Select all the available data.

Multiple Object Selection Window

The Multiple Object Selection screen is a common screen that is presented whenever an option is selected for Multiple objects. It provides the facility to select the objects required for the desired function.

The options that invoke the Multiple Object Selection screen are:

- Import Multiple from File.

- Import Multiple from Source.

- Export Multiple to File.

- Delete Multiple Object Documentation.

The only variation to this screen is the title displayed in the title bar, which will contain reference to the option that has invoked this screen. All screen functionality is identical for all options.

One of the variations of the Multiple Object Selection screen is now illustrated. The subsequent screen description is only shown once, but equally applies to all variations.

The following Figure 3-39 illustrates the Multiple Object Selection screen for the Import Multiple from File option.
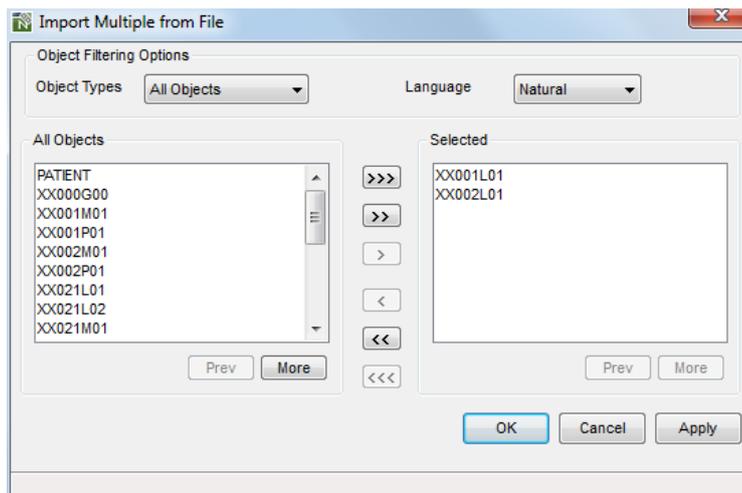
Figure 3-39 Multiple Object Selection screen for Import Multiple from File option

SCREEN ITEMS	DESCRIPTION
Object Types	Allows you to select the types of object to be listed. The list will be tailored depending on what type of object is in your application.

Possible selections are:

- **All Objects**
- **Programs**
- **Classes**
- **Subprograms**
- **Functions**
- **Subroutines**
- **Copycodes**
- **Helproutines**
- **Dialogs**
- **Maps**
- **Local Data Areas**
- **Global Data Areas**
- **Parameter Data Areas**
- **Adapters**
- **Cobol Source**
- **Cobol Copybooks**
- **JCL Members**
- **JCL Procedures**
- **JCL Includes**

Language	Allows you to select the programming language of the objects to be listed. The list will be tailored depending on what type of language the objects are in your application.

Possible selections are:

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

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

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 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**.

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SCREEN ITEMS	DESCRIPTION
Selected	Lists all the objects that have been selected for the current function.
	Objects can be de-selected by using a double click with the **left hand mouse button**.

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.

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 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 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.

Multiple Object Selection screen:

OK	Accept the selections made, invoke the selected Multiple Object process and close the current screen.
Cancel	Cancel the Multiple Object Selection process and close the current screen.
Apply	Accept the selections made, invoke the selected Multiple Object process and retain the current screen. *Note: This button is only enabled if any changes have been made.*

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 Multiple Object Selection processing messages.

Saving Object Documentation Comments to a PC text format file

It is possible to save any Object Documentation comments to a PC text format file. These files can then be used to 'import' the comments, updating the objects within an application in a single operation.

This can be used where common objects span across many applications and the Object Documentation comments only need to be specified once, saved and then reused using either the Import Single from File or Import Multiple from File options from the Options drop-menu on the Object Documentation screen.

Alternatively, comments can be saved for an application and then imported after any subsequent re-extract and load executions applied to the same application.

The saved files are located by default, in the Natural Engineer Data folder.

The PC text format file holds records of up to 71 bytes in length for each of the Object Title and Comments detail lines present per object. The Format of each record is:

Byte 1	One-byte control character indicating the type of record. Valid values are:
	H Header information. This will be the Object name. There will be one header per object.
	T The data present in the Object Title line. There will be 1 per object.
	C The data present in the Comments lines. There can be 1-50 of these per object.
	K The data present in the Keywords line. There will be 1 per object.
	E The data present in the Extended Documentation line. There will be 1 per object.
	2 The data present in the Second Extended Documentation line. There will be 1 per object.
Bytes 2-71	Contains the free format text input on the Object Documentation screen.

When the file is saved, a file extension of .CMT is used. The file name defaults to one of two formats, depending on whether the data is being saved for a single object or multiple objects. The default formats are:

1. **Export Single to File.**

    Default file name of **aaaaaaaa_ooooooo.CMT** is presented, where **aaaaaaaa** is the application name, and **ooooooo** is the single object that has been selected.

    For Example:

    From the **HOSPITAL** application, object **XX001P01** has had the following comments specified:

    Object Title = XX001P01

Keywords = MAIN MENU

Comments =

```
*********************************************************************

Author          : A. Coder

Date created    : 01/02/2001

Function        : Main Menu Program for the HOSPITAL system.

*********************************************************************
```

Extended Documentation = C:\HOSPITAL\XX001P01_Spec.doc

These are to be saved to file.

The default file name will be **HOSPITAL_XX001P01.CMT**.

The following Figure 3-43 illustrates the save file screen for Export Single to File function.
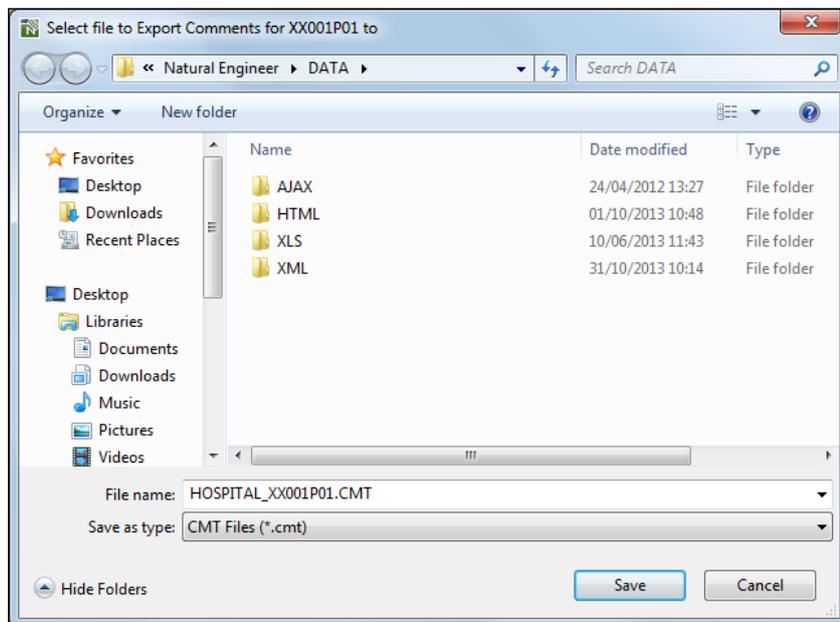
Figure 3-43 Save file screen for Export Single to File function.

The HOSPITAL_XX001P01.CMT records are:

```
HXX001P01
TXX001P01
C***********************************************************************
CAuthor          : A. Coder
CDate created    : 01/02/2001
CFunction        : Main Menu Program for the HOSPITAL system.
C***********************************************************************
KMAIN MENU
EC:\HOSPITAL\XX001P01_Spec.doc
```

2. **Export Multiple to File.**

Default file name of **aaaaaaaa.CMT** is presented, where **aaaaaaaa** is the application name.

For Example:

From the **HOSPITAL** application, objects **XX001L01, XX00M01** and **XX001P01** have had the following comments specified:

Object Title = XX001L01

Comments =
```
***********************************************************************
Author         : A. Coder
Date created   : 01/02/2001
Function       : Main Menu Local Data Area for the HOSPITAL system.
***********************************************************************
```

Object Title = XX001M01

Comments =
```
***********************************************************************
Author         : A. Coder
Date created   : 01/02/2001
Function       : Main Menu Map for the HOSPITAL system.
***********************************************************************
```

Object Title = XX001P01

Comments =
```
***********************************************************************
Author         : A. Coder

Date created   : 01/02/2001

Function       : Main Menu Program for the HOSPITAL system.

***********************************************************************
```

These are to be saved to file.

The default file name will be **HOSPITAL.CMT**.

The following Figure 3-44 illustrates the save file screen for Export Multiple to File function.
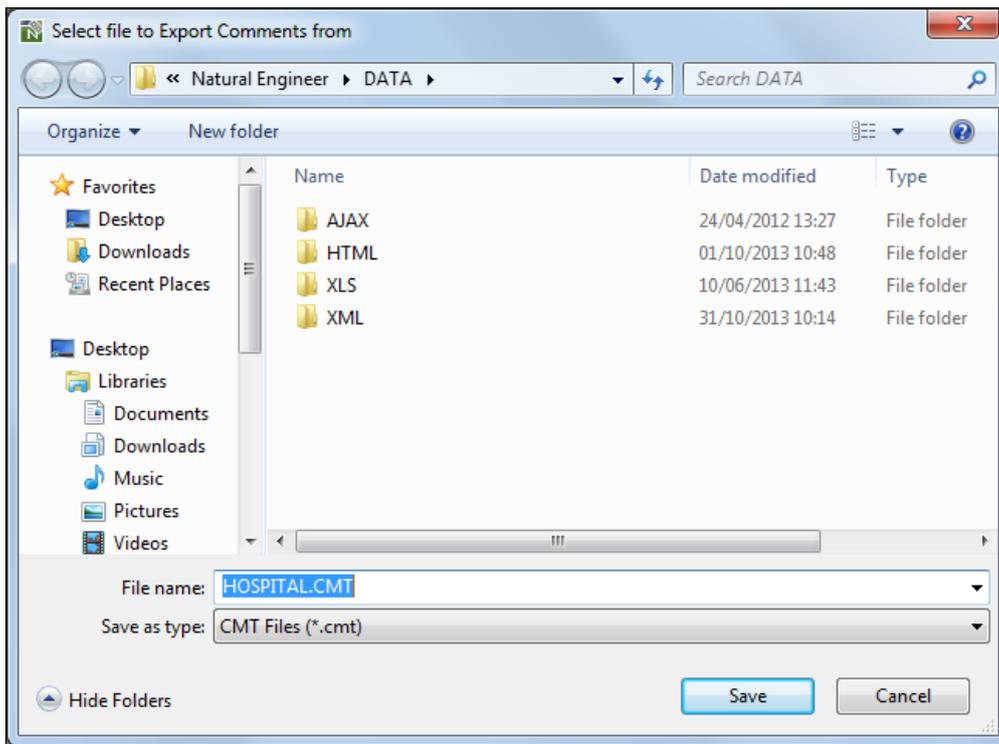
Figure 3-44 Save file screen for Export Multiple to File function.

The HOSPITAL.CMT records are:

```
HXX001P01
TXX001P01
C**********************************************************************
CAuthor          : A. Coder
CDate created    : 01/02/2001
CFunction        : Main Menu Program for the HOSPITAL system.
C**********************************************************************
HXX001M01
TXX001M01
C**********************************************************************
CAuthor          : A. Coder
CDate created    : 01/02/2001
CFunction        : Main Menu Map for the HOSPITAL system.
C**********************************************************************
HXX001L01
TXX001L01
C**********************************************************************
CAuthor          : A. Coder
CDate created    : 01/02/2001
CFunction        : Main Menu Local Data Area for the HOSPITAL system.
C**********************************************************************
```

In each of these two cases, the file name may be overwritten to meet individual site standards, but the file extension must not be changed from .CMT, otherwise the Object Documentation import function will not locate the file.

Object Documentation Log Files

Several of the Object Documentation functions provide log files detailing the processing that has been executed for that function. These Log files are available to view immediately after the function has completed.

Alternatively they may be viewed outside of Natural Engineer as they are saved in the Data folder.

The file is saved with a file extension of .LOG. The file name defaults to one of four formats depending on the Object Documentation option used to generate them. These are described below.

1. **Import Multiple from File.**

    The log file name used for this option is **aaaaaaaa_IMP_FIL.LOG**, where **aaaaaaaa** is the application name. This file will contain information on the import of multiple object comments for an application, from a .CMT file.

    For Example:

    From the **HOSPITAL** application, the Import Multiple from File option is used to import Object Documentation comments using a saved file: HOSPITAL.CMT. This file contains the following records:

```
HXX001P01
TXX001P01
C**********************************************************************
CAuthor         : A. Coder
CDate created   : 01/02/2001
CFunction       : Main Menu Program for the HOSPITAL system.
C**********************************************************************
HXX001M01
TXX001M01
C**********************************************************************
CAuthor         : A. Coder
CDate created   : 01/02/2001
CFunction       : Main Menu Map for the HOSPITAL system.
C**********************************************************************
HXX001L01
TXX001L01
C**********************************************************************
CAuthor         : A. Coder
CDate created   : 01/02/2001
CFunction       : Main Menu Local Data Area for the HOSPITAL system.
C**********************************************************************
```

    The objects **XX001L01**, **XX001M01** and **XX001P01** are selected using the Multiple Object Selection screen.

After the import has completed, the log file **HOSPITAL_IMP_FIL.LOG** will contain the following:

```
Mass Import from -
D:\PROGRAMDATA\Software AG\NATURAL ENGINEER\DATA\Hospital.cmt
01/02/2001 12:45:22 - XX001L01 imported
01/02/2001 12:45:22 - XX001M01 imported
01/02/2001 12:45:22 - XX001P01 imported
```

2. **Import Multiple from Object Source**

    The log file name used for this option is **aaaaaaaa_IMP_OBJ.LOG**, where **aaaaaaaa** is the application name. This file will contain information on the import of multiple object comments from the Object source.

    For Example:

    From the **HOSPITAL** application, program objects **XX021P01, XX023P01, XX024P01** and **XX025P01** are selected to import multiple comments from object source. Using the menu option Options➔Import Object Comments➔Import Multiple form Object Source.

    After the import has completed, the log file **HOSPITAL_IMP_OBJ.LOG** will contain the following:

```
Multiple Import from Object
01/02/2001 12:55:07 - XX021P01 saved
01/02/2001 12:55:07 - XX023P01 saved
01/02/2001 12:55:07 - XX024P01 saved
01/02/2001 12:55:07 - XX025P01 saved
```

3. **Export Multiple to File.**

    The log file name used for this option is **aaaaaaaa_EXP_FIL.LOG**, where **aaaaaaaa** is the application name. This file will contain information on the export of multiple object comments to a .CMT file.

    For Example:

From the **HOSPITAL** application, objects **XX001L01, XX001M01** and **XX001P01** have had the following comments specified:

Object Title = XX001L01

Comments =

```
************************************************************************
Author         : A. Coder
Date created   : 01/02/2001
Function       : Main Menu Local Data Area for the HOSPITAL system.
************************************************************************
```

Object Title = XX001M01

Comments =

```
************************************************************************
Author         : A. Coder
Date created   : 01/02/2001
Function       : Main Menu Map for the HOSPITAL system.
************************************************************************
```

Object Title = XX001P01

Comments =

```
************************************************************************
Author         : A. Coder
Date created   : 01/02/2001
Function       : Main Menu Program for the HOSPITAL system.
************************************************************************
```

After the import has completed, the log file **HOSPITAL_EXP_FIL.LOG** will contain the following:

```
Mass Export to -
D:\PROGRAMDATA\Software AG\NATURAL ENGINEER\DATA\Hospital.cmt
01/02/2001 12:58:37 - XX001L01 exported
01/02/2001 12:58:37 - XX001M01 exported
01/02/2001 12:58:37 - XX001P01 exported
```

4. **Delete Multiple Object Documentation**

The log file name used for this option is **aaaaaaaa_DEL.LOG**, where **aaaaaaaa** is the application name. This file will contain information on the deletion of Object Documentation comments for an application.

For Example:

From the **HOSPITAL** application, objects **XX001L01, XX00M01 and XX001P01** all have Object Documentation comments saved for them. These comments will be deleted using Options➔Delete Multiple Object Documentation.

The objects **XX001L01**, **XX001M01** and **XX001P01** are selected using the Multiple Object Selection screen.

After the import has completed, the log file **HOSPITAL_DEL.LOG** will contain the following:

```
Delete Multiple Object Documentation
01/02/2001 13:05:40 - XX001L01 comments deleted
01/02/2001 13:05:40 - XX001M01 comments deleted
01/02/2001 13:05:40 - XX001P01 comments deleted
```

JCL Viewer

The JCL Viewer option allows you to select and review the JCL steps and data sets within individual JCL objects. Information will be displayed to show the data sets used by each of the JCL steps along with the actual JCL source code for each step.

The information is presented on a single screen and a diagramming tool e.g., Microsoft Visio can be utilized to provide a diagrammatic view of the relationship between the JCL steps, data sets, database access definitions (e.g. DDMs, SQL Tables or Predict User Views) and executable batch programs within a single JCL object.

The JCL Viewer screen is accessed by placing the cursor on any of the JCL objects displayed in the site workplace and using the right hand mouse button with a single click to view the context menu.

How to Invoke the JCL Viewer Option

Use the following navigation in the site workplace:

- Select the JCL Object required.
- Single click with the right hand mouse button to invoke the context menu.
- Select the option: **JCL Viewer**.

Note: The JCL Viewer option is only available for applications with JCL objects loaded in the Repository.

JCL Viewer Window

For the selected JCL object, a list of the JCL steps referenced by the JCL object is displayed in JCL step list box.

If you select one of the JCL steps, all the statement details for the selected JCL step are displayed in the source code list box. The data sets used by the selected JCL step are displayed in the data set list box as well as the Disposition (DISP=) keyword settings.

The following Figure 3-48 illustrates the JCL Viewer screen.
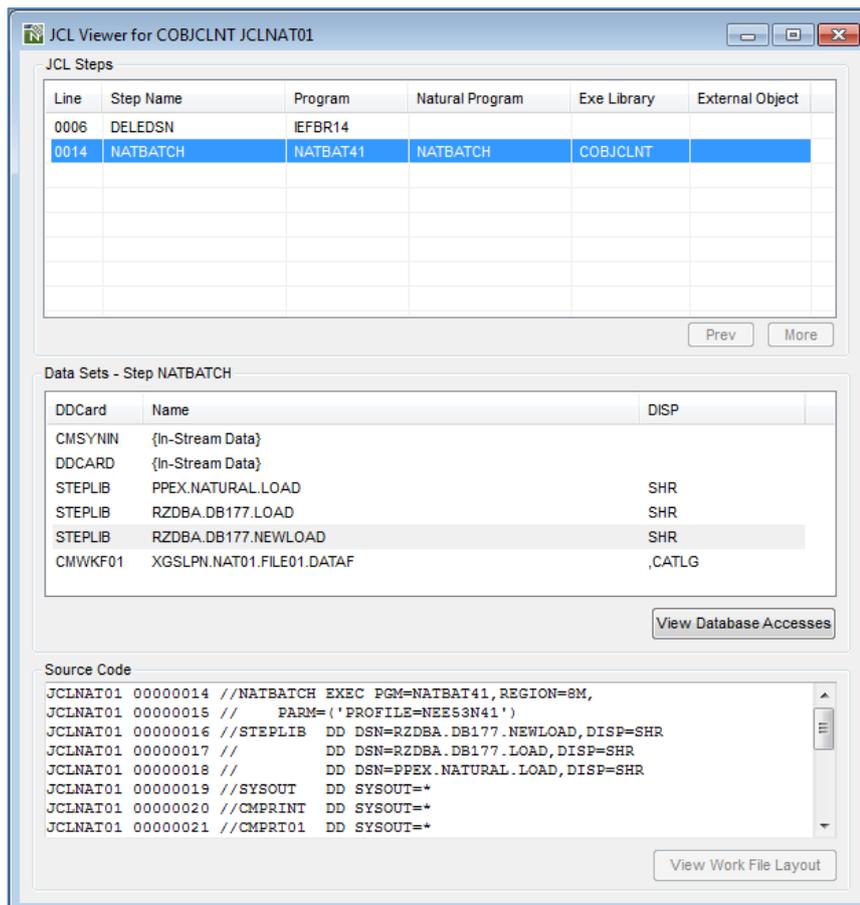
Figure 3-48 JCL Viewer screen

If you select one of the JCL steps that executes a program which uses a Database Access Definition then the "View Database Accesses" button is available. Selecting this will show all the corresponding Database accesses used by the program.

The following Figure 3-48-1 illustrates the JCL Viewer screen showing a Natural Program that uses Data Definition Modules.
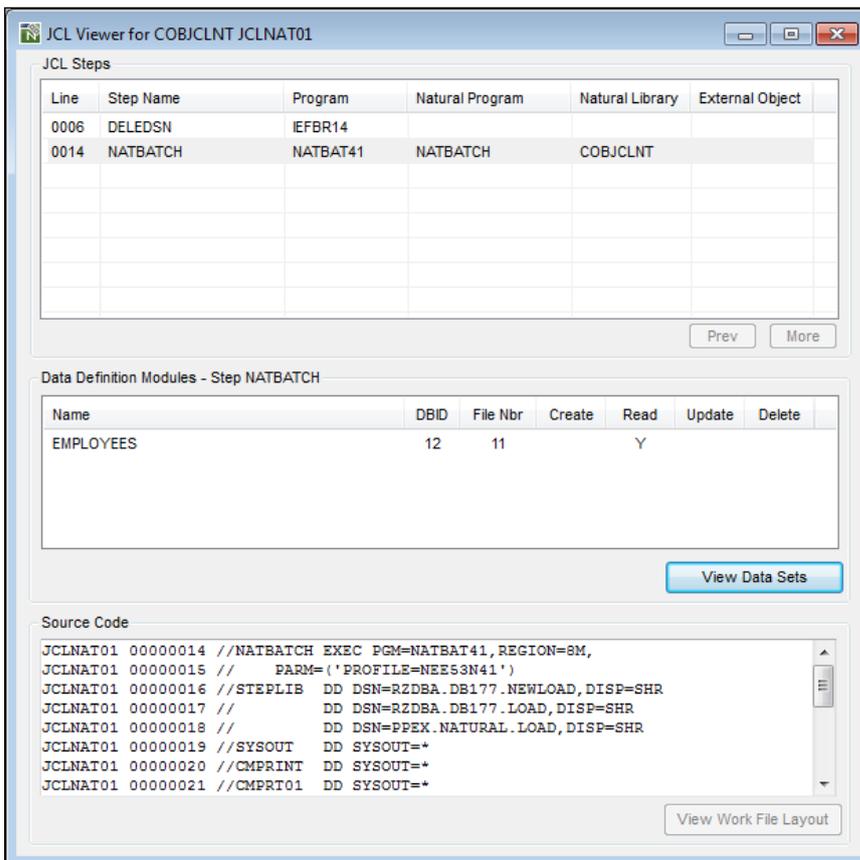
Figure 3-48-1 Data Definition Modules on JCL Viewer screen

If you select a Data Set that is used as a work file, the "View Work File layout" button is available. Selecting this will show all the Offset Mapping for Work Files details. See Offset Mapping for Work Files for further information.

The following Figure 3-48-2 illustrates the JCL Viewer screen showing the Work File Layout details.
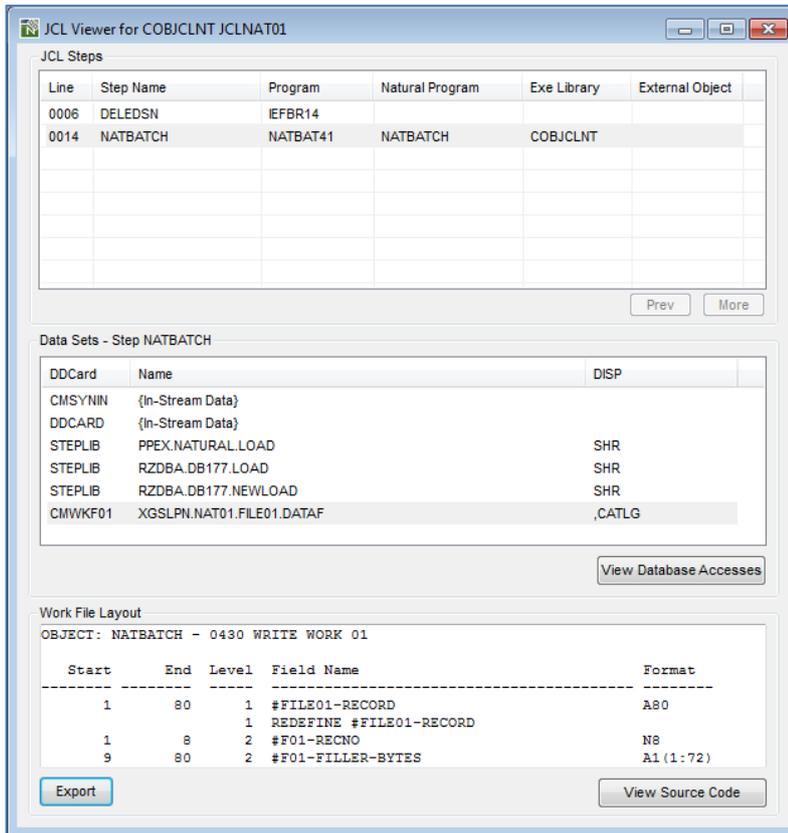
Figure 3-48-2 Work File Layout on JCL Viewer screen

SCREEN ITEMS	DESCRIPTION
JCL Step List	Lists all the JCL steps referenced by the selected JCL object.
	A context menu is available to navigate between the JCL Viewer screen and the Object Viewer, Object Reference, Entry Point Structure Diagram, Object Documentation for Natural or COBOL Objects, Cobol Link Maintenance or Object Reference, Object Documentation for JCL Objects, or use the View Source Code by using the **right hand mouse button** on a selected JCL step.
	The columns available are:

	Line	The statement line number of the JCL step.
	Step Name	The name of the JCL step.
	Program	The executable program name for the JCL step.
	Natural Program	The name of the Natural program to be executed for the JCL step.
		Note: Only available for JCL steps that are running batch Natural.
	External Object	The name of the JCL object that contains the JCL statements, if the JCL step references external sets of JCL statements, for example, INCLUDES or PROCS.

The Data Set list box is a multi-purpose list box used to display, either the Data Set or Database Accesses information for the selected item. The display is controlled by the View Database Accesess/View Data Sets button.

The default display is Data Sets.

Data Sets	Displays the data sets used within the selected JCL Step. The associated 'ddname' for each data set is also displayed and the disposition(DISP=) keyword..
	A context menu is available to navigate between the JCL Viewer screen and the JCL Data Set Viewer screen by using the **right hand mouse button** on a selected data set.
Database Accesses	Displays all the database access definitions used by the Object executed by the selected JCL step.
	A context menu is available to view the source code (if the object is a DDM) or display the Database Access (CRUD) screen for the particular Job step by using the **right hand mouse button** on a selected object.

The Source Code box is a multi-purpose list box used to display, either the Source Code or the Work File Layout information for the selected item. The display is controlled by the View Work File Layout/View Source Code button.

The default display is Source Code.

SCREEN ITEMS	DESCRIPTION
Source Code	Displays all the JCL statement references for the selected JCL step.
Work File Layout	Displays the start and end byte positions of each field within a record layout, for work files. See <u>Offset Mapping for Work Files</u> for further details.

Note: For more information on the JCL Step and Data Set List context menus, refer to section <u>JCL Viewer Context Menus</u>.

BUTTON NAME	DESCRIPTION
JCL Step List group:	
Prev	Scrolls the JCL step 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 JCL step list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
Data Sets List group:	
View Database Accesses	Displays all the database access definitions used by the Object executed by the selected JCL step. This button will alternate with the View Data Sets button depending on what option is currently being shown.
View Data Sets	Displays the data sets used within the selected JCL Step. This button will alternate with the View Database Accesses button depending on what option is currently being shown
Source Code List group:	
View Work File Layout	Displays the record layout of the selected work file. This button will alternate with the View Source Code button depending on what option is currently being shown.
View Source Code	Displays all the JCL statement references for the selected JCL step. This button will alternate with the View Work File Layout button depending on what option is currently being shown.
Export	Allows the work file layout to be exported to a spreadsheet e.g., Microsoft Excel. *Note: This is only visible when a Work File Layout is being displayed.*

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

JCL Viewer Context Menus

The JCL Viewer context menus are invoked by placing the cursor on any of the items listed in the JCL Step or Data Set lists and using the right hand mouse button with a single click.

JCL Step List Context Menu

The JCL Step list context menu allows you to navigate between the JCL Viewer screen and the Object Viewer, Object Reference, Entry Point Structure Diagram, Object Documentation for Natural or COBOL Objects, Cobol Link Maintenance or Object Reference, Object Documentation for JCL Objects, or use the View Source Code option.

Note: The JCL Step List context menu is not available for any steps that are not executing either COBOL or Natural programs. For example z/OS Utilities.

The following Figure 3-49 illustrates the JCL Step List context menu
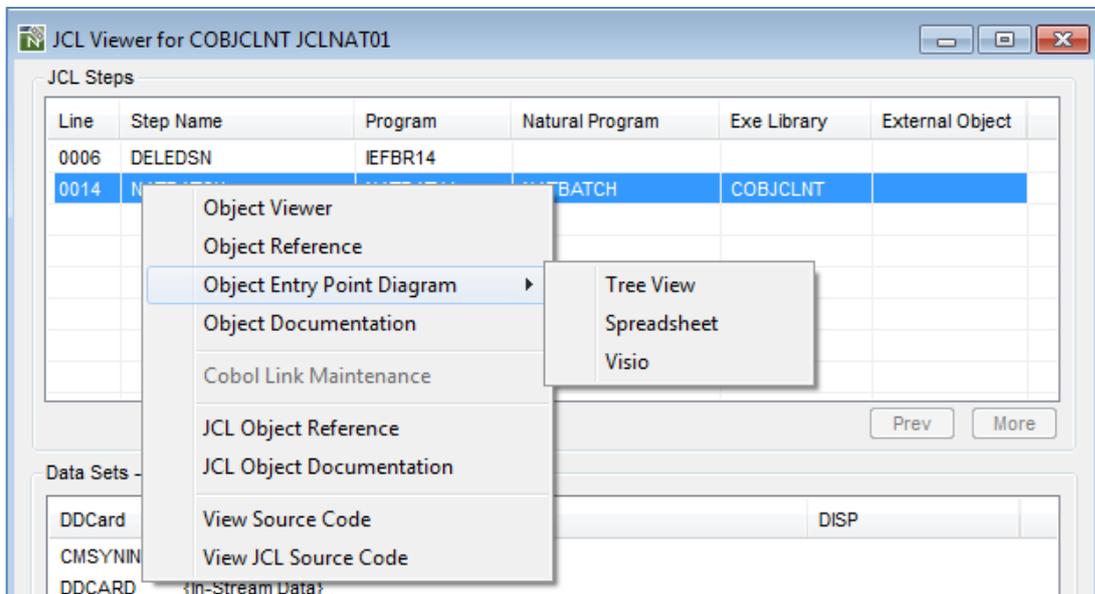
Figure 3-49 JCL Step List context menu

CONTEXT MENU ITEM	DESCRIPTION
Object Viewer	Invoke the Object Viewer screen for the Natural or COBOL Program selected.
Object Reference	Invoke the Object Reference screen for the Natural or COBOL Program selected.
Object Entry Point Diagram	Invoke the Entry Point Structure Diagram for the Natural or COBOL Program selected.
Object Documentation	Invoke the Object Documentation screen for the Natural or COBOL Program selected.
Cobol Link Maintenance	Invoke the Cobol Link Maintenance screen. *Note: Only available if the JCL step is executing a Cobol program and Cobol Links have been specified.*
JCL Object Reference	Invoke the Object Reference screen for the JCL Object selected.
JCL Object Documentation	Invoke the Object Documentation screen for the JCL Object selected.
View Source Code	Display the selected Natural or COBOL object source code in a browser.
View JCL Source Code	Display the selected JCL object source code in a browser.

Data Set List Context Menu

The Data Set list context menu allows you to navigate between the JCL Viewer screen and the JCL Data Set Viewer screen or if showing Data Definition Modules, view the DDM Source Code or display the Database Access (CRUD) screen for the particular Job step.

The following Figure 3-50 illustrates the Data Set List context menu when showing Data Sets.
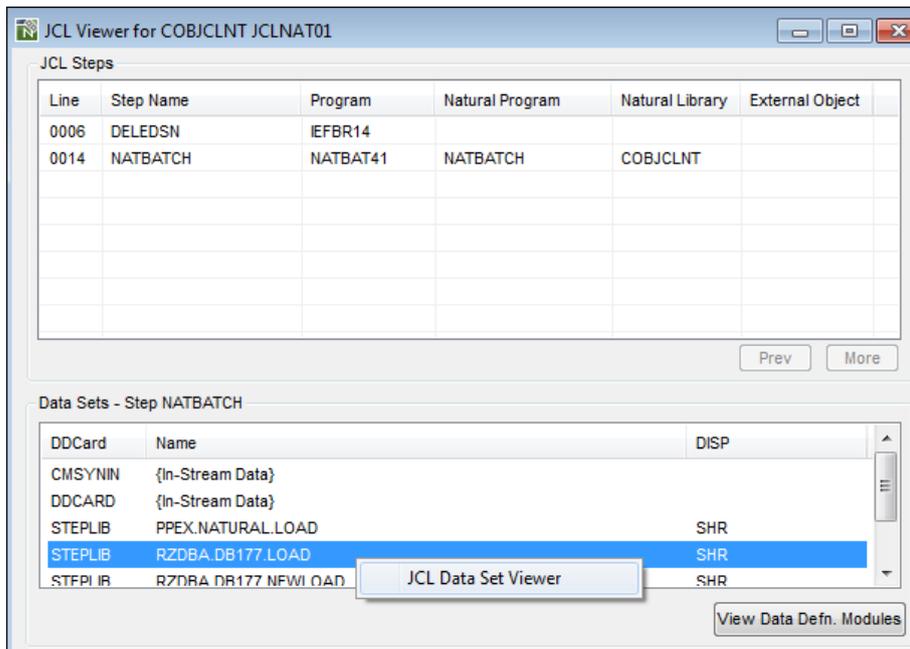
Figure 3-50 Data Set List context menu when showing Data Sets

CONTEXT MENU ITEM	DESCRIPTION
JCL Data Set Viewer	Invoke the JCL Data Set Viewer screen. Only active when Data Sets are being displayed.
View DDM Source Code	Views the DDM Source Code. Only active when Data Definition Modules are being displayed.
Database Access (CRUD) for Job Step	Invoke the Database Access (CRUD) screen for the particular DDM/ Job Step. Only active when Data Definition Modules are being displayed.

JCL Data Set Viewer

The JCL Data Set Viewer option allows you to review the data sets being used within an application. Information will be displayed to show the JCL objects and steps using the data sets along with the actual JCL source code for each step.

The information is presented on a single screen.

How to Invoke the JCL Data Set Viewer Option

Use the following navigation in the site workplace:

- Select the JCL Object required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **JCL Data Set Viewer**.

Note: The JCL Data Set Viewer option is only available for applications with JCL objects loaded in the Repository.

JCL Data Set Viewer Window

The data sets used by JCL objects within an application that has been loaded into the Repository are listed in the Data Set list box. If you select a data set, a list of the JCL steps referencing the data set is displayed in JCL step list box.

If you select one of the JCL steps, all the statement details for the selected JCL step are displayed in the source code list box.

The following Figure 3-51 illustrates the JCL Data Set Viewer screen.
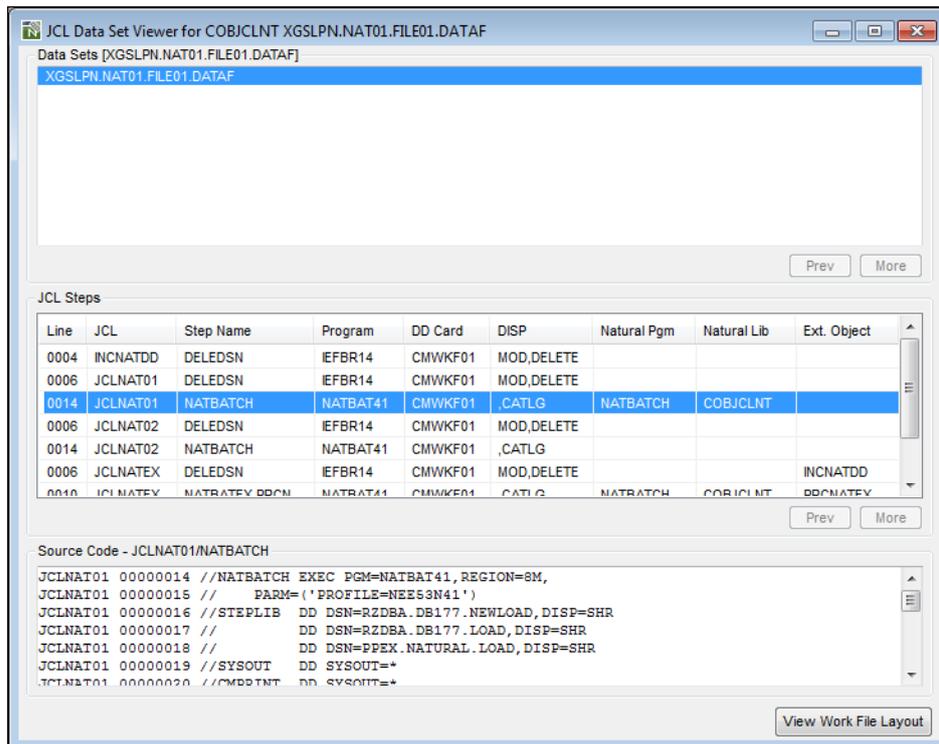
Figure 3-51 JCL Data Set Viewer screen

If a Work File is selected in the JCL Steps List box the option to view the record layout of the work file is available by selecting the View Work File Layout button. Selecting this will show all the Offset Mapping for Work Files details. See Offset Mapping for Work Files for further information.

The following Figure 3-51-1 illustrates the JCL Data Set Viewer screen showing the Work File Layout details.
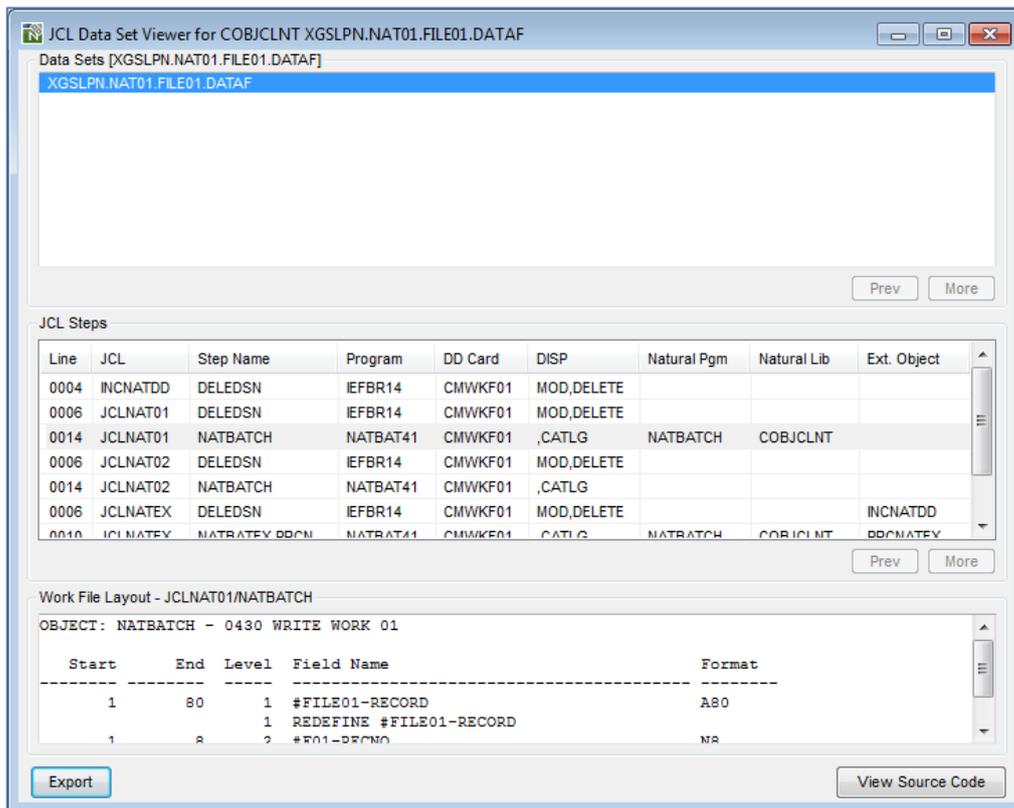
Figure 3-51-1 Work File Layout on JCL Data Set Viewer screen

SCREEN ITEMS	DESCRIPTION
Data Set List	List of all the data sets used by the currently selected application.
	The list of data sets can be tailored to your requirements using the option 'Change Start Position of Data Set List…' from the Data Set context menu.
	The Data Set List title will append any reposition values that may have been specified.
JCL Step List	Lists all the JCL steps referencing the selected data set.
	A context menu is available to navigate between the JCL Data Set Viewer screen and the Object Viewer, Object Reference or Object Documentation, JCL Viewer, JCL Natural Program Viewer or Cobol Link Maintenance screens, or use the View Source Code option by using the **right hand mouse button** on a selected object.
	The columns available are:

	Line	The statement line number of the JCL step.
	JCL	The name of the JCL object.
	Step Name	The name of the JCL step.
	Program	The executable program name for the JCL step.
	DD Card	The DD Card.
	DISP	The Disposition keyword.
	Natural Program	The name of the Natural program to be executed for the JCL step.
		Note: Only available for JCL steps that are running batch Natural.
	External Object	The name of the JCL object that contains the JCL statements, if the JCL step references external sets of JCL statements, for example, INCLUDES or PROCS.

The Source Code box is a multi-purpose list box used to display, either the Source Code or the Work File Layout information for the selected item. The display is controlled by the View Work File Layout/View Source Code button. The default display is Source Code.

Source Code	Displays all the JCL statement references for the selected JCL step.
Work File Layout	Displays the start and end byte positions of each field within a record layout, for work files. See Offset Mapping for Work Files for further details.

Note: For more information on the Data Set and JCL Step context menus, refer to section JCL Data Set Viewer Context Menus.

BUTTON NAME	DESCRIPTION
Data Set List group:	
Prev	Scrolls the data set 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 data set list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
JCL Step List group:	
Prev	Scrolls the JCL step 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 JCL step list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
Source Code List group:	
View Work File Layout	Displays the record layout of the selected work file. This button will alternate with the View Source Code button depending on what option is currently being shown.
View Source Code	Displays all the JCL statement references for the selected JCL step. This button will alternate with the View Work File Layout button depending on what option is currently being shown.
Export	Allows the work file layout to be exported to a spreadsheet e.g., Microsoft Excel. *Note: This is only visible when a Work File Layout is being displayed.*

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

JCL Data Set Viewer Context Menus

The JCL Data Set Viewer context menus are invoked by placing the cursor on any of the items listed in the Data Set or JCL Step lists and using the right hand mouse button with a single click.

Data Set List Context Menu

The Data Set list context menu allows you to reposition the list of data sets to start from a particular data set name.

The following Figure 3-52 illustrates the Data Set List context menu
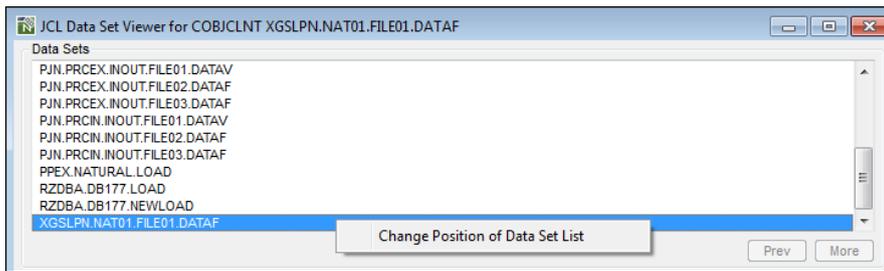
Figure 3-52 Data Set List context menu

CONTEXT MENU ITEM	DESCRIPTION
Change Start Position of Data Set List…	Reposition the list of data sets to start from a particular data set 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 data set list title to highlight the type of repositioning being applied.
	Possible reposition values are:

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

JCL Step List Context Menu

The JCL Step List context menu allows you to navigate between the JCL Data Set Viewer screen and the Object Viewer, Object Reference, Object Documentation for Natural Objects, Cobol Link Maintenance or Object Viewer, Object Reference, Object Documentation for JCL Objects, or use the View Source Code option for Natural or JCL objects.

Note: The JCL Step List context menu is not available for any steps that are not executing either Cobol or Natural programs. For example z/OS Utilities.

The following Figure 3-53 illustrates the JCL Step List context menu
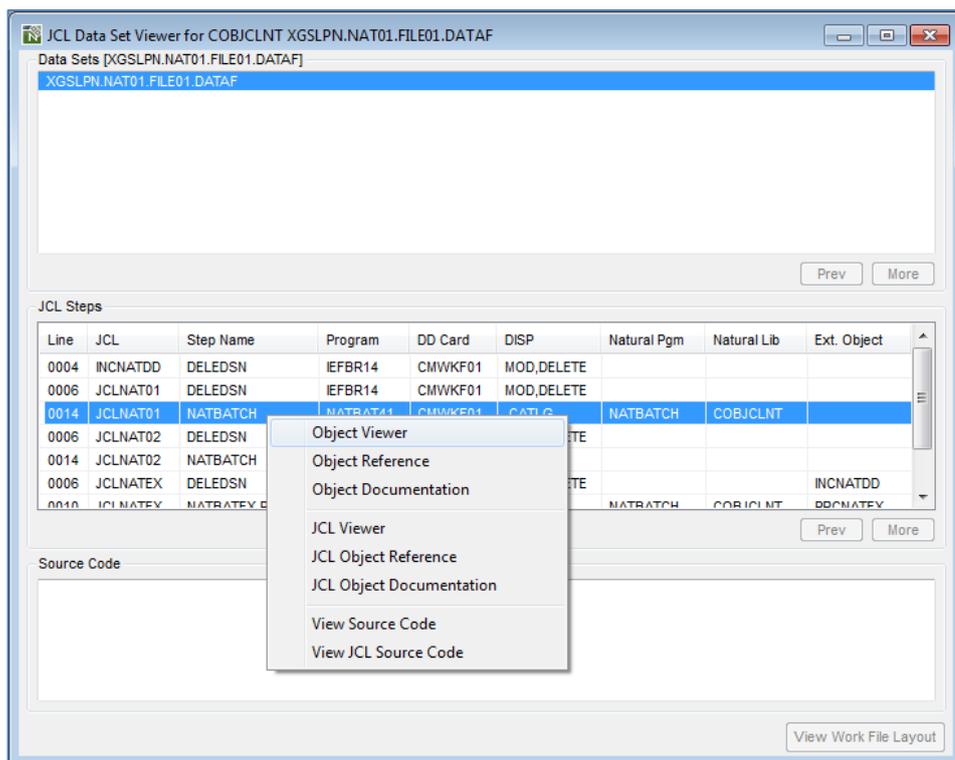
Figure 3-53 JCL Step List context menu

CONTEXT MENU ITEM	DESCRIPTION
Object Viewer	Invoke the Object Viewer screen for the program selected.
Object Reference	Invoke the Object Reference screen for the program selected.
Object Documentation	Invoke the Object Documentation screen for the program selected.
Cobol Link Maintenance	Invoke the Cobol Link Maintenance screen. *Note: Only available if the JCL step is executing a Cobol program and Cobol Links have been specified.*
JCL Viewer	Invoke the JCL Viewer.
JCL Object Reference	Invoke the Object Reference screen for the JCL Object selected.
JCL Object Documentation	Invoke the Object Documentation screen for the JCL Object selected.
View Source Code	Display the selected Natural or COBOL object source code in a browser.
View JCL Source Code	Display the selected JCL object source code in a browser.

JCL Diagram

The JCL Diagram option provides a mechanism to diagrammatically illustrate the relationship within JCL objects between the JCL steps, datasets, database access definitions (e.g. DDMs, SQL Tables or Predict User Views) and executable batch programs.

The JCL Diagram option is accessed by placing the cursor on any of the JCL objects displayed in the site workplace and using the right hand mouse button with a single click to view the context menu.

The JCL Diagram will consist of individual pages, a header page for the JCL object, a summary page of all the JCL steps available and a separate page for each JCL step.

Each JCL step detail page will show the steplib, database access definition, program, data set and print file references available for that step.

The JCL Diagrams are drawn and displayed using Microsoft Visio. From the diagram it is possible to view the source code of the JCL object, the program, database access definition or data sets using GenSource. This is invoked by simply selecting the respective object on the diagram.

Note: For more information on GenSource refer to Chapter 2 in the Natural Engineer Reporting manual.

The diagrams can be printed and/or saved using the functions found within Microsoft Visio, providing useful additional systems documentation that will complement existing systems specifications.

The following Figure 3-54 illustrates the JCL Diagram for JCL object JCLNAT01 step NATBATCH
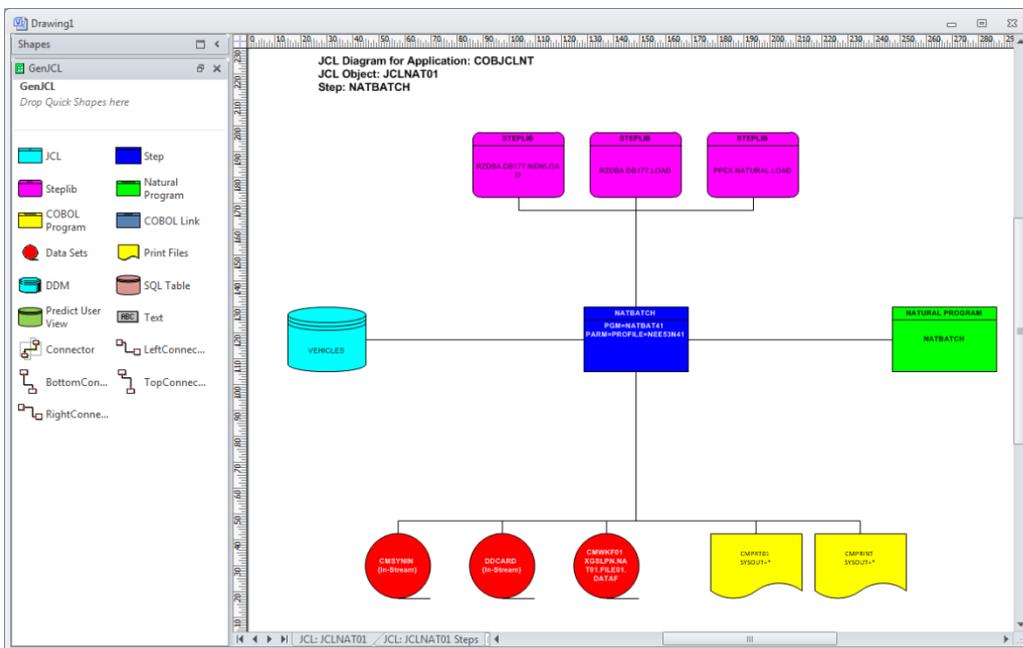
Figure 3-54 JCL Diagram for JCL Object JCLNAT01 step NATBATCH

The JCL Diagram shows the JCL step NATBATCH within JCL object JCLNAT01. For this step all the steplib, database access definition, program, data set and print file information is displayed.

To the left of the diagram is the GenJCL.vss stencil showing all the shapes available within the diagrams.

The source code for the database access definition, JCL step, program and data set can be viewed using GenSource, which is invoked by selecting the respective shape on the diagram and using a double-click of the left hand mouse button.

Note: For complex diagrams where link lines and object items are difficult to distinguish, the diagrams can be re-organized by dragging and dropping selected items.

How to Invoke the JCL Diagram Option

Use the following navigation in the site workplace:

- Select the JCL Object required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **JCL Diagram**.

Note: The JCL Diagram option is only available for applications with JCL objects loaded in the Repository.

Stencils and Shapes

The JCL Diagram is drawn using Microsoft Visio using the shapes found in the GenJCL.vss stencil. This can be located in the DATA\VSD folder of the Natural Engineer installation.

The following describes the shapes used on the JCL diagram.

JCL Object

This shape is used to represent the JCL object containing the JCL statements.

The title section of the shape will always show 'JCL'.

The detail section of the shape will show the name of the JCL object.

GenSource is not available for this shape.

The following Figure 3-55 illustrates the shape used for JCL objects.
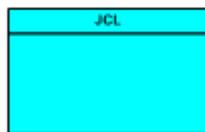
Figure 3-55 Shape used for JCL objects

JCL Step

This shape is used to represent the JCL step.

The title section of the shape will show the JCL step name.

The detail section of the shape will show any program and parameter data.

GenSource is available for this shape and will display the JCL object source code.

The following Figure 3-56 illustrates the shape used for JCL steps.

Figure 3-56 Shape used for JCL steps

Steplib

This shape is used to represent the steplib references within a JCL step. Steplibs are the load libraries where the executable batch programs and databases are located.

The title section of the shape will always show 'STEPLIB'.

The detail section of the shape will show the name of the steplib data set.

GenSource is not available for this shape.

The following Figure 3-57 illustrates the shape used for Steplibs.
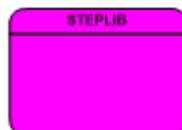
Figure 3-57 Shape used for Steplibs

Natural Program

This shape is used to represent the Natural program references within a JCL step. This is only available if the JCL step is executing batch Natural objects.

The title section of the shape will always show 'NATURAL PROGRAM'.

The detail section of the shape will show the name of the Natural program.

GenSource is available for this shape and will display the Natural program source code.

The following Figure 3-58 illustrates the shape used for Natural Programs.
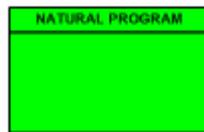
Figure 3-58 Shape used for Natural Programs

COBOL Program

This shape is used to represent the COBOL program references within a JCL step. This is only available if the JCL step is executing batch COBOL objects.

The title section of the shape will always show 'COBOL PROGRAM'.

The detail section of the shape will show the name of the COBOL program.

GenSource is available for this shape and will display the COBOL program source code.

The following Figure 3-58-1 illustrates the shape used for COBOL Programs.
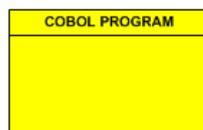
Figure 3-58-1 Shape used for COBOL Programs

COBOL Link

This shape is used to represent the COBOL Link references within a JCL step. This is only available if the JCL step is executing a COBOL Link objects.

The title section of the shape will always show 'COBOL Link.

The detail section of the shape will show the name of the COBOL Link.

GenSource is available for this shape and will display the COBOL objects that are contained within the COBOL Link.

The following Figure 3-58-2 illustrates the shape used for COBOL Links.
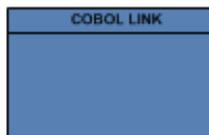
Figure 3-58-2 Shape used for COBOL Links

Print Files

This shape is used to represent the print file references within a JCL step.

The detail section of the shape will show the name and destination of the print file.

GenSource is not available for this shape.

The following Figure 3-60 illustrates the shape used for print files.

Figure 3-60 Shape used for print files

Data Sets

This shape is used to represent the data set references within a JCL step.

The detail section of the shape will show the name of the data set.

GenSource is available for this shape and will display the data set record layout used by the batch program.

If the data set is a Work File used by Natural programming objects, then GenSource will display the Offset Mapping details for that file.

Note: For more information on Offset Mapping refer to the section Offset Mapping for Work Files.

The following Figure 3-59 illustrates the shape used for data sets.
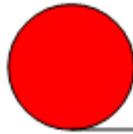
Figure 3-59 Shape used for data sets

Note: The JCL Analysis process needs to be processed first, in order for the necessary work file and cross-reference record layout data to be available. For more information on JCL Analysis refer to Chapter 3 in the Natural Engineer Application Management for Windows manual.

DDMs

This shape is used to represent the DDM references within a JCL step.

The detail section of the shape will show the name of the DDM.

GenSource is available for this shape and will display the DDM record layout used by the batch program.

The following Figure 3-61 illustrates the shape used for DDMs.
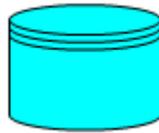
Figure 3-61 Shape used for DDMs

SQL Tables

This shape is used to represent the SQL Table references within a JCL step.

The detail section of the shape will show the name of the SQL Table.

GenSource is available for this shape and will display the SQL Table record layout used by the batch program. The SQL table has to be loaded into the Global SQL Node.

The following Figure 3-61-1 illustrates the shape used for SQL Tables.
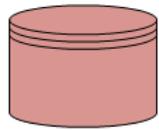
Figure 3-61-1 Shape used for SQL Tables

Predict User Views

This shape is used to represent the Predict User View references within a JCL step.

The detail section of the shape will show the name of the Predict User View.

GenSource is available for this shape and will display the Predict User View record layout used by the batch program.

The following Figure 3-61-2 illustrates the shape used for Predict User Views.
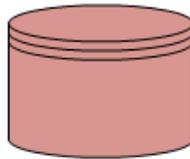
Figure 3-61-2 Shape used for Predict User Views

Note: For Database Access Definitions (i.e., DDMS, SQL Tables and Predict User Views) the JCL Analysis process needs to be processed first, in order for the necessary work file and cross-reference record layout data to be available. For more information on JCL Analysis refer to Chapter 3 in the Natural Engineer Application Management for Windows manual.

Offset Mapping for Work Files

The Offset Mapping for Work Files provides the facility to review the start and end byte positions of each field within a record layout, for work files referenced by Natural or COBOL programming objects.

The start and end values span the whole record layout, starting from the first byte of the record and ending at the last byte of the record.

The Offset Mapping details can be viewed using the GenSource option from the JCL Diagram, by selecting a dataset that is being accessed by a programming object or by selecting a dataset that contains a work file from the JCL Viewer or by selecting a dataset on the JCL Viewer or JCL Dataset Viewer and selecting the View Work File Layout button. In these cases the Offset Mapping Details will be shown in the bottom section of the window.

The following Figure 3-62 illustrates the Offset Mapping for Work Files in GenSource.

Figure 3-62 Offset Mapping for Work Files in GenSource.

The name of the programming object, the statement line number and the statement keywords of the Work File access statement will be shown, followed by the record layout and offset mapping information.

Objects Referenced in JCL Steps

The Objects Referenced in JCL Steps option shows all Objects, COBOL or Natural, that have been referenced in the steps of the JCL objects and steps. Information will be displayed to show the JCL steps that each Object is referenced in along with the actual JCL source code for each step.

The information is presented on a single screen.

How to Invoke the Objects Referenced in JCL Steps Option

Use the following navigation in the site workplace:

- Select the application required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: Objects Referenced in JCL Steps.

Objects Referenced in JCL Steps Window

For the selected Object, a list of the JCL objects and steps that reference the Object are displayed in JCL steps list box.

If you select one of the JCL steps, all the statement details for the selected JCL step are displayed in the source code list box.

The following Figure 3-63 illustrates the Objects Referenced in JCL Steps screen.

Figure 3-63 Objects Referenced in JCL Steps screen

SCREEN ITEMS	DESCRIPTION

Object Filtering group:

Object Types Allows you to select the types of object to be listed. The selections are dependent on the objects identified.

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

Objects group:

Objects List Lists all the Objects and respective libraries referenced by the JCL Objects loaded into the repository.

The list of Objects can be tailored to your requirements using the option 'Change Start Position of Object List…' from the Objects context menu.

The Objects List title will append any reposition values that may have been specified.

The columns available are:

Name	The name of the Object.
Library	The name of the Library.
Call Type	The type of call invoking the Object.

JCL group:

JCL Step List	Lists all the JCL steps referencing the selected Objects.
	A context menu is available to navigate between the Objects Referenced in JCL Steps screen and the Object Viewer, Object Reference, Object Documentation for Natural or COBOL Objects, Cobol Link Maintenance or Object Viewer, Object Reference, Object Documentation for JCL Objects, or use the View Source Code option by using the **right hand mouse button** on a selected object.
	The columns available are:

JCL	The name of the JCL object.
	If a JCL Object name is followed by a * then this indicates that the JCL Object has been loaded as Global JCL.
Step Name	The name of the JCL step.
Line	The statement line number of the JCL step.
Program	The executable program name for the JCL step.
Natural Program	The name of the Natural Object.
Natural Library	The name of the Natural Library.
External Object	The name of the JCL object that contains the JCL statements, if the JCL step references external sets of JCL statements, for example, INCLUDES or PROCS.

Source Code group:

Source Code	Displays all the JCL statement references for the selected JCL step.

Note: For more information on the Object and JCL Steps List context menus, refer to section [Objects Referenced in JCL Steps Context Menus](#).

BUTTON NAME	DESCRIPTION
Objects List group:	
Prev	Scrolls the Objects 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 Objects list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
JCL Step List group:	
Prev	Scrolls the JCL step 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 JCL step 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.

Objects Referenced in JCL Steps Context Menus

The Objects Referenced in JCL Steps context menus are invoked by placing the cursor on any of the items listed in the Objects or JCL Step lists and using the right hand mouse button with a single click.

Objects List Context Menu

The Objects context menu is invoked by placing the cursor on any of the items listed in 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 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 Objects 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.

The following Figure 3-64 illustrates the Object List context menu
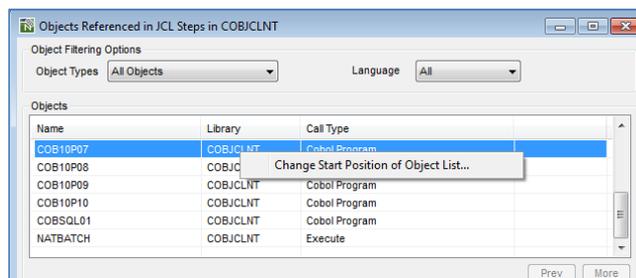
Figure 3-64 Objects List context menu

JCL Step List Context Menu

The JCL Steps List context menu allows you to navigate between the Objects Referenced in JCL Steps screen and the Object Viewer, Object Reference, Object Documentation for Natural or COBOL Objects, Cobol Link Maintenance or Object Viewer, Object Reference, Object Documentation for JCL Objects, or use the View Source Code option.

Note: The JCL Step List context menu is not available for any steps that are not executing either COBOL or Natural programs. For example z/OS Utilities.

The following Figure 3-65 illustrates the JCL Steps List context menu
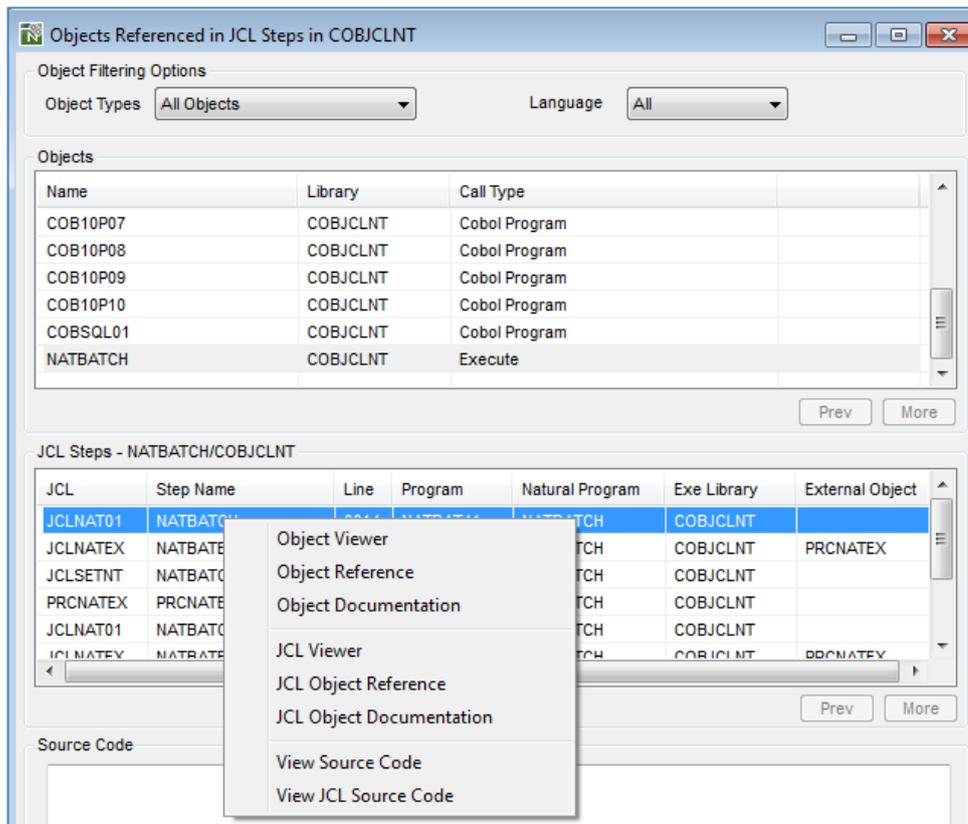
Figure 3-65 JCL Steps List context menu

CONTEXT MENU ITEM	DESCRIPTION
Object Viewer	Invoke the Object Viewer screen for the Natural or COBOL Program selected.
Object Reference	Invoke the Object Reference screen for the Natural or COBOL Program selected.
Object Documentation	Invoke the Object Documentation screen for the Natural or COBOL Program selected.
JCL Viewer	Invoke the JCL Viewer.
JCL Object Reference	Invoke the Object Reference screen for the JCL Object selected.
JCL Object Documentation	Invoke the Object Documentation screen for the JCL Object selected.
View Source Code	Display the selected Natural or COBOL Object source code in a browser.
View JCL Source Code	Display the selected JCL Object source code in a browser.

JCL Reference

The JCL Reference option shows for a selected Database Access Definition (DDM, SQL Table or Predict User View) all JCL Objects and steps that the database access definition has been referenced in. Information will be displayed to show the JCL steps that each database access definition is referenced in along with the actual JCL source code for each step.

The information is presented on a single screen.

How to Invoke the JCL Reference Option

Use the following navigation in the site workplace:

* Select the Database Access Definition required.

* Single click with the right hand mouse button to invoke the context menu.

* Select the option: JCL Reference.

Note: The JCL Reference context menu is only available if the Database Access Definition has been referenced in JCL objects and JCL Analysis has been run.

JCL Reference Window

For the selected Database Access Definition, a list of the JCL objects and steps that reference the Database Access Definition are displayed in JCL steps list box.

If you select one of the JCL steps, all the statement details for the selected JCL step are displayed in the source code list box.

The following Figure 3-66 illustrates the JCL Reference screen.
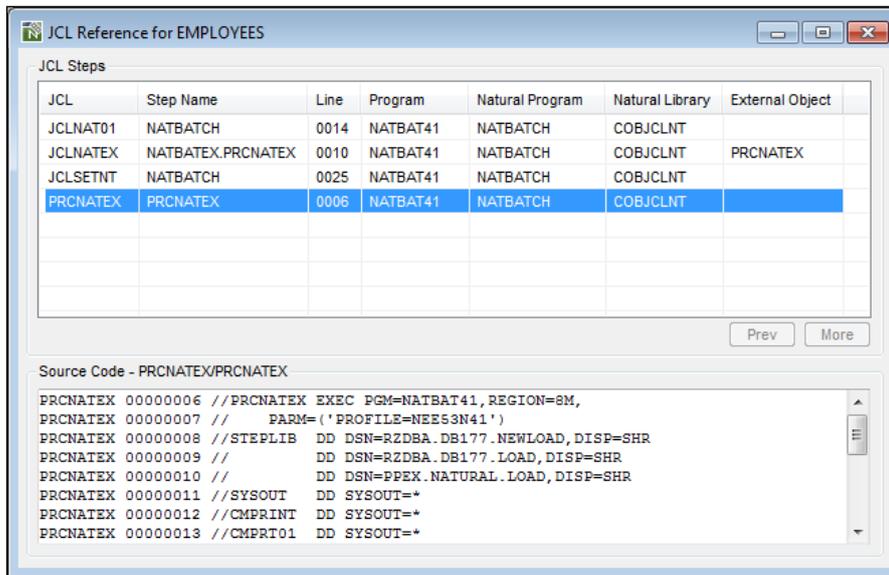
Figure 3-66 JCL Reference screen

SCREEN ITEMS	DESCRIPTION
JCL Step List	Lists all the JCL steps referencing the selected Database Access Definition.
	A context menu is available to navigate between the JCL Reference screen and the Object Viewer, Object Reference, Object Documentation for Natural or COBOL Objects, Cobol Link Maintenance or Object Viewer, Object Reference, Object Documentation for JCL Objects, or use the View Source Code option by using the **right hand mouse button** on a selected object.
	The columns available are:

	JCL	The name of the JCL object.
	Step Name	The name of the JCL step.
	Line	The statement line number of the JCL step.
	Program	The executable program name for the JCL step.
	Natural Program	The name of the Natural Object.
	Natural Library	The name of the Natural Library.
	External Object	The name of the JCL object that contains the JCL statements, if the JCL step references external sets of JCL statements, for example, INCLUDES or PROCS.

Source Code	Displays all the JCL statement references for the selected JCL step.

Note: For more information on the JCL Steps List context menus, refer to section JCL Reference Context Menus.

BUTTON NAME	DESCRIPTION
JCL Step List group:	
Prev	Scrolls the JCL step 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 JCL step 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.

JCL Reference Context Menus

The JCL Reference context menus are invoked by placing the cursor on any of the items listed in the JCL Step lists and using the right hand mouse button with a single click.

JCL Steps List Context Menu

The JCL Steps List context menu allows you to navigate between the JCL Reference screen and the Object Viewer, Object Reference, Object Documentation for Natural or COBOL Objects, Cobol Link Maintenance or Object Viewer, Object Reference, Object Documentation for JCL Objects, or use the View Source Code option.

The following Figure 3-67 illustrates the JCL Steps List context menu
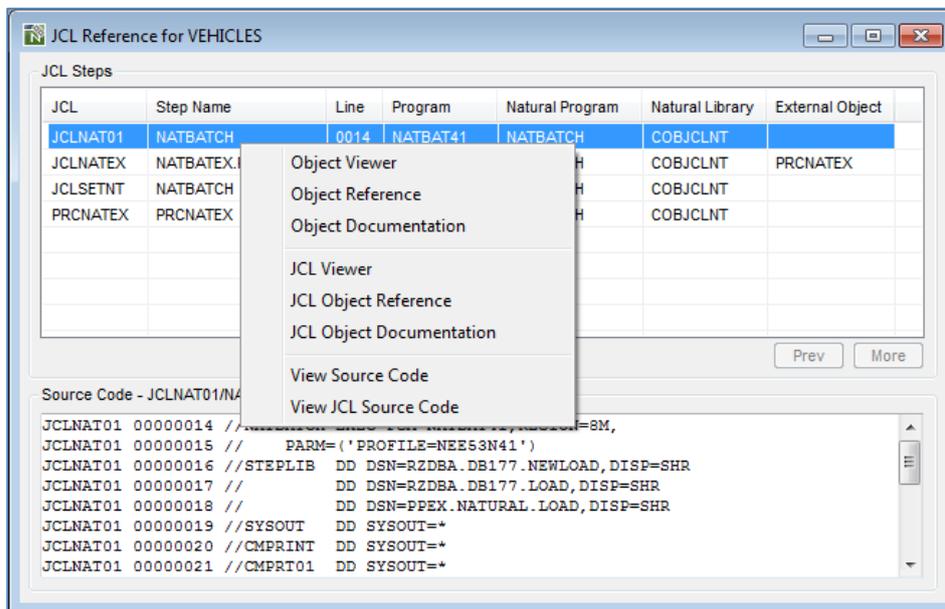
Figure 3-67 JCL Steps List context menu

CONTEXT MENU ITEM	DESCRIPTION
Object Viewer	Invoke the Object Viewer screen for the Natural or COBOL Program selected.
Object Reference	Invoke the Object Reference screen for the Natural or COBOL Program selected.
Object Documentation	Invoke the Object Documentation screen for the Natural or COBOL Program selected.
JCL Viewer	Invoke the JCL Viewer.
JCL Object Reference	Invoke the Object Reference screen for the JCL Object selected.
JCL Object Documentation	Invoke the Object Documentation screen for the JCL Object selected.
View Source Code	Display the selected Natural or COBOL Object source code in a browser.
View JCL Source Code	Display the selected JCL Object source code in a browser.

Database Access in Global JCL

The Database Access in Global JCL option shows all database access definitions that have been referenced in the JCL objects and steps loaded as Global JCL. Information will be displayed to show the JCL steps that each Object is referenced in along with the actual JCL source code for each step.

The information is presented on a single screen.

How to Invoke the Database Access in Global JCL Option

Use the following navigation in the site workplace:

- Select the Global Job Control Language node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: Database Access in Global JCL.

Database Access in Global JCL Window

For the selected database access definition a list of the JCL objects and steps that reference the database access definition are displayed in JCL steps list box.

If you select one of the JCL steps, all the statement details for the selected JCL step are displayed in the source code list box.

The following Figure 3-68 illustrates the Database Access in Global JCL screen.

Figure 3-68 Database Access in Global JCL screen

SCREEN ITEMS	DESCRIPTION
Data Definition Module List	Lists all the DDM and their Database IDs and File Numbers referenced by the JCL Objects loaded into the repository.
	The list of DDMs can be tailored to your requirements using the option 'Change Start Position of DDM List…' from the Data Definition Modules context menu.
	The Data Definition Modules List title will append any reposition values that may have been specified.
	The columns available are:

Data Definition Module	The name of the DDM.
Database ID	The Database ID of the DDM.
File Nbr	The File Number of the DDM.

NB: There are separate tabs for each type of database access definition e.g., DDMs, SQL Tables and Predict User Views (PUVs). The headings will be named accordingly.

JCL Step List	Lists all the JCL steps referencing the selected database access definition.
	A context menu is available to navigate between the Database Access in Global JCL screen and the Object Viewer, Object Reference, Object Documentation for Natural or COBOL Objects, or Object Viewer, Object Reference, Object Documentation for JCL Objects, or use the View Source Code option by using the **right hand mouse button** on a selected object.
	The columns available are:

JCL	The name of the JCL object.
Step Name	The name of the JCL step.
Line	The statement line number of the JCL step.
Program	The executable program name for the JCL step.
Natural Program	The name of the Natural Object.
Natural Library	The name of the Natural Library.
External Object	The name of the JCL object that contains the JCL statements, if the JCL step references external sets of JCL statements, for example, INCLUDES or PROCS.

Source Code	Displays all the JCL statement references for the selected JCL step.

Note: For more information on the Database Access Definition and JCL Steps List context menus, refer to section [Database Access in Global JCL Context Menus](#).

BUTTON NAME	DESCRIPTION
Database Access Definition List group:	
Prev	Scrolls the 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 list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
JCL Step List group:	
Prev	Scrolls the JCL step 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 JCL step 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.

Database Access in Global JCL Context Menus

The Database Access in Global JCL context menus are invoked by placing the cursor on any of the items listed in the Database Access Definition or JCL Step lists and using the right hand mouse button with a single click.

Database Access in Global JCL Context Menu

The Database Access in Global JCL context menu is invoked by placing the cursor on any of the items listed in the Database Access Definitions list and using the right hand mouse button with a single click.

CONTEXT MENU ITEM	DESCRIPTION
Change Start Position of DDM List…	Reposition the list of DDMs to start from a particular DDM 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 Data Definition Module list title to highlight the type of repositioning being applied.
	Possible reposition values are:

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

View DDM Source Code	Display the selected DDM source code in a browser.

NB: The menu items will change according to the type of database access definition selected.

The following Figure 3-69 illustrates the Data Definition Module List context menu
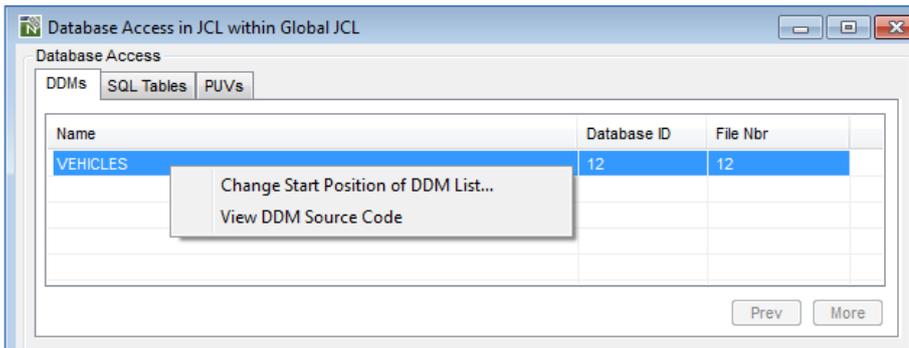
Figure 3-69 Data Definition Module List context menu

JCL Step List Context Menu

The JCL Steps List context menu allows you to navigate between the Database Access in Global JCL screen and the Object Viewer, Object Reference, Object Documentation for Natural or COBOL Objects, Cobol Link Maintenance or Object Viewer, Object Reference, Object Documentation for JCL Objects, or use the View Source Code option.

The following Figure 3-70 illustrates the JCL Steps List context menu
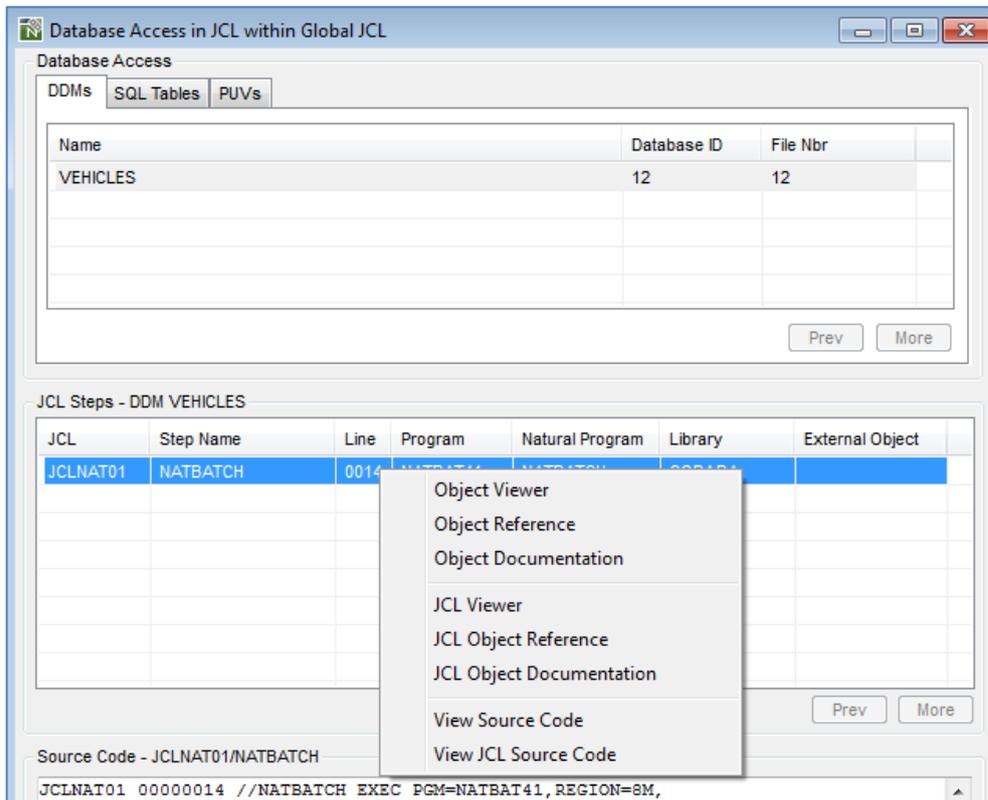
Figure 3-70 JCL Steps List context menu

CONTEXT MENU ITEM	DESCRIPTION
Object Viewer	Invoke the Object Viewer screen for the Natural or COBOL Program selected.
Object Reference	Invoke the Object Reference screen for the Natural or COBOL Program selected.
Object Documentation	Invoke the Object Documentation screen for the Natural or COBOL Program selected.
JCL Viewer	Invoke the JCL Viewer.
JCL Object Reference	Invoke the Object Reference screen for the JCL Object selected.
JCL Object Documentation	Invoke the Object Documentation screen for the JCL Object selected.
View Source Code	Display the selected Natural or COBOL Object source code in a browser.
View JCL Source Code	Display the selected JCL Object source code in a browser.

CICS Object Reference

The CICS Object Reference option becomes active if an application has been linked to a CICS Region/Transaction. It shows Files, CICS Transient Data Queues and CICS Temporary Storage Queues that are referenced in objects within the application.

The information is presented on a single screen.

How to Invoke the CICS Object Reference Option

Use the following navigation in the site workplace:

- Select the application required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: CICS Object Reference.

Note: The CICS Object Reference screen only becomes active if an application has been linked to a CICS Region/Transaction via the Application Properties screen.

CICS Object Reference Window

All Objects that use Files, CICS Transient Data Queues and CICS Temporary Storage Queues that are referenced in the relevant linked CICS Region are shown. It is possible to filter the list by type of CICS Object Type.

If you select one of the CICS Objects, all the statement details for the selected CICS Object Type are displayed in the source code list box.

The following Figure 3-71 illustrates the CICS Object Reference screen.
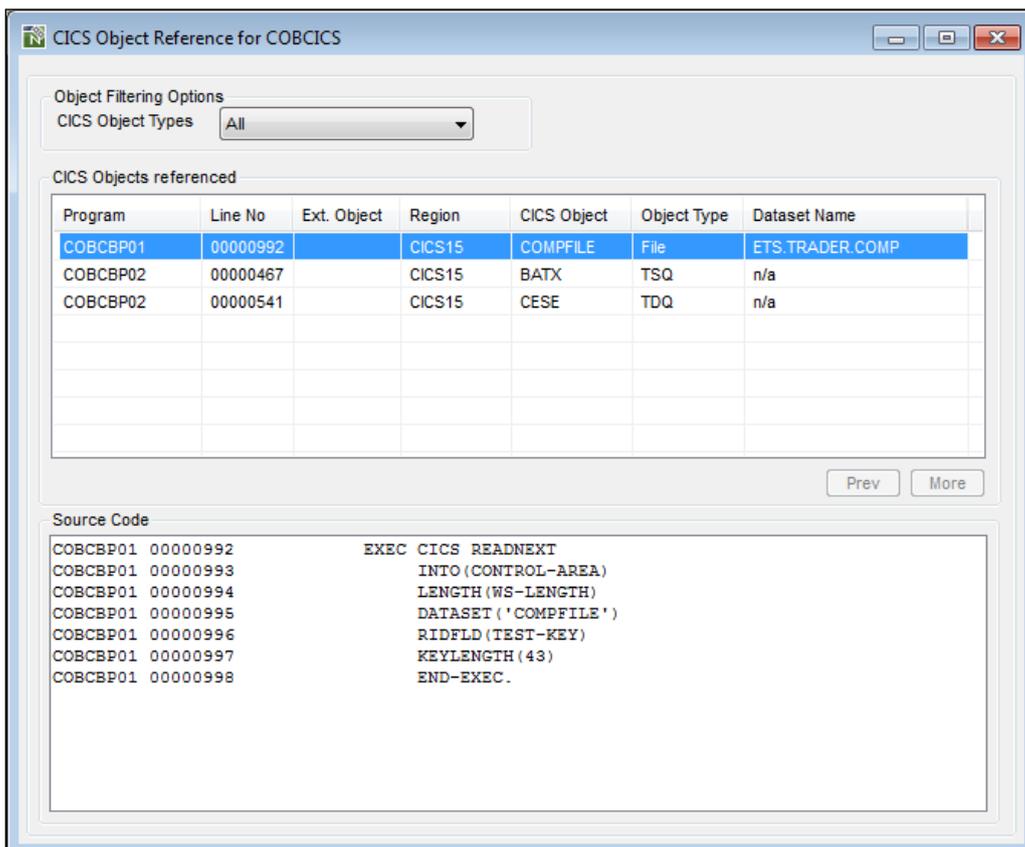
Figure 3-71 CICS Object Reference screen

SCREEN ITEMS	DESCRIPTION
CICS Object Types	Allows the user to filter the objects displayed in the CICS Objects Referenced list by File, TSQs, TSDs or All types.
CICS Objects Referenced	Lists the statements referenced by the CICS Object type in applications that have been linked to the CICS Region.
	A context menu is available to navigate between the CICS Object Reference screen and the View Source screen by using the **right hand mouse button** on a selected program.
	The columns available are:

	Program	The name of the program containing references to the CICS Object.
	Line No.	The statement line number for the reference within the program.
	Ext. Object	The name of the object that contains the definition if the data item is defined externally, such as in a copybook.
	Region	The name of the linked Region.
	CICS Object	The name of the CICS Object.
	Object Type	The type of the CICS Object.
	Dataset Name	The name of the Dataset that is associated with the Object Type.

BUTTON NAME	DESCRIPTION
Prev	Scrolls the program 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 program 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.

Database Access (CRUD)

The Database Access (CRUD) option shows all objects in the application that contain any database access, the database access definition (e.g., DDM, SQL Table or Predict User View) that is referenced and the type of access i.e., whether the file is Created, Read, Updated and/or Deleted. If the option is invoked via Object level then the report is limited to the selected object.

How to Invoke the Database Access (CRUD) Option

The Database Access (CRUD) option can be invoked in two different ways:

1. Application Level

Use the following navigation in the site workplace:

- Select the application required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Database Access (CRUD)**.

2. Object Level

Use the following navigation in the site workplace:

- Select the object required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Database Access (CRUD)**.

Database Access (CRUD) Window – Application Level

All objects that access Database files, the database access definition and the type of access is shown. Each type of Database file will be shown on a separate tab. If a particular type e.g. SQL Table is not present then the tab will not be shown.

The following Figure 3-72 illustrates the Database Access (CRUD) screen at Application Level.
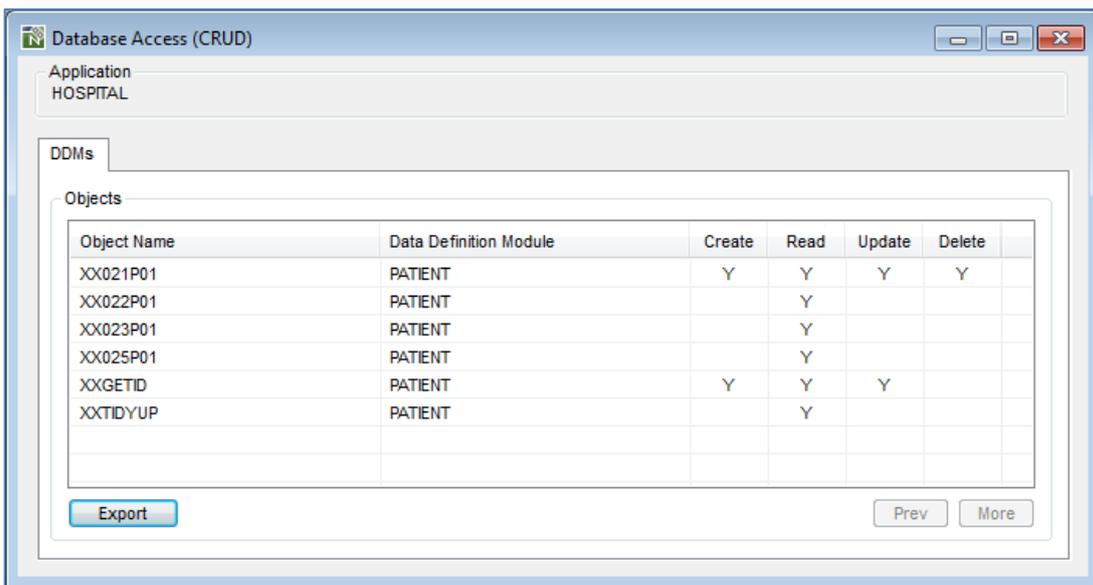
Figure 3-72 Database Access (CRUD) at Application Level

SCREEN ITEMS	DESCRIPTION
Application	The name of the Application.
Objects	Lists the objects, database access definition and type of access.
	A context menu is available to navigate between the Database Access (CRUD) screen, the View Source Code, View DDM Source Code, Object Viewer, Object Reference and the Database Access (CRUD) by Field screens or to Change the Start position of the Object List by using the

SCREEN ITEMS	DESCRIPTION
	right hand mouse button on a selected row.
	NB: View DDM Source Code is only available for Data Definition Modules.
	The columns available are:

Object Name	The name of the Object containing the access to the database access definition.
Data Definition Module/ SQL Table/ Predict User View	The name of the database access definition. *NB: The heading will change depending on the database access definition shown.*
Create	Will be set to Y if the field is used in a CREATE(STORE) statement in the application.
Read	Will be set to Y if the field is used in a READ(BROWSE) statement in the application.
Update	Will be set to Y if the field is used in an UPDATE statement in the application.
Delete	Will be set to Y if the field is used in a DELETE statement in the application.

BUTTON NAME	DESCRIPTION
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.
Export	Allows the work file layout to be exported to a spreadsheet e.g., Microsoft Excel.

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

Database Access (CRUD) Window – Object Level

All database access definitions accessed by the selected object and the type of access is shown.

The following Figure 3-73 illustrates the Database Access (CRUD) screen at Object Level.
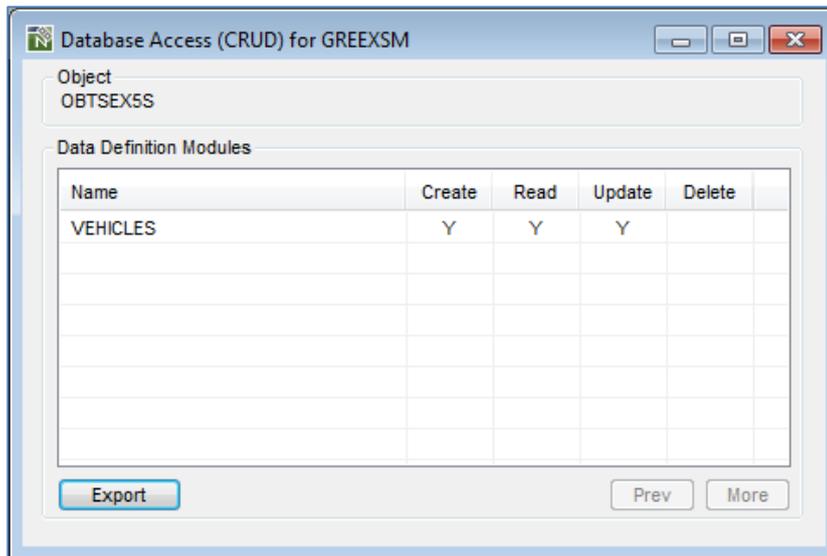
Figure 3-73 Database Access (CRUD) at Object Level

SCREEN ITEMS	DESCRIPTION
Object	The name of the Object.
Data Definition Modules/SQL Tables/Predict User Views	Lists the database access definition and type of access. *NB: The heading will change depending on the database access definition shown.* A context menu is available to navigate between the Database Access (CRUD) screen, the View Source Code, View DDM Source Code, Object Viewer and the Database Access (CRUD) by Field screens or to Change the Start position of the database access definition list by using the **right hand mouse button** on a selected row. *NB: View DDM Source Code is only available for Data Definition*

SCREEN ITEMS	DESCRIPTION
	Modules.
	The columns available are:
Name	The name of the database access definition.
Create	Will be set to Y if the field is used in a CREATE(STORE) statement in the application.
Read	Will be set to Y if the field is used in a READ(BROWSE) statement in the application.
Update	Will be set to Y if the field is used in an UPDATE statement in the application.
Delete	Will be set to Y if the field is used in a DELETE statement in the application.

BUTTON NAME	DESCRIPTION
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.
Export	Allows the work file layout to be exported to a spreadsheet e.g., Microsoft Excel.

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

Database Access (CRUD) by Object

The Database Access (CRUD) by Object option shows all objects in the application that contain any database access for a selected database access definition (e.g., DDM, SQL Table or Predict User View) and the type of access i.e., whether it is Created, Read, Updated and/or Deleted.

How to Invoke the Database Access (CRUD) by Object Option

Use the following navigation in the site workplace:

- Select the database access definition required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: Database Access (CRUD) by Object option.

The Database Access (CRUD) by Object option may also be invoked from the context menu of the Database Access (CRUD) by Application screen, the Application sub-node of the Database node or the Application sub-node of the Predict User views node.

Database Access (CRUD) by Object Window

All Objects that access the selected database access definition and the type of access is shown.

The following Figure 3-74 illustrates the Database Access (CRUD) by Object screen.
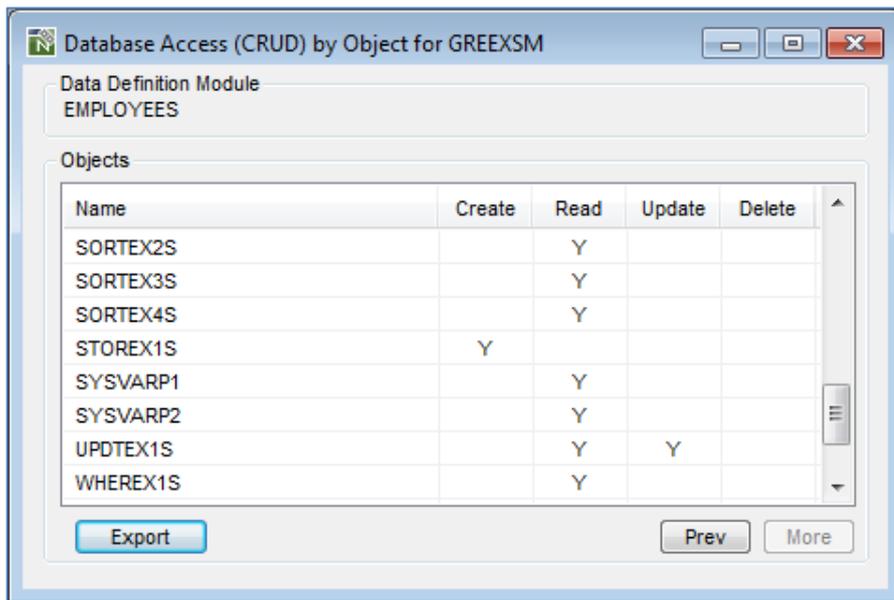
Figure 3-74 Database Access (CRUD) by Object screen

SCREEN ITEMS	DESCRIPTION	
Data Definition Module/Predict User View/SQL Table	The name of the object. *NB: The heading will change depending on the database access definition shown..*	
Objects	Lists the Objects and type of access.	
	A context menu is available to navigate between the Database Access (CRUD) by object screen, the View Source Code, Object Viewer and the Database Access (CRUD) by Field screens or to Change the Start position of the Object List by using the **right hand mouse button** on a selected row.	
	The columns available are:	
	Name	The name of the Object containing the access to the file.
	Create	Will be set to Y if the field is used in a CREATE(STORE) statement in the application.
	Read	Will be set to Y if the field is used in a READ(BROWSE) statement in the application.
	Update	Will be set to Y if the field is used in an UPDATE statement in the application.
	Delete	Will be set to Y if the field is used in a DELETE statement in the application.

BUTTON NAME	DESCRIPTION
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.
Export	Allows the work file layout to be exported to a spreadsheet e.g., Microsoft Excel.

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

Database Access (CRUD) by Field

The Database Access (CRUD) by Field option shows all objects in the application that contain any database access for a selected database access definition (e.g. DDM, Predict User View or SQL Table) and the type of access i.e., whether it is Created, Read, Updated and/or Deleted.

How to Invoke the Database Access (CRUD) by Field Option

The Database Access (CRUD) by Field option may be invoked from the context menu of the Database Access (CRUD) or Database Access (CRUD) by Object screens.

Database Access (CRUD) by Field Window

All fields for the selected Object/database access definition combination the type of access is shown.

The following Figure 3-75 illustrates the Database Access (CRUD) by Field screen.

Figure 3-75 Database Access (CRUD) by Field screen

SCREEN ITEMS	DESCRIPTION	
Application & Object	The name of the Application and Object.	
Fields	Lists the Fields and type of access.	
	A context menu is available to Change the Start position of the Field List by using the **right hand mouse button** on a selected row.	
	The columns available are:	
	Name	The name of the Field.
	Create	Will be set to Y if the field is used in a CREATE(STORE) statement in the application.
	Read	Will be set to Y if the field is used in a READ(BROWSE) statement in the application.
	Update	Will be set to Y if the field is used in an UPDATE statement in the application.
	Delete	Will be set to Y if the field is used in a DELETE statement in the application.
	Key Usage	Will be set to Y if the field is used as a key within the application.

BUTTON NAME	DESCRIPTION
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	Allows the work file layout to be exported to a spreadsheet e.g., Microsoft Excel.

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

Database Field Access (CRUD) by Object

The Database Field Access (CRUD) by Object option shows all objects in the application that contain any database access for a selected DDM and DDM Field combination and the type of access i.e., whether the DDM is Created, Read, Updated and/or Deleted.

How to Invoke the Database Field Access (CRUD) by Object Option

The Database Field Access (CRUD) by Object option may be invoked from the context menu of the Database Field Access (CRUD) by Application or Object Viewer screens. The option is only available on Object Viewer when selecting a DDM Field.

Database Field Access (CRUD) by Object Window

All objects for the selected DDM/DDM Field combination the type of access is shown.

The following Figure 3-76 illustrates the Database Field Access (CRUD) by Object screen.
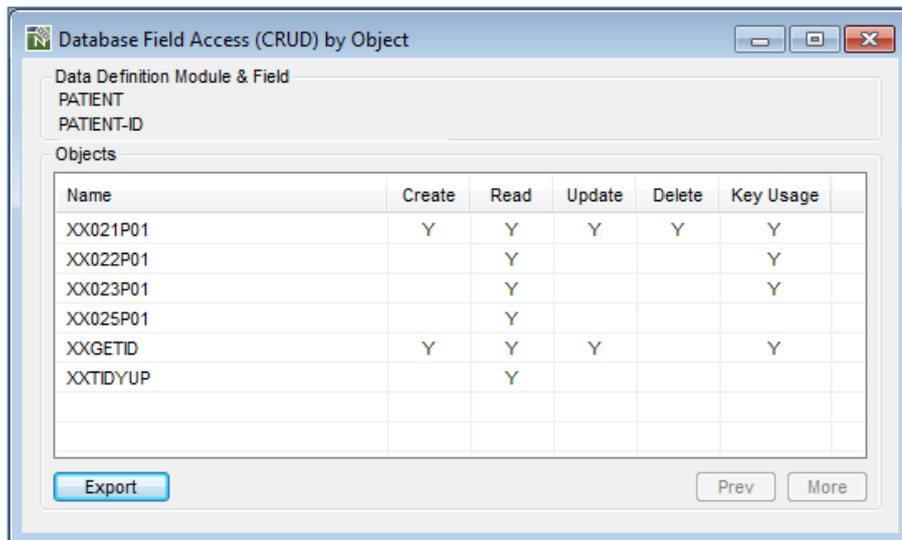
Figure 3-76 Database Field Access (CRUD) by Object screen

SCREEN ITEMS	DESCRIPTION
Data Definition Module & Field	The name of the DDM and DDM Field.
Objects	Lists the Objects and type of access.
	A context menu is available to navigate between the Database Field Access (CRUD) by Object screen and the View Source Code, Object Viewer options or to Change the Start position of the Object List by using the **right hand mouse button** on a selected row.
	The columns available are:

	Name	The name of the Object.
	Create	Will be set to Y if the field is used in a CREATE(STORE) statement in the application.
	Read	Will be set to Y if the field is used in a READ(BROWSE) statement in the application.
	Update	Will be set to Y if the field is used in an UPDATE statement in the application.
	Delete	Will be set to Y if the field is used in a DELETE statement in the application.
	Key Usage	Will be set to Y if the field is used as a Key within the application..

BUTTON NAME	DESCRIPTION
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.
Export	Allows the work file layout to be exported to a spreadsheet e.g., Microsoft Excel.

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

Database Access (CRUD) by Job Step

The Database Access (CRUD) by Job Step option shows all objects in the application that contain any database access for a selected database access definition (e.g., DDM, SQL Table or Predict User View)/Job Step combination and the type of access i.e., whether it is Created, Read, Updated and/or Deleted.

How to Invoke the Database Access (CRUD) by Job Step Option

The Database Access (CRUD) by Job Step option may be invoked from the Data set context menu of the JCL Viewer screen when Database Accesses are displayed.

Database Access (CRUD) by Job Step Window

All objects for the selected combination the type of access is shown.

The following Figure 3-76-1 illustrates the Database Access (CRUD) by Job Step screen.
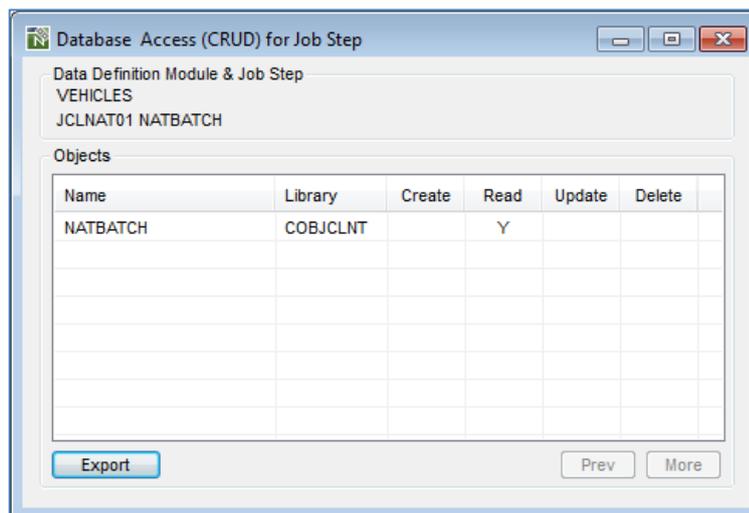
Figure 3-76-1 Database Access (CRUD) by Job Step screen

SCREEN ITEMS	DESCRIPTION
Data Definition Module & Field	The name of the DDM and DDM Field.
	NB: This will change depending on the type of access e.g., DDM, Predict User View or SQL Table.
Objects	Lists the Objects and type of access.
	A context menu is available to navigate between the Database Field Access (CRUD) by Object screen and the View Source Code, Object Viewer options or to Change the Start position of the Object List by using the **right hand mouse button** on a selected row.
	The columns available are:

Name	The name of the Object.	
Create	Will be set to Y if the field is used in a CREATE(STORE) statement in the application.	
Read	Will be set to Y if the field is used in a READ(BROWSE) statement in the application.	
Update	Will be set to Y if the field is used in an UPDATE statement in the application.	
Delete	Will be set to Y if the field is used in a DELETE statement in the application.	

BUTTON NAME	DESCRIPTION
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.
Export	Allows the work file layout to be exported to a spreadsheet e.g., Microsoft Excel.

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

Predict Information

The Predict Information screen shows details from Predict for the DDM/Predict User View such as whether the file is an Adabas file or an Adabas Userview, master file name, added and modified information, keywords, abstract details and description.

Note: This option is only available if Natural Engineer is executing in a remote development environment, Natural version 4.2 or above is installed on the mainframe and the Predict file is mapped in the remote environment settings

How to Invoke the Predict Information Option

The Predict Information option is available via the context menu when selecting a DDM object from the Application Node, the Global DDM Node or by selecting a Predict User View from the Predict User View nodes.

The following Figure 3-77 illustrates the Predict Information screen.
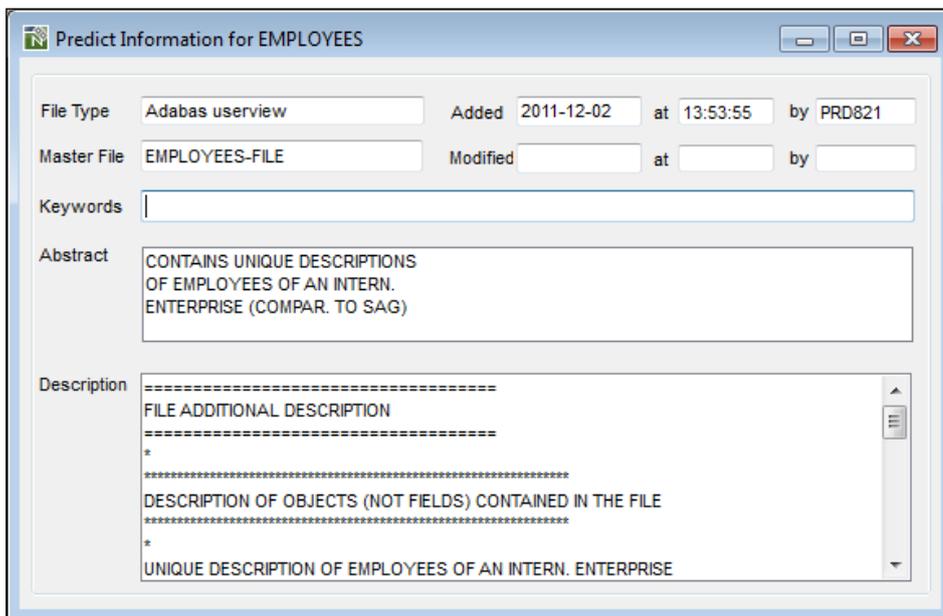
Figure 3-77 Predict Information screen

SCREEN ITEMS	DESCRIPTION
File Type	The type of the File e.g., Adabas File or Adabas userview.
Added/at/by	The date, time and user id relating to the addition of the entry into Predict.
Modified/at/by	The date, time and user id relating to the last modification of the entry in Predict.
Master File	The name of any Master File defined.
Keywords	The name of any keywords defined.
Abstract	The short comments of the object.
Description	The extended description of the object.

Predict Field Information

The Predict Field Information screen shows details from Predict for a DDM field such as Adabas short name, format, suppression, type, level, keywords, abstract details and description.

Note: This option is only available if Natural Engineer is executing in a remote development environment, Natural version 4.2 or above is installed on the mainframe and the Predict file is mapped in the remote environment settings

How to Invoke the Predict Field Information Option

The Predict Field Information option is available via the context menu when selecting a DDM field object from the DDM Field List or Object Viewer screens.

The following Figure 3-78 illustrates the Predict Field Information screen.
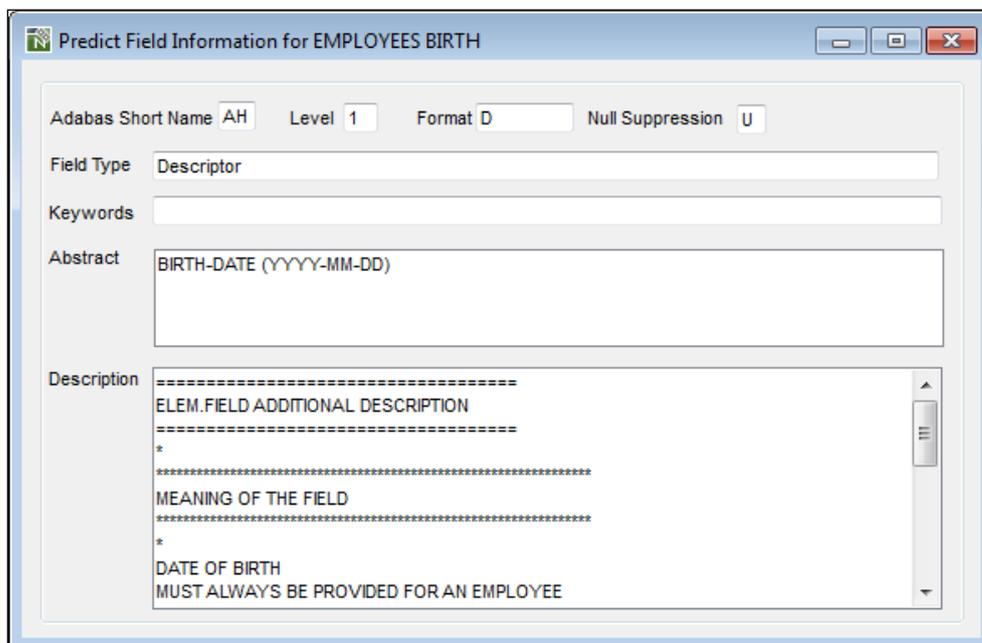
Figure 3-78 Predict Field Information screen

SCREEN ITEMS	DESCRIPTION
Adabas Short Name	The Adabas short name for the DDM field.
Level	The level number of the DDM field in the DDM.
Format	The format and length of the data item.
Null Suppression	The type of suppression for the DDM field.
Field Type	The type of DDM field. May be: ▪ **Descriptor** ▪ **Super Descriptor** ▪ **Phonetic Descriptor** ▪ **Hyper Descriptor** ▪ **Non Descriptor** And/or ▪ **Periodic Group** ▪ **Multiple Value field**
Keywords	The name of any keywords defined.
Abstract	The short comments of the object.
Description	The extended description of the object.

Data Model Relationships

The Data Model Relationships screen allows the definition of any relationships between DDMs.

How to Invoke the Data Model Relationships Option

The Data Model Relationships option is available from the Application Level Object Documentation or the Object Level Object Documentation screens when a DDM object has been selected.

The following Figure 3-79 illustrates the Data Model Relationships screen.

Figure 3-79 Data Model Relationships screen

SCREEN ITEMS	DESCRIPTION
To Relationships Group:	
DDM	The name of the DDM that the selected DDM has a "To Relationship" with.
	Click on the DDM Name to invoke the Data Model Relationships Maintenance screen to review or modify the existing relationship.
Relationship Description	The description of the relationship.
From Relationships Group:	
DDM	The name of the DDM that the selected DDM has a "From Relationship" with.
	Click on the DDM Name to invoke the Data Model Relationships Maintenance screen to review or modify the existing relationship.
Relationship Description	The description of the relationship.

BUTTON NAME	DESCRIPTION
To/From Relationships Group:	
Prev	Scrolls the DDM 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 DDM list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
Data Model Relationships Group:	
Add Data Model Relationship	Invokes the Data Model Relationships Maintenance screen to allow the definition of a new relationship for the selected DDM.
Cancel	Exits the screen and returns to the previous Object Documentation 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.

Data Model Relationships Maintenance Window

The Data Model Relationships Maintenance Window allows for the definition of a new relationship from the selected DDM or the review and modification of an existing relationship.

The following Figure 3-80 illustrates the Data Model Relationships Maintenance screen.

Figure 3-80 Data Model Relationships Maintenance screen

SCREEN ITEMS	DESCRIPTION
Fields	Select the required DDM field for the relationship from the selected DDM from the drop-down list.
	Note: The start and end position of the field for the relationship may be changed by using the context menu on the Selected Fields list after it has been added.
Selected Fields	The list of selected fields for the relationship.
	A context menu is available to modify the start or end position of the selected field, to move the field up or down in the list or delete the field from the list by using the **right hand mouse button** on a selected field.
Related to DDM	The name of the related DDM in the relationship.
Key Fields	Select the name of the key field from the selected related DDM.
Relationship Type	The type of the relationship.
	Options are:
	1-1
	1-Many
	Many-Many
Description	The description of the relationship.
Position within Key Field Group:	
Start Position	The start position of the key field within the selected related DDM.
End Position	The end position of the key field within the selected related DDM.

BUTTON NAME	DESCRIPTION

Fields Group:

Add   Add the selected field from the DDM to the selected fields list.

Data Model Relationships Maintenance Group:

Delete   Delete the relationship and returns to the Object Documentation Screen.

OK   Save changes and close the current screen.

Apply   Save changes and retain the current screen.
                 Note: This button is only enabled if any changes have been made.

Cancel   Exits the screen and returns to the Object Documentation 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.

Data Model Relationships Maintenance Context Menu

The Data Model Relationships Maintenance context menu is invoked by placing the cursor on any of the fields listed in the Selected Fields box and using the right hand mouse button with a single click.

The following Figure 3-81 illustrates the Data Model Relationships context menu
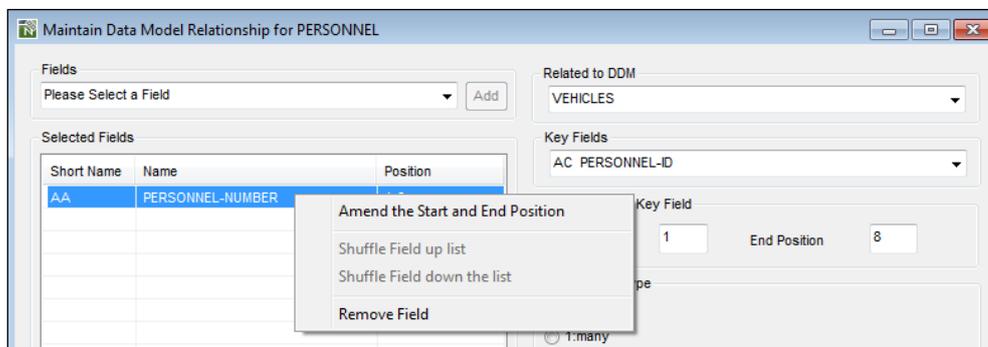
Figure 3-81 Data Model Relationships Maintenance context menu

CONTEXT MENU ITEM	DESCRIPTION
Amend the Start and End Position	Allows the start and end position of the selected field to be modified.
Shuffle Field up list	Move the selected field up the list.
Shuffle Field down the list	Move the selected field down the list.
Remove Field	Removes the selected field from the selected field list.

Pseudo Code

The Pseudo Code Generator takes the structural components of an object and presents it as a high level skeleton of the code in a Word Document.

The following Figure 3-83 illustrates a sample Pseudo Code Report.


```
                          Pseudo Code

    Application: HOSPITAL
    Object Name: XX025P01
    Object Type: Program


    0010 * THIS PROGRAM LISTS THE PATIENTS BY NAME
    0280 * SET UP THE FIRST READ KEY!
    0300 PERFORM READ-DATA
    0320 REPEAT
    0370   DECIDE ON FIRST VALUE OF *PF-KEY
    0390     VALUE "PF12", "PF24"
    0400     PERFORM XXEXIT
    0410     VALUE "PF3", "PF15"
    0420     ESCAPE ROUTINE
    0430     VALUE "FF8", "PF20"
    0440     IF #W-END-OF-DATA
    0460       ESCAPE TOP
    0470     END-IF
    0480     IF #W-PAGE-NUMBER = 100
    0500       ESCAPE TOP
    0510     END-IF
    0530     PERFORM READ-DATA
    0540     ESCAPE TOP
    0550     VALUE "PF7", "PF19"
    0570     PERFORM READ-DATA
    0590     ESCAPE TOP
    0600     VALUE "ENTR"
    0610     PERFORM PROCESS-SELECTED
    0620     NONE VALUE
    0640   END-DECIDE
    0660 END-REPEAT


    0680 DEFINE SUBROUTINE READ-DATA
    0730 READ PATIENT BY S2-SURNAME-PATIENT-ID
    0750   IF #V-NUMBER = 99999
    0760     ESCAPE TOP
    0770   END-IF
```

Figure 3-83 Sample Pseudo Code Report

How to Invoke Pseudo Code

Use the following navigation in the application workplace:

- Select the object required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Pseudo Code**.

NB: Pseudo Code is only available for Program, Subprogram, Subroutine, Helproutine, Copycode and Function type objects.

Field Tracking

The Field Tracking Option displays the usage of the selected item within the object where the value of the field could have been affected and then shows where the field is passed to or from, depending on whether Forward or Backward Tracking has been selected.

If the item is passed to or from another object then further usage of the passed or receiving field will be displayed.

The GenTree Structure Analyzer will display the field tracking for the selected item.

NB: System Variables cannot be tracked using these options.

The following Figure 3-84 illustrates a sample forward Field Tracking diagram.
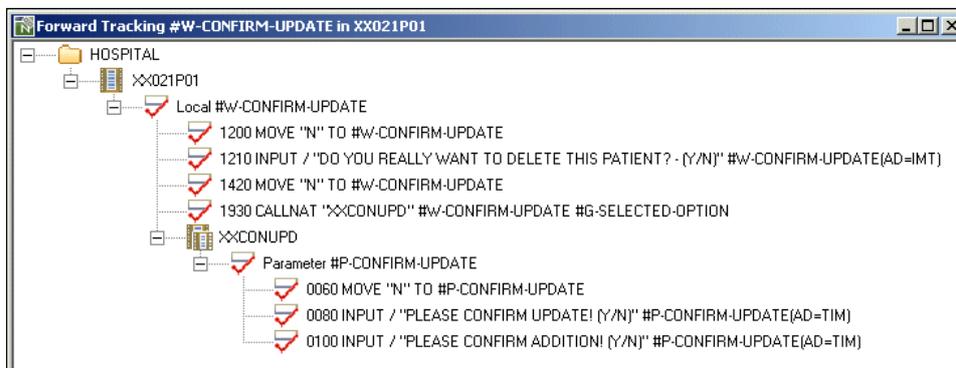
Figure 3-84 Sample Forward Field Tracking Diagram

A context menu is available on the GenTree structure to enable further forward/backward tracking of fields displayed on the diagram.

How to Invoke Field Tracking

Use the following navigation in the Object Viewer dialog:

- Select the item required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Field Tracking Forward/Backward**.

JCL Flow Chain

The JCL Flow Chain Option displays forward or backward tracing information on the flow of Jobs.

The information on the diagram is based on information loaded into the repository via the JCL Flow API (NEEAPI1). Attributes of each trigger e.g., colour, icon displayed are dependant on the trigger type. These are defined on the JCL Triggers tab of the Global Properties screen.

For further information on defining trigger types please see the Global Properties section of the Natural Engineer Administration Guide.

For further information on the JCL Flow API (NEEAPI1) please see the Natural Engineer Concepts & Facilities Guide.

The GenTree Structure Analyzer will display the JCL Flow for the selected JCL object.

The following Figure 3-85 illustrates a sample forward JCL Flow Chain Diagram.
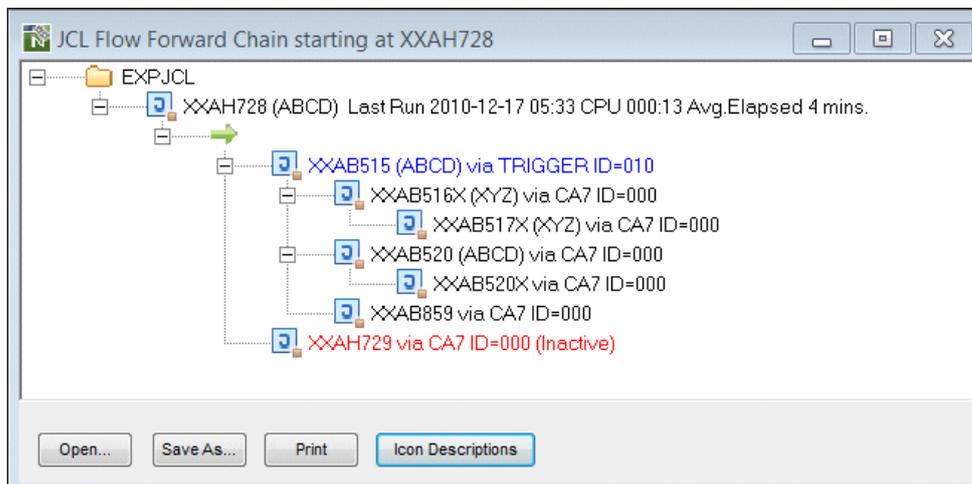
Figure 3-85 Sample Forward JCL Flow Chain Diagram

The following Figure 3-86 illustrates a sample backward JCL Flow Chain Diagram.
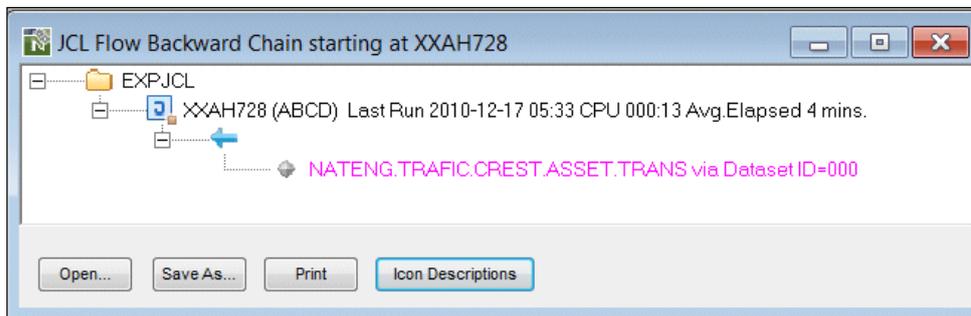
Figure 3-86 Sample Backward JCL Flow Chain Diagram

How to Invoke JCL Flow Chain

Use the following navigation in the site workplace:

- Select the JCL Object required.
- Single click with the right hand mouse button to invoke the context menu.
- Select the option: **JCL Flow Chain Forward/Backward.**

Database Key Usage

The Database Key Usage diagram shows all references for a selected key (DDM, SQL Table or Predict User View) for all applications within the repository.

The GenTree Structure Analyzer will display the Database Key Usage for the selected item.

The following Figure 3-87 illustrates a sample Database Key Usage diagram.
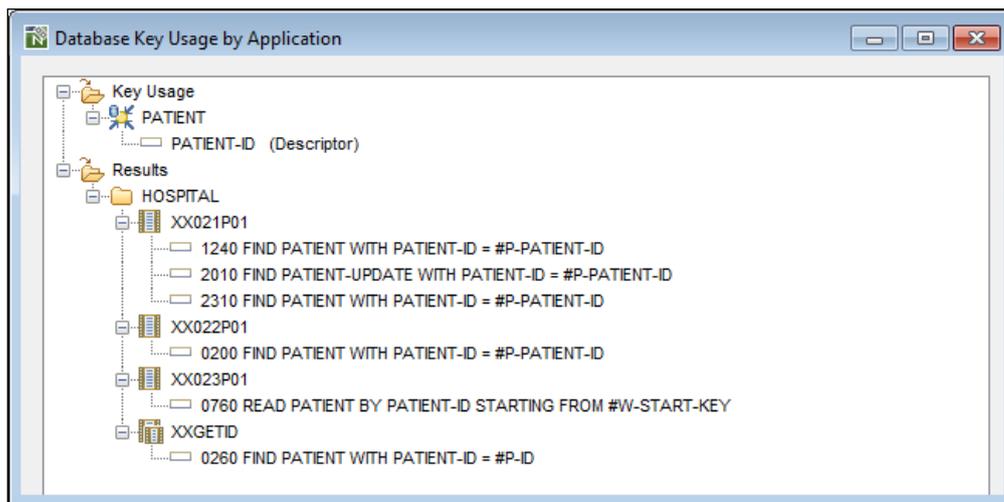
Figure 3-87 Sample Database Key Usage Diagram

How to Invoke Database Key Usage

Use the following navigation in the Object Viewer dialog, from Field List dialog when on a DDM or Predict User View or from SQL Table Viewer:

- Select the field required. This must be a key e.g. Descriptor/Super-descriptor.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Database Key Usage**.

Database Key Usage Context Menu

The Database Key Usage context menu is invoked by placing the cursor on either an object name node or on a Source Code node and using the right hand mouse button with a single click.

The following Figure 3-88 illustrates the Database Key Usage context menu on an object name.
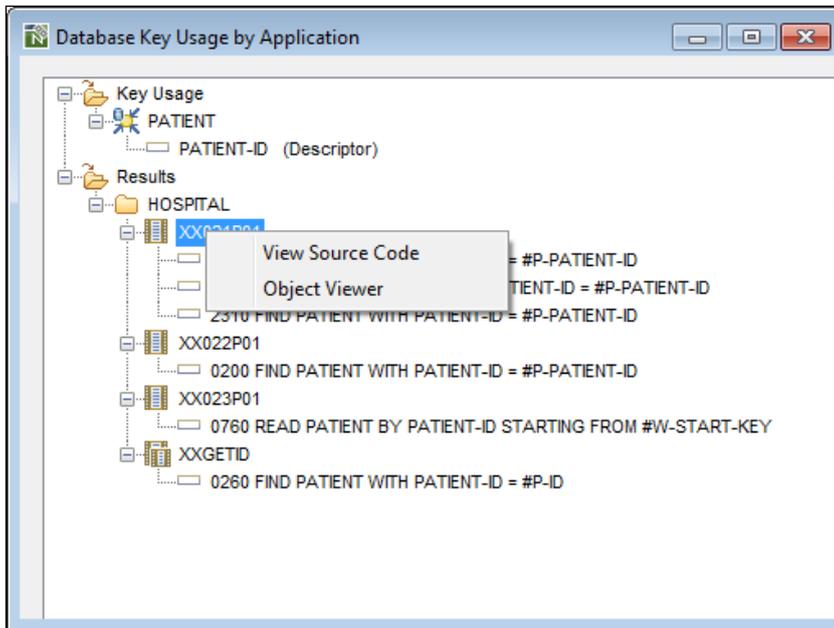
Figure 3-88 Database Key Usage (Object Node) context menu

CONTEXT MENU ITEM	DESCRIPTION
View Source Code	Invokes the View Source Code function for the selected object.
Object Viewer	Invokes the Object Viewer screen for the selected object.
Field Definitions	Invokes the Field Definitions screen for the key specified in the Source Code line.

Field Definitions

The Field Definitions diagram shows the field definitions and off-sets for a selected view.

The following Figure 3-89 illustrates a sample Field Definitions diagram.
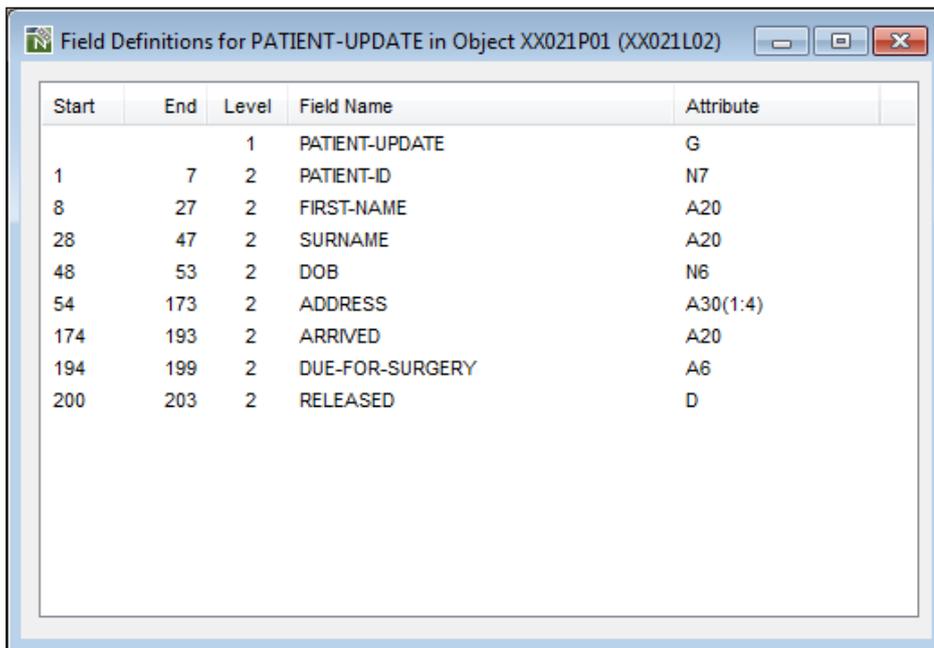
Figure 3-89 Sample Field Definitions Diagram

How to Invoke Field Definitions

Use the following navigation in the Database Key Usage diagram:

- Select the source code line required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Field Definitions**.

Global Object Usage

The Global Object Usage diagram shows a summary of which applications objects reside in. It is a global option and is applicable to all applications loaded into your repository.

If the application is restricted to the user via site security e.g., Natural Security or NEEUEX6 user exit then '** Access Denied **' will be shown next to the application name.

The information is presented on a single screen with the option to output detailed information, including where the objects are called from, to a report.

How to Invoke the Global Object Usage Option

Use the following navigation in the site workplace:

- Select the main Applications node.
- Single click with the right hand mouse button to invoke the context menu.
- Select the option: **Global Reports**.
- Select the option: **Global Object Usage**.

Global Object Usage Window

The Global Object Usage Window allows you to select an object or range of objects that you wish to find within all applications loaded into the repository. The summary list may be filtered by Language and/or Object Type if required.

Detailed information may be output to a standard report layout which will include where the objects are called from.

The following Figure 3-90 illustrates the Global Object Usage screen.
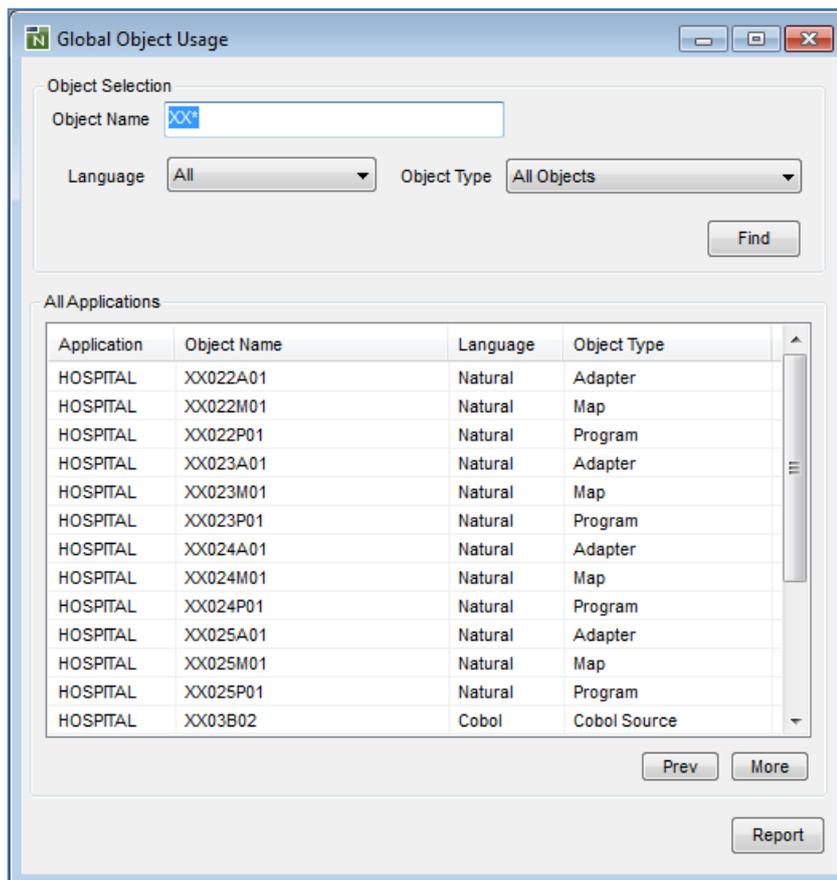
Figure 3-90 Global Object Usage screen

SCREEN ITEMS	DESCRIPTION

Object Selection Group:

Object Name	The name of the object to be used.
	A group of objects can be selected by typing in a part name using an '*' (asterisk) wildcard. For example 'XX001*' will include all objects that are prefixed with 'XX001'.
	All Objects can be selected by typing in a single '*' (asterisk).
Object Type	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**
- **JCL**
- **Natural**

Applications Group:

Application	List of all the Applications that have objects within them as identified by the selection criteria.
	Further refinement can be made using the option 'Change Start Position of Application List…' from the Global Object Usage context menu by using the **right hand mouse button**.
	Note: For more information on the Global Object Usage context menu, refer to section Global Object Usage Context Menu
	The Applications Group list title reflects the Applications being listed and will append any reposition values that may have been specified.

Object Name	The name of the Object.
Language	The language of the Object.
Object Type	The Object Type of the Object.

BUTTON NAME	DESCRIPTION
Object Selection group:	
Find	Will show the Applications that the Object Names as specified by the selection criteria reside in.
Applications group:	
Prev	Scrolls the 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 list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
Global Object Usage screen:	
Report	Will output detailed data to one of the standard report formats.
	Note: For more information on the content of the report refer to the Global Reports section in Chapter 3 of the Natural Engineer 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.

Global Object Usage Context Menu

The Global Object Usage context menu is invoked by placing the cursor on any of the items listed in the Applications lists and using the right hand mouse button with a single click. It allows you to navigate between the Global Object Usage screen and the Object Reference or Entry Point Structure Diagram or to filter the Application list. Any filtering will also be reflected in the Report if this is selected.

The following Figure 3-91 illustrates the Global Object Usage context menu
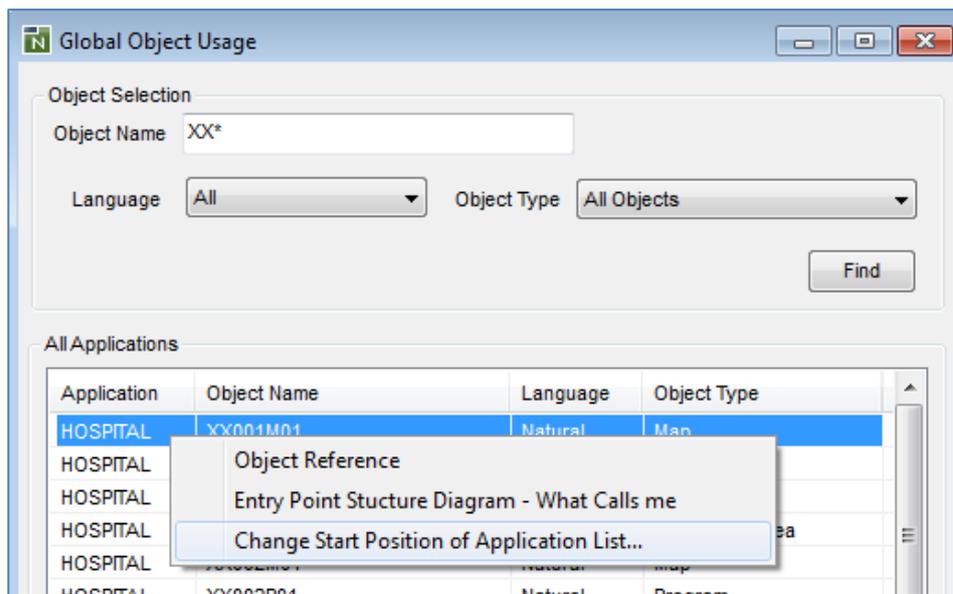
Figure 3-91 Global Object Usage context menu

CONTEXT MENU ITEM	DESCRIPTION
Object Reference	Invokes the Object Reference screen for the selected object.
Entry Point Structure Diagram – What Calls me	Invokes the Entry Point Structure Diagram in a Tree View (GenTree) using the What Calls me option for the selected object.

CONTEXT MENU ITEM	DESCRIPTION
Change Start Position of Application List…	Reposition the list of objects to start from a particular application 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 application list title to highlight the type of repositioning being applied.

Possible reposition values are:

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

Global Field Usage

The Global Field Usage diagram shows a summary of which applications fields reside in. It is a global option and is applicable to all applications loaded into your repository.

If the application is restricted to the user via site security e.g., Natural Security or NEEUEX6 user exit then '** Access Denied **' will be shown next to the application name.

The information is presented on a single screen with the option to output detailed information, including the keyword and line number associated with the field and the attribute of the field, to a report.

How to Invoke the Global Field Usage Option

Use the following navigation in the site workplace:

- Select the main Applications node.
- Single click with the right hand mouse button to invoke the context menu.
- Select the option: **Global Reports**.
- Select the option: **Global Field Usage**.

Global Field Usage Window

The Global Field Usage Window allows you to select a field or range of fields that you wish to find within all applications loaded into the repository. The summary list may be filtered by Language and/or Object Type if required.

Detailed information may be output to a standard report layout which will include the attribute of the field and the keyword/line number associated with the field.

The following Figure 3-92 illustrates the Global Field Usage screen.

Figure 3-92 Global Field Usage screen

SCREEN ITEMS	DESCRIPTION
Field Selection Group:	
Field Name	The name of the field to be used.
	The field name can be typed in. A group of fields can be selected by typing in a part name using an '*' (asterisk) wildcard. For example
	'#M-YEAR*' will include all field names that begin with '#M-YEAR'.
	It is not possible to search for All Field using just a single '*' (asterisk).
Include objects with definitions only	If this is selected then objects will also be listed that contain the field but where the field is defined only i.e., not used within the procedural code. If this option is not selected then objects will only be shown where the field is defined and used within the object.
Object Type	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**
	▪ **JCL**
	▪ **Natural**
Applications Group:	
Application	List of all the Applications that have the Field Names within them as identified by the selection criteria.
	Further refinement can be made using the option 'Change Start Position of Application List…' from the Global Field Usage context menu by using the **right hand mouse button**.
	Note: For more information on the Global Field Usage context menu, refer to section Global Field Usage Context Menu
	The Applications Group list title reflects the Applications being listed and will append any reposition values that may have been specified.
Field Name	The name of the Field.
Object Name	The name of the Object.
Language	The language of the Object.
Object Type	The Object Type of the Object.

BUTTON NAME	DESCRIPTION

Field Selection group:

Find
Will show the Applications that the Field Names as specified by the selection criteria reside in.

Applications group:

Prev
Scrolls the 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 list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.

Global Field Usage screen:

Report
Will output detailed data to one of the standard report formats.

Note: For more information on the content of the report refer to the Global Reports section in Chapter 3 of the Natural Engineer 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.

Global Field Usage Context Menu

The Global Field Usage context menu is invoked by placing the cursor on any of the items listed in the Applications lists and using the right hand mouse button with a single click. It allows you to filter the Application list.

Any filtering applied will also be reflected in the Report if this is selected.

The following Figure 3-93 illustrates the Global Field Usage context menu
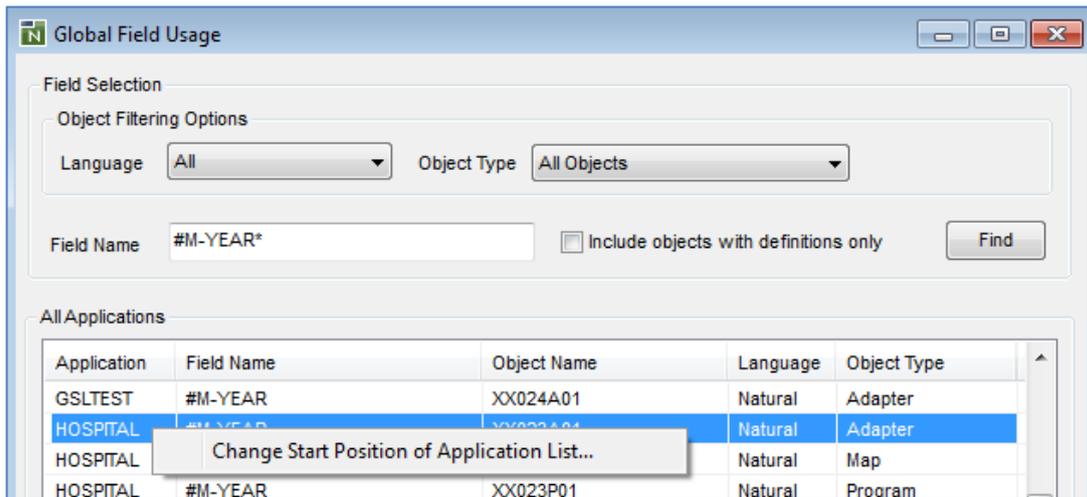
Figure 3-93 Global Field Usage context menu

CONTEXT MENU ITEM	DESCRIPTION
Change Start Position of Application List…	Reposition the list of objects to start from a particular application 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 application list title to highlight the type of repositioning being applied. Possible reposition values are:

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

Decision Tables

A decision table is used to show conditional logic by creating a list of associated actions representing business level rules.

The information is presented on a single screen.

How to Invoke the Decision Tables Option

Use the following navigation in the site workplace:

- Select the Object required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Decision Tables**.

Decision Tables Window

Each conditional block is shown as a separate decision table. Within each decision table there are conditions, rules and actions shown.

Due to restrictions in displaying items on an interactive screen there is a limit of 4000 Decision Tables, 100 Conditions, 100 Actions and 30 Rules. Objects with items greater than these may export the data to an EXCEL spreadsheet to see all the information.

If you select one of the conditions in the Conditions group a separate screen will be displayed showing the source code positioned at the statement number pertaining to that particular condition number.

Each Decision Table, Condition or Action may have their name changed to better reflect the business nature of the item. Please note that if the application or object is re-loaded into the repository or the Decision Table Analysis re-run for an object then the names will revert to their default settings.

The following Figure 3-94 illustrates the Decision Tables screen.

Figure 3-94 Decision Tables screen

SCREEN ITEMS	DESCRIPTION
Decision Tables group:	
T#	The number of the Table.
Table Name	The name of each separate conditional block.
Conditions group:	
C#	The number of the Condition.
Stt No.	The statement number of the condition.
Ext. Obj	The name of the object that contains the statement if the statement is present in an external object e.g., a Natural copycode object or COBOL copybook.
Condition	The syntax of the conditional logic.
Rule 'n'	Will be set to 'Y' if the condition is true or 'N' if false.
Actions group:	
A#	The number of the Action.
Stt No.	The statement number of the action.
Ext. Obj	The name of the object that contains the statement if the statement is present in an external object e.g., a Natural copycode object or COBOL copybook.
Action	The syntax of the logic executed within the rule.
Rule 'n'	Will be set to 'Y' if the action is executed by the rule.

BUTTON NAME	DESCRIPTION
Export	Will export the data to an EXCEL spreadsheet.
Cancel	Will cancel the Decision Tables screen and return to the main Natural Engineer Window.

Decision Tables Context Menu

The Decision Tables context menu is invoked by placing the cursor on any of the rows in the Decision Tables, Conditions or Actions boxes and using the right hand mouse button with a single click.

CONTEXT MENU ITEM	DESCRIPTION
Decision Tables group:	
Update Table Name	Invokes a pop-up screen allowing the name of the table to be changed.
Export Table	Will export the details for the table to an EXCEL Spreadsheet.
Conditions group:	
Update Condition	Invokes a pop-up screen allowing the name of the condition to be changed.
Actions group:	
Update Action	Invokes a pop-up screen allowing the name of the action to be changed.
Delete Action	Will delete the selected action.

Object Usage

The Object Usage diagram shows the objects used within an application and the amount of times they are called. Selecting a particular object will show the statements where the selected object is used.

The information is presented on a single screen.

How to Invoke the Object Usage Option

Use the following navigation in the site workplace:

- Select the Application required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Object Usage**.

Object Usage Window

The Object Usage Window allows you to select an object or range of objects that you wish to find within the selected applications. The summary list may be filtered by Language and/or Object Type if required.

Detailed information may be exported to a spreadsheet.

The following Figure 3-95 illustrates the Object Usage screen.
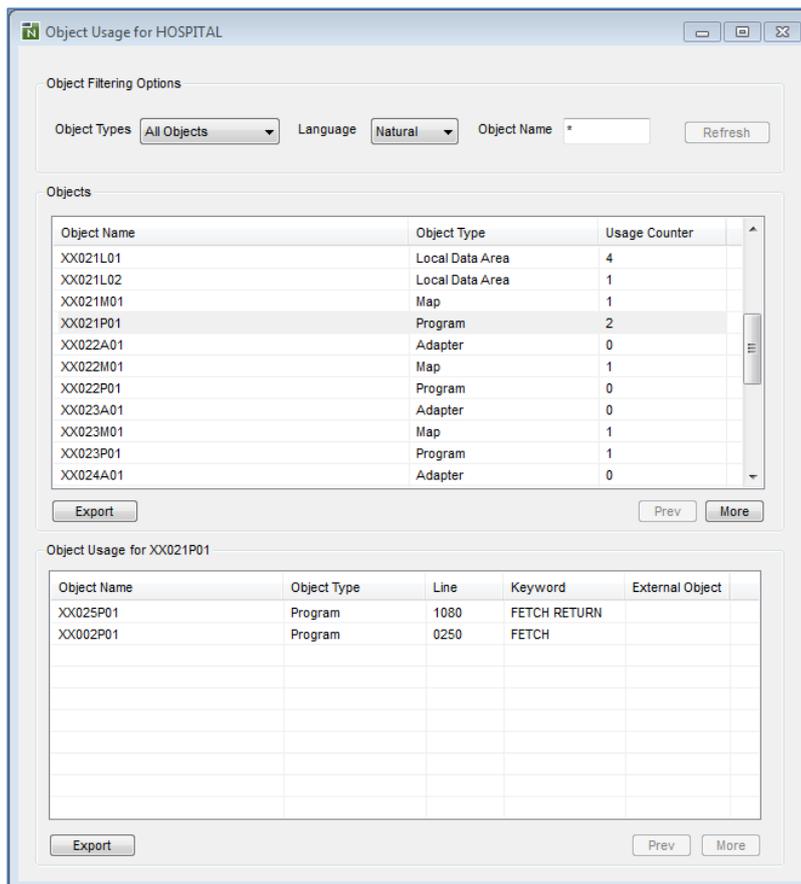
Figure 3-95 Object Usage screen

SCREEN ITEMS	DESCRIPTION

Object Filtering group:

Object Name
The name of the object to be used.

A group of objects can be selected by typing in a part name using an '*' (asterisk) wildcard. For example 'XX001*' will include all objects that are prefixed with 'XX001'.

All Objects can be selected by typing in a single '*' (asterisk).

Object Type
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**
- **JCL**
- **Natural**

Objects group:

Object Name
The name of the Object.

Object Type
The Object Type of the Object.

Usage Counter
The number of times the Object is referenced within the Application.

Object Usage group:

Object Name
The name of the Object containing the reference to the Object.

Object Type
The Object Type of the Object containing the reference to the Object.

Line
The statement line number for the Object reference within the selected object.

Keyword
The syntax of the statement referencing the Object.

External Object
The name of the object that contains the statement if the statement is present in an external object e.g., a Natural copycode object or COBOL copybook.

BUTTON NAME	DESCRIPTION
Object Filtering group:	
Refresh	Will refresh the data in the Objects and Object Usage windows following a change in Object Name criteria.
Objects group:	
Prev	Scrolls the Objects 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 Objects 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 Object data to a spreadsheet.
Object Usage group:	
Prev	Scrolls the Object Usage 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 Usage 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 Object Usage data to a spreadsheet.

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

Object Usage Context Menu

The Object Usage context menu is invoked by placing the cursor on any of the rows in the Objects or Object Usage boxes and using the right hand mouse button with a single click.

CONTEXT MENU ITEM	DESCRIPTION
Object Viewer	Invoke the Object Viewer screen for the Natural or COBOL Program selected. *Note: Not available for JCL, SQL or COBOL Link Objects.*
Object Reference	Invoke the Object Reference screen for the Natural or COBOL Program selected. *Note: Not available for JCL or SQL Objects.*
Object Entry Point Diagram	Invoke the Entry Point Structure Diagram for the Natural or COBOL Program selected. *Note: Not available for JCL or SQL Objects.*
Object Documentation	Invoke the Object Documentation screen for the Object selected.
JCL Viewer	Invoke the JCL Viewer for the selected JCL Object. *Note: Only available for JCL Objects.*
SQL Table Viewer	Invoke the SQL Table Viewer for the selected SQL Object. *Note: Only available for SQL Objects.*
View Source Code	Display the selected Object source code.

4

APPLICATION INVENTORY

Chapter Overview

This chapter provides a basic overview of the reporting available for the Applications within Natural Engineer.

Once an application has been defined and then extracted from the Natural application library and loaded into the Repository, Natural Engineer provides a series of reports that detail the structure and contents of the applications.

This chapter overviews the following Reporting options:

1. Quality Logs

2. Application Reports

Note: This chapter does not describe the individual reports available in the Quality Logs and Application Reports options from the Environment menu. For more information on these reports refer to the Natural Engineer Reporting manual.

Quality Logs

The Quality Logs provides information on errors that have occurred during both the Extract and Load processes, as well as any missing or unused objects from the Natural application being processed.

How to Invoke the Quality Logs Option

Use the following navigation in the site workplace:

* Select the application node required.

* Single click with the right hand mouse button to invoke the context menu.

* Select the option: **Quality Logs**. This will open a sub-menu of further options.

* Select the report required.

Quality Log Reports

The following list illustrates the Quality Log reports that are available:

- Extract Source Code
- Extract Source Code Summary
- Load Repository
- Load Audit Trail
- Missing Objects
- Unused Objects

The Extract Source Code and Extract Source Code Summary quality logs relate to the Extract process and are only available if there has been a problem during the Extract execution.

The following lists the options that may trigger these quality logs:
- Extract Source Code
- Extract & Load
- Extract Missing Objects

Natural Engineer Application Management

The Load Repository quality log relates to the Load process and is only available if there has been a problem during the Load execution.

The following lists the options that may trigger this quality log:

- Load Repository
- Extract & Load

The Missing Objects and Unused Objects quality logs only become available after the Load process has been executed. These quality logs rely on the Load process to generate the object information required to identify missing and unused objects.

The following lists the options that may trigger these quality logs:

- Load Repository
- Extract & Load

The Load Audit Trail quality logs only become available after the Load process has been executed and the Activate Load Audit Trail setting is selected within Global Properties. The Load Audit Trail will invoke a screen where a date range to limit the report may be applied and housekeeping to maintain the Load Audit Trail records performed.

The following lists the options that may trigger these quality logs:

- Load Repository

Note: For more information on the Quality Logs refer to Chapter 3 in the Natural Engineer Reporting manual.

Load Audit Trail

The Load Audit Trail option identifies any objects that when loaded have had a different timestamp to the corresponding object within the repository.

How to Invoke the Load Audit Trail Report

The Load Audit Trail Report is available from the Quality Logs menu when an Application has been loaded and the Activate Load Audit Trail setting is selected in Global Properties.

The following Figure 4-1 illustrates the Load Audit Trail screen.
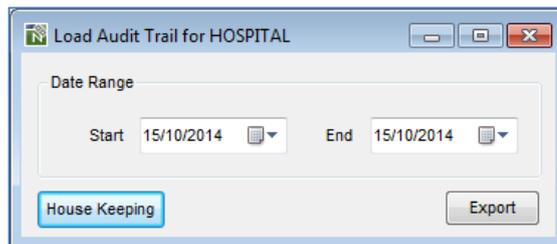
Figure 4-1 Load Audit Trail

SCREEN ITEMS	DESCRIPTION
Date Range Group:	
Start	Insert the start date for the information to be shown on the report.
End	Insert the end date for the information to be shown on the report..

BUTTON NAME	DESCRIPTION
Housekeeping	Invoke the Load Audit Trail Housekeeping screen to maintain the Load Audit Trail records within the repository.
Export	Exports the report for the dates chosen to a spreadsheet e.g., Microsoft Excel.

Note: For more information on the Load Audit Trail Report refer to Chapter 3 in the Natural Engineer Reporting manual.

Load Audit Trail Housekeeping

The Load Audit Trail Housekeeping allows for Load Audit Trail records to be deleted from the repository based on a date. It is invoked via the housekeeping button on the Load Audit trail report screen.

The following Figure 4-2 illustrates the Load Audit Trail Housekeeping screen.
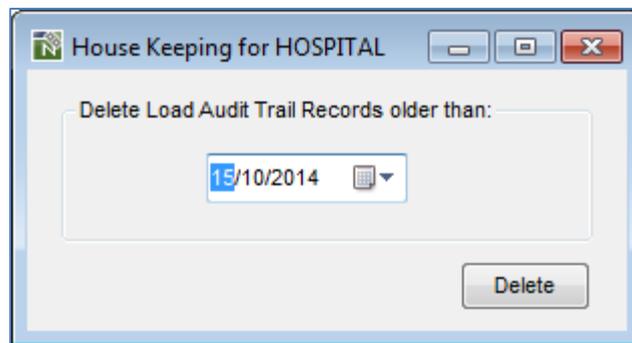
Figure 4-2 Load Audit Trail Housekeeping

BUTTON NAME	DESCRIPTION
Delete	Will delete any Load Audit Trail records that are older than the date selected.

Application Reports

The Application Reports provide various levels of Analysis information on the application after it is loaded in the Repository (i.e., before Impact Analysis).

How to Invoke the Application Reports Option

Use the following navigation in the site workplace:

* Select the application required.

* Single click with the right hand mouse button to invoke the context menu.

* Select the option: **Reports**. This will open a sub-menu of further options.

* Select the report required.

Application Reports

The following list illustrates the Application Reports that are available:

- Soft Links Report
- Source Code Summary
- Object Summary
- Keywords Summary
- Literals Summary
- Object Overview
- Objects Referencing Objects
- Objects Referenced by Objects
- Objects Referenced by DDM fields
- External Objects Referenced by Objects
- Construct Models Referenced by Objects
- DDMs Referenced
- DDMs Referenced by Objects
- DDMs Accessed by Objects
- Database Data Requirements
- Database Access(CRUD)
- Database Access(CRUD) by Objects
- Data Item Inventory
- Data Item Usage Inventory
- Steplib Object Reference
- View Source Code

The Application Reports option becomes available after the application has been loaded into the Repository.

Note: For more information on the Application Reports refer to Chapter 3 in the Natural Engineer Reporting manual.

APPLICATION METRICS

Chapter Overview

This chapter describes the various options available under the Application Metrics option found on the Environment menu.

The Application Metrics option provides summary and detailed information about the application, objects and source code, for the purpose of providing structural statistics, complexity and quality information.

Reports

The Application Metrics Graphics option will produce graphed reports to show various measurement and complexity information on the objects within an application.

How to Invoke the Application Metrics Option

Use the following navigation in the site workplace:

*   Select the application required.

*   Single click with the right hand mouse button to invoke the context menu.

*   Select the option: **Application Metrics**.

*   Select the report required.

Application Metrics Reports

The reports available are:

1.   Object Type Summary
The Object Type Summary graphed report will display the number of objects per object type being used within an application.

2.   Object Size
The Object Size graphed report will display the number of objects within specified object size ranges within an application.

3.   Object Usage
The Object Usage graphed report will display the number of times objects are referenced within an application.

4.   Object Statistics
The Object Statistics report provides summary and detailed information about the application, objects and code, for the purpose of providing structural statistics e.g., Halstead and McCabe.

Note: For more information on the Application Metrics Graphics reports refer to Chapter 2 in the Natural Engineer Reporting manual.

MANAGING DATA DEFINITION MODULES

Chapter Overview

This chapter describes how to select and manage global Data Definition Modules for processing in Natural Engineer.

Whenever an object is loaded into the Natural Engineer repository that uses a Data Definition Module, Natural Engineer will add an entry to the relevant Data Definition Module node. This allows the user to have a global view of the DDMs and applications over their whole site.

The node is structured as follows;

- DDM Name1

    o Application1

    o Application2

Unused DDM Items

The Unused DDM Items option provides the facility to review unused keys and fields within DDM objects, within the applications loaded into the Repository.

The queries can be run for all DDMs or for a selected DDM only. The results are displayed online using a tree view structure, and can also be printed using standard textual report display options.

It is possible to limit the output of the report by specifying an [Application Filter](#).

How to Invoke the Unused DDM Items

Use the following navigation in the application workspace:

- Select the top level Data Definition Modules node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Unused DDM Items**.

The Unused DDM Items screen may also be invoked from a DDM Object Sub-node of the top level Data Definition Modules node section.

Unused DDM Items Window

The Unused DDM Items window displays all the DDMs that are loaded in the Repository. The various reviewing options are accessed from context menus attached to the various nodes in the DDM List tree view.

The following Figure 6-1 illustrates the Unused DDM Items screen.
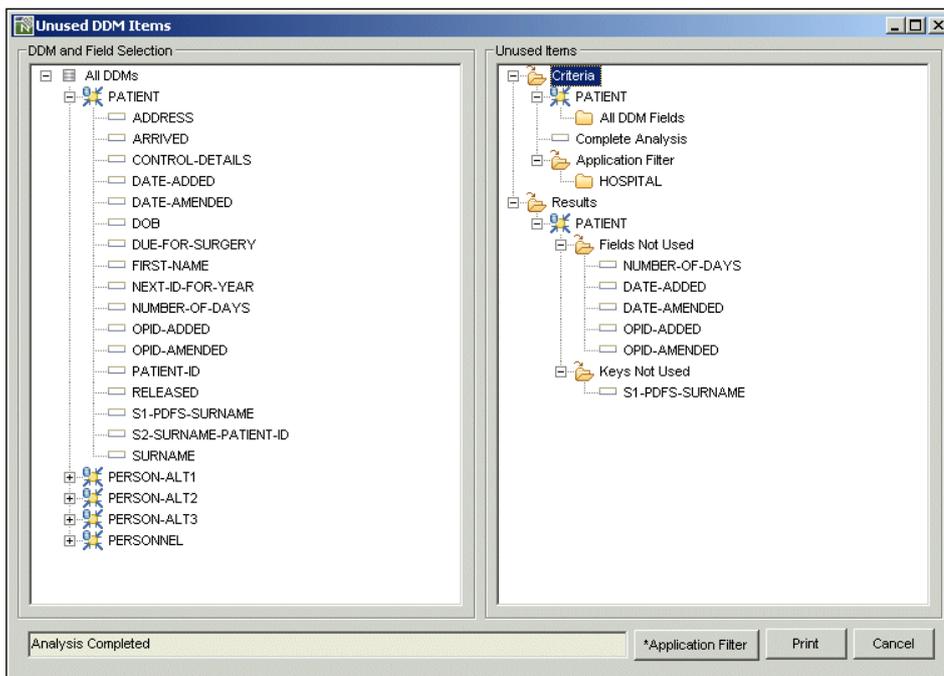
Figure 6-1 Unused DDM Items screen

SCREEN ITEMS	DESCRIPTION
DDM and Field Selection Workspace	This is a tree view window used to display all the DDMs loaded in the Repository and for each selected DDM, the fields and keys for that DDM. Context menus are available for the various nodes to provide the reviewing options available for the selected node.

Note: For more information on the context menus refer to the section Unused DDM Items Context Menus.

The DDM and Field Selection workspace is a hierarchical structured display controlled by three nodes:

NODE	DESCRIPTION
All DDMs	All the loaded DDMs are located under this node.
	The DDMs available can be expanded and collapsed by clicking on the plus or minus signs in front of the All DDMs node.
	The number of DDMs shown can be controlled by the LISTBOXMAX parameter in the NATENG.INI file.
	If the number of DDMs exceeds the LISTBOXMAX parameter value, then the list become scrollable via prev and more icons. The prev icon will scroll the list to the previous page, and, the more icon will scroll the list forward one page.
	Note: For more information on the NATENG.INI file parameter LISTBOXMAX refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.
DDM	The DDM fields and keys within each DDM are listed from this node.
	The DDM fields and keys available can be expanded and collapsed by clicking on the plus or minus signs in front of each DDM node.
DDM Item	The DDM fields and keys.
	There is no expand/collapse functionality for this node.

SCREEN ITEMS	DESCRIPTION
Unused Items workspace	The Unused DDM Items results can be viewed here.
	The Unused Items workspace utilizes a tree view structure to display the review results.
	The criteria used to produce the results are displayed at the top of the tree view structure.
	If any Application Filters have been defined these will be displayed at the top of the treeview structure as well.
Processing Status	Any Unused DDM Items processing messages.

BUTTON NAME	DESCRIPTION
Application Filter	Invoke the Application Filter screen.
	If any Application Filters are specified, the Application Filters button will have an '*' (asterisk) showing to the left of the button text.
	If no Application Filter is specified then the function will run against all applications by default.
Print	Invoke the Report Confirmation process.
Cancel	Cancel the Unused DDM Items process and close the current screen.

Unused DDM Items Context Menus

Context menus are available to the various nodes within the DDM and Field Selection workspace. These provide the reviewing options available at the selected node level. To invoke a context menu:

- Select the node for which you want to invoke the context menu for.

- Single click with the right hand mouse button.

- The context menu will appear, choose the option you require.

All DDMs Node Context Menu

CONTEXT MENU ITEM	DESCRIPTION
Run Key Analysis for All DDMs	Invokes the Unused DDM Items process to report on unused keys in all DDMs.
Run Field Analysis for All DDMs	Invokes the Unused DDM Items process to report on unused fields in all DDMs.
Run Complete Analysis for All DDMs	Invokes the Unused DDM Items process to report on unused keys and fields in all DDMs.
Change Start Position of DDM List…	Reposition the list of DDMs to start from a particular DDM name.
	This option is not available if the screen has been invoked from a single DDM.
	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 DDM list title to highlight the type of repositioning being applied.
	Possible reposition values are:

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

DDM Node Context Menu

CONTEXT MENU ITEM	DESCRIPTION
Run Key Analysis for Selected DDM	Invokes the Unused DDM Items process to report on unused keys for the selected DDM.
Run Field Analysis for Selected DDM	Invokes the Unused DDM Items process to report on unused fields for the selected DDM.

CONTEXT MENU ITEM	DESCRIPTION
Run Complete Analysis for Selected DDM	Invokes the Unused DDM Items process to report on unused keys and fields for the selected DDM.

DDM Item Node Context Menu

CONTEXT MENU ITEM	DESCRIPTION
Run Key Analysis for Selected Field	Invokes the Unused DDM Items process to report on unused keys for the selected field
	Note: This option is only available for fields that have been defined as keys. For example: descriptors, superdescriptors.
Run Field Analysis for Selected Field	Invokes the Unused DDM Items process to report on unused fields for the selected field.
	Note: This option is only available for non-key fields.

DDM Field Usage

The DDM Field Usage option provides the facility to show where a DDM field is used within the applications loaded into the repository.

The queries can be run for all DDMs or for a selected DDM only. The results are displayed online using a tree view structure, and can also be printed using standard textual report display options.

It is possible to limit the output of the report by specifying an Application Filter.

How to Invoke DDM Field Usage

Use the following navigation in the application workspace:

- Select the top level Data Definition Modules node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **DDM Field Usage**.

The DDM Field Usage screen may also be invoked from a DDM Object Sub-node of the top level Data Definition Modules node section.

DDM Field Usage Window

The DDM Field Usage window displays all the DDMs that are loaded in the Repository. The various reviewing options are accessed from context menus attached to the various nodes in the DDM List tree view.

The following Figure 6-2 illustrates the DDM Field Usage screen.
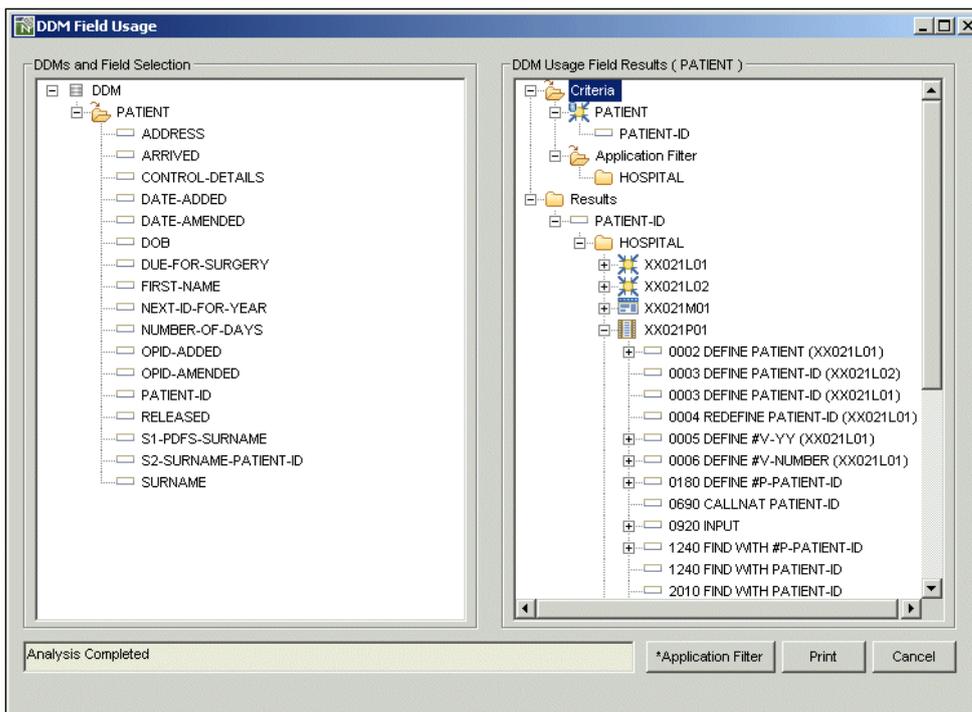
Figure 6-2 DDM Field Usage screen

SCREEN ITEMS	DESCRIPTION
DDM and Field Selection Workspace	This is a tree view window used to display all the DDMs loaded in the Repository and for each selected DDM, the fields and keys for that DDM. Context menus are available for the various nodes to provide the reviewing options available for the selected node.
	Note: For more information on the context menus refer to the section <u>DDM Field Usage Context Menus</u>.
	The DDM and Field Selection workspace is a hierarchical structured display controlled by three nodes:

NODE	DESCRIPTION
All DDMs	All the loaded DDMs are located under this node.
	The DDMs available can be expanded and collapsed by clicking on the plus or minus signs in front of the All DDMs node.
	The number of DDMs shown can be controlled by the LISTBOXMAX parameter in the NATENG.INI file.
	If the number of DDMs exceeds the LISTBOXMAX parameter value, then the list become scrollable via prev and more icons. The prev icon will scroll the list to the previous page, and, the more icon will scroll the list forward one page.
	Note: For more information on the NATENG.INI file parameter LISTBOXMAX refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.
DDM	The DDM fields and keys within each DDM are listed from this node.
	The DDM fields and keys available can be expanded and collapsed by clicking on the plus or minus signs in front of each DDM node.
DDM Item	The DDM fields and keys.
	There is no expand/collapse functionality for this node.

SCREEN ITEMS	DESCRIPTION
DDM Usage workspace	The DDM Field Usage results can be viewed here.
	The DDM Field Usage workspace utilizes a tree view structure to display the review results.
	The criteria used to produce the results are displayed at the top of the tree view structure.
	If any Application Filters have been defined these will be displayed at the top of the treeview structure as well.
Processing Status	Any DDM Field Usage processing messages.

BUTTON NAME	DESCRIPTION
Application Filter	Invoke the Application Filter screen.
	If any Application Filters are specified, the Application Filters button will have an '*' (asterisk) showing to the left of the button text.
	If no Application Filter is specified then the function will run against all applications by default.
Print	Invoke the Report Confirmation process.
Cancel	Cancel the DDM Field Usage process and close the current screen.

DDM Field Usage Context Menus

Context menus are available to the various nodes within the DDM and Field Selection workspace. These provide the reviewing options available at the selected node level. To invoke a context menu:

- Select the node for which you want to invoke the context menu for.

- Single click with the right hand mouse button.

- The context menu will appear, choose the option you require.

All DDMs Node Context Menu

CONTEXT MENU ITEM	DESCRIPTION
Change Start Position of DDM List…	Reposition the list of DDMs to start from a particular DDM name.
	This option is not available if the screen has been invoked from a single DDM.
	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 DDM list title to highlight the type of repositioning being applied.
	Possible reposition values are:

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

DDM Item Node Context Menu

CONTEXT MENU ITEM	DESCRIPTION
Perform Field Analysis	Invokes the DDM Field Usage processing to show where the DDM field is used.

Application Filter

The Application Filter screen provides a means of creating a sub-set of objects which a particular function will run against.

Applications are selected from the 'Select from' list (on left-hand side of dialog) and are transferred to the 'Selected' list (on right-hand side of dialog).

Once all selections have been made, the applications now form the Application Filter, which will be used during the execution of the function. Only applications within the Application Filter will be impacted.

If no Application Filter is set then the functions will run against all the objects in the application.

The functions that use an Application Filter include:

- Unused DDM Items

- DDM Field Usage

Application Filter Window

The Application Filter screen is accessed using the 'Application Filter' button from the relevant function.

The following Figure 6-2-1 illustrates the Application Filter screen.
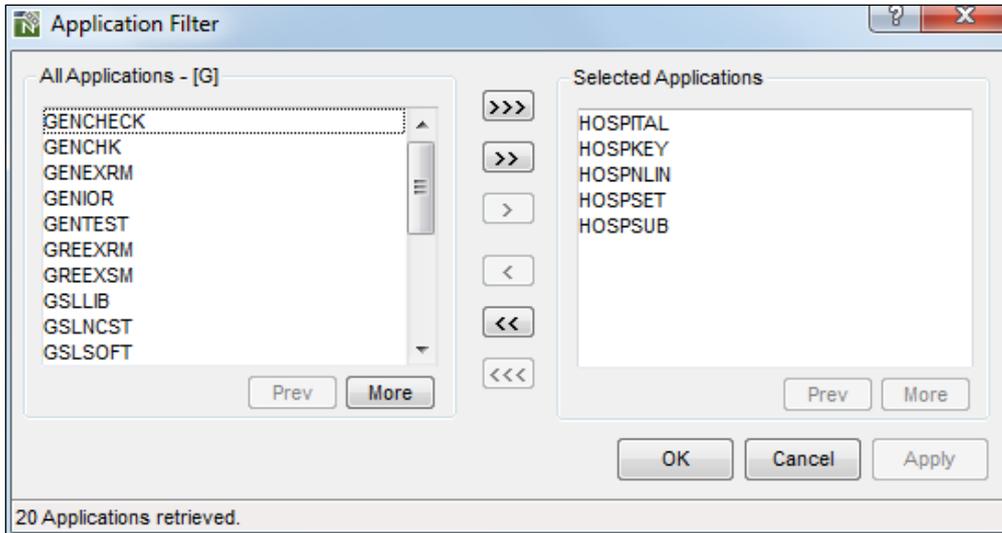
Figure 6-2-1 Application Filter screen

SCREEN ITEMS	DESCRIPTION
All Applications	List of all the applications in the repository.
Selected Applications	Lists all the applications that have been selected for the current function. Applications can be de-selected by using a double click with the **left hand mouse button**.

BUTTON NAME	DESCRIPTION
All Applications group:	
Prev	Scrolls the application 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 application 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 applications in the application list (when more than one page is available, as set by the LISTBOXMAX parameter in the NATENG.INI file).
>>	Select all applications on the current page in the applications list.
>	Select all applications in the applications list.
<	De-select all selected applications in the selected list.
<<	De-select all applications on the current page in the selected list.
<<<	De-select all applications in the selected list (when more than one page is available, as set by the LISTBOXMAX parameter in the NATENG.INI file).
Selected Applications group:	
Prev	Scrolls the applications 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 applications list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
Application Filter screen:	
OK	Save the Application Filter settings.
Cancel	Cancel the Application Filter process and return back to the previous screen.
Apply	Save changes and retain the current screen. *Note: This button is only enabled if any changes have been made.*

CONTEXT MENU ITEM	DESCRIPTION

CONTEXT MENU ITEM	DESCRIPTION
Change Start Position of Application List…	Reposition the list of applications to start from a particular application 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 application list title to highlight the type of repositioning being applied.
	Possible reposition values are:

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

Database Access (CRUD) by Application

The Database Access (CRUD) by Application option shows all applications that contain any database access for a selected DDM or Predict User View and the type of access i.e., whether it is Created, Read, Updated and/or Deleted.

How to Invoke the Database Access (CRUD) by Application Option

Use the following navigation in the site workplace:

- Select the DDM Object from within the top level Data Definition Modules node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Database Access (CRUD) by Application.**

The Database Access (CRUD) by Application screen may also be invoked from the DDM Sub-node of the Database Node section or the Predict User View from the Predict User View file node.

Database Access (CRUD) by Application Window

All Applications that access the selected DDM/Predict User View name and the type of access is shown.

The following Figure 6-3 illustrates the Database Access (CRUD) by Application screen.
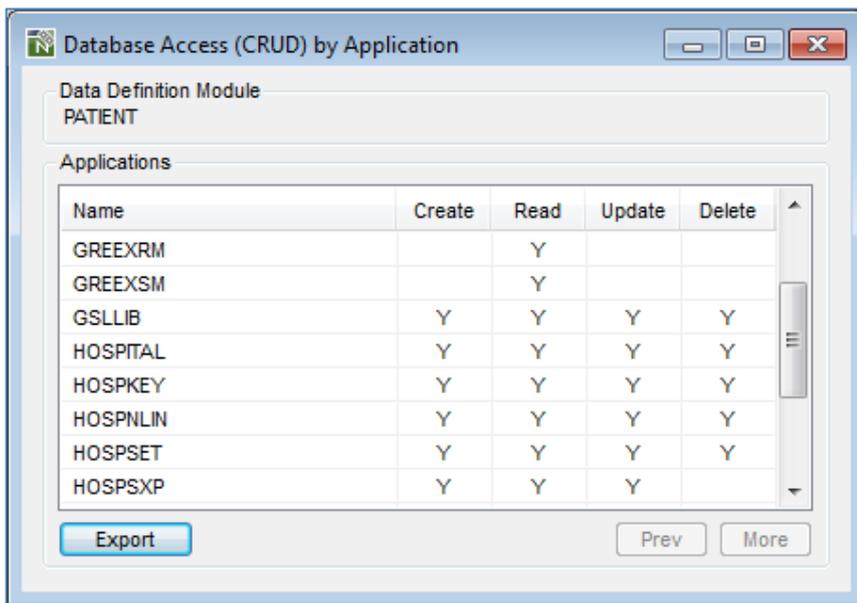
Figure 6-3 Database Access (CRUD) by Application screen

SCREEN ITEMS	DESCRIPTION
Data Definition Module/Predict User View	The name of the object.
Applications	Lists the Applications and type of access.
	A context menu is available to navigate between the Database Access (CRUD) by Application screen and the Database Access (CRUD) by Object screen or to Change the Start position of the Application List by using the **right hand mouse button** on a selected row.
	The columns available are:
	Name — The name of the Application containing the access to the DDM.
	Create — Will be set to Y if the field is used in a CREATE(STORE) statement in the application.
	Read — Will be set to Y if the field is used in a READ(BROWSE) statement in the application.
	Update — Will be set to Y if the field is used in an UPDATE statement in the application.
	Delete — Will be set to Y if the field is used in a DELETE statement in the application.

BUTTON NAME	DESCRIPTION
Prev	Scrolls the Application 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 Application 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	Allows the work file layout to be exported to a spreadsheet e.g., Microsoft Excel.

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

Database Field Access (CRUD) by Application

The Database Field Access (CRUD) by Application option shows all applications that contain any database access for a selected DDM and the type of access i.e., whether the DDM is Created, Read, Updated and/or Deleted.

How to Invoke the Database Field Access (CRUD) by Application Option

The Database Field Access (CRUD) by Application option may be invoked from the context menu of the DDM Field List screen.

Database Field Access (CRUD) by Application Window

All Applications that access the selected DDM/DDM Field Name combination and the type of access is shown.

The following Figure 6-4 illustrates the Database Field Access (CRUD) by Application screen.
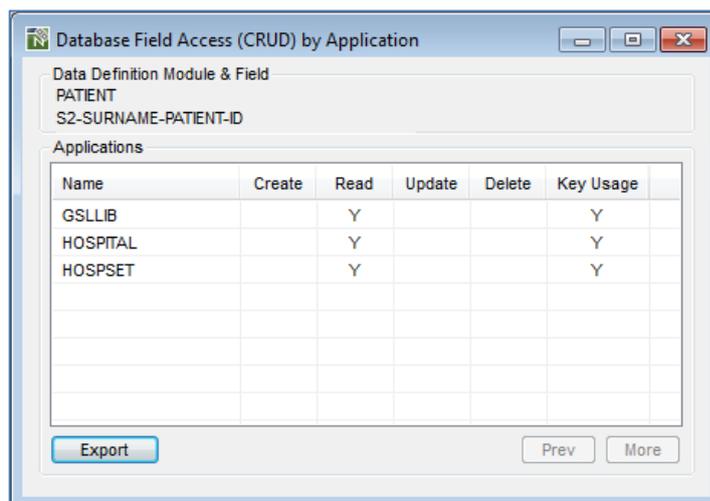
Figure 6-4 Database Field Access (CRUD) by Application screen

SCREEN ITEMS	DESCRIPTION
Data Definition Module & Field	The name of the DDM and DDM Field.
Applications	Lists the Applications and type of access. A context menu is available to navigate between the Database Field Access (CRUD) by Application screen and the Database Access (CRUD) by Object screen or to Change the Start position of the Application List by using the **right hand mouse button** on a selected row. The columns available are:
	Name The name of the Application containing the access to the DDM.
	Create Will be set to Y if the field is used in a CREATE(STORE) statement in the application.
	Read Will be set to Y if the field is used in a READ(BROWSE) statement in the application.
	Update Will be set to Y if the field is used in an UPDATE statement in the application.
	Delete Will be set to Y if the field is used in a DELETE statement in the application.
	Key Usage Will be set to Y if the field is used as a key within the application.

BUTTON NAME	DESCRIPTION
Prev	Scrolls the Application 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 Application 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	Allows the work file layout to be exported to a spreadsheet e.g., Microsoft Excel.

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

Field List

The Field list option shows field information, attributes and definitions for a selected DDM or Predict User View.

How to Invoke the Field List Option

Use the following navigation in the site workplace:

- Select the DDM Object from within the top level Data Definition Modules node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Field List.**

The Field list may also be accessed from a DDM Object underneath the Databases Node or from a Predict User View underneath the Predict User view node.

Field List Window

The following Figure 6-5 illustrates the Field List screen for a DDM.

Figure 6-5 Field List screen for a DDM

SCREEN ITEMS	DESCRIPTION
Fields	Lists the Fields.
	A context menu is available to navigate between the Field List screen and the <u>Database Field Access (CRUD) by Application</u> or <u>Predict Field Information</u> screens or to Change the Start position of the Field List by using the **right hand mouse button** on a selected Field. If the field is a key then it is also possible to navigate to the <u>Database Key Usage</u> diagram via the Context menu.
	Note: The Predict Field Information option is only available if Natural Engineer is executing in a remote development environment, Natural version 4.2 or above is installed on the mainframe and the Predict file is mapped in the remote environment settings.
	The columns available are:
Name	The name of the data item.
Attribute	The format and length of the data item.
Short Name	The Adabas short name for the field.
Field Type	The type of field. May be:
	▪ **Descriptor**
	▪ **Super Descriptor**
	▪ **Phonetic Descriptor**
	▪ **Hyper Descriptor**
	▪ **Non Descriptor**
	And/or
	▪ **Periodic Group**
	▪ **Multiple Value field**
	And/or
	▪ **Long Alpha**
	▪ **Large Object**

BUTTON NAME	DESCRIPTION
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.

Data Model Perspective Documentation

The Data Model Perspective Documentation option allows you to add, select and review documentation for Data Model Perspectives. Data Model Perspectives allow the specification of a partial view of your data model.

How to Invoke the Data Model Perspective Documentation Option

Use the following navigation in the site workplace:

- Select the top level Data Definition Modules node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Data Model Perspective Documentation**

Data Model Perspective Documentation Window

A list of the Data Model Perspectives defined to Natural Engineer is listed in the Data Model Perspective list. Selecting a Data Model Perspective will display all the documentation that is associated with that Data Model Perspective. It is also possible to maintain the Data Model Perspectives from this screen by adding or deleting existing Data Model Perspectives.

The following Figure 6-6 illustrates the Data Model Perspective Documentation screen.
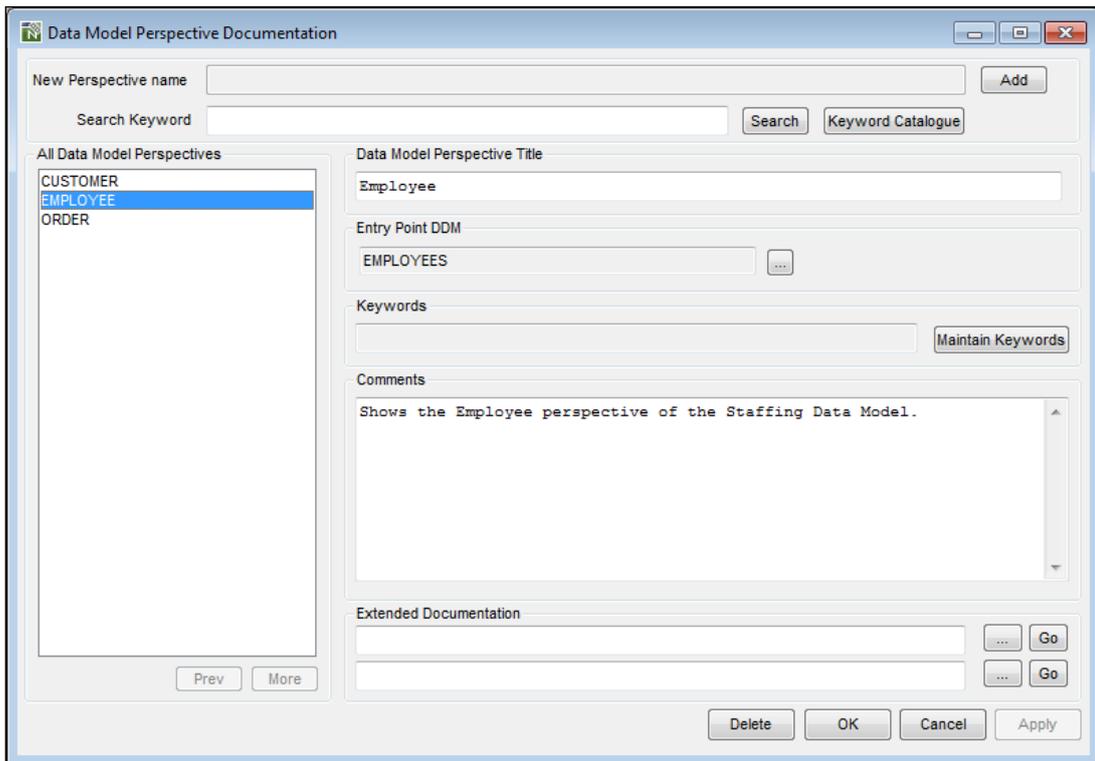
Figure 6-6 Data Model Perspective Documentation screen

SCREEN ITEMS	DESCRIPTION
New Perspective Name	Allows you to define the name of a new Data Model Perspective. This is only available when the ADD button has been activated to add a new Data Model Perspective.
Search Keyword	Allows you to input search keywords to refine the list of Data Model Perspectives displayed. The search keywords associated with a Data Model Perspective need to be manually added using the Maintain Keywords button.
Data Model Perspective List	List of all the Data Model Perspectives defined. The list of Data Model Perspectives can be tailored to your requirements using the option 'Change Start Position of Data Model Pers. List…' from the context menu which is invoked by using the **right hand mouse button** on a selected Data Model Perspective.
Data Model Perspective Title	Provides the input of a Data Model Perspective Title. The default is the Data Model Perspective name. The input is in free format style allowing a maximum of 70 characters to be input. Standard PC Copy, Paste and Cut functions are available.
Keywords	List of search keywords that have been specified for the Data Model Perspective. Up to 20 search keywords may be added by using the Maintain Keywords button. *NB: When Data Model Perspective Documentation is saved a default *ALL* keyword is added. This allows any 'orphaned' documentation to be identified by using the Keyword Catalogue.*
Comments	Provides the ability to input any required comments to document the Data Model Perspective. The input is in free format style allowing a maximum of 250 lines, each of which can have a maximum of 70 characters to be input. Standard PC Copy, Paste and Cut functions are available.
Extended Documentation	Provides the ability to specify a location of any supporting documentation that you wish to associate with the Data Model Perspective. For example: Program specification, execution instructions. The location can be typed in, or selected by the Extended Description Selection button [….].

BUTTON NAME	DESCRIPTION
Search	Invoke a search of all the Data Model Perspectives defined to locate any that have matching search keywords.
Add	Will allow the creation of a new Data Model Perspective.
Keyword Catalogue	Invokes the Keyword Catalogue screen to search for related entities.
	Note: For more information on the Keyword Catalogue refer to Chapter 6 in the Natural Engineer Utilities for Windows manual.

Keywords group:

Maintain Keywords	Invokes a screen to add/maintain up to 20 search keywords. These keywords may be used to group related entities which can then be identified via the Keyword Catalogue.

Data Model Perspectives List group:

Prev	Scrolls the Data Model Perspectives 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 Data Model Perspectives list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.

Entry Point DDM group:

Entry Point DDM Selection [….]	Invokes the general selection screen where the DDM name of the entry point for the Data Model Perspective can be selected.

Extended Documentation group:

Extended Documentation Selection [….]	Invokes the standard Windows 'Open File' dialog, where the documentation can be selected.
Go	Will open the specified file using the appropriate program associated with the file extension of the document.
	For example XX001P01_Spec.doc would be opened by MS Word.
	Note: This button is only enabled if a specified file is present.

Data Model Perspectives Documentation screen:

Delete	Delete the Data Model Perspective Documentation comments for the current selected Data Model Perspective only.
OK	Save changes and close the current screen.
Cancel	Cancel the Data Model Perspective Documentation process and close the current screen.
Apply	Save changes and retain the current screen.
	Note: This button is only enabled if any changes have been made.

Data Model Perspective Documentation Context Menus

The context menus are invoked by placing the cursor within the Data Model Perspectives list, Data Model Perspective Title or Comments screen items and using the right hand mouse button with a single click.

CONTEXT MENU ITEM	DESCRIPTION
Data Model Perspectives List:	
Change Start Position of Data Model Pers. List…	Reposition the list of Data Model Perspectives to start from a particular 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 Data Model Perspectives list title to highlight the type of repositioning being applied.
	Possible reposition values are:

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

Data Model Perspective Title / Comments group:

Undo	Undo last action.
Cut	Copy the selected data to the clipboard.
Copy	'Cut' out selected data (delete) to the clipboard.
Paste	Paste clipboard data to selected input position.
Delete	Delete selected data.
Select All	Select all the available data.

MANAGING DATABASES

Chapter Overview

This chapter describes how to select and manage global Databases for processing in Natural Engineer.

Whenever an object is loaded into the Natural Engineer repository that uses a Data Definition Module, Natural Engineer will add an entry to the relevant Database node. The information regarding Database and File Number is taken from the DDM header information. This allows the user to have a global view of the databases, file numbers, DDMs and applications over their whole site.

The node is structured as follows;

- Database Number
  - File Number1
    - DDM Name1
      - Application1
      - Application2
  - File Number2
    - DDM Name2
      - Application1
      - Application2

Database Options

The Database Node has the ability to invoke various screens to show DDM and Database information.

For further details please refer to the following sections;

Options available from DDM Name sub-node:

DDM Field List

Database Access (CRUD) by Application

Options available from Application Name sub-node:

Database Access (CRUD) by Object

MANAGING JOB CONTROL LANGUAGE

Chapter Overview

This chapter describes how to select and manage global JCL for processing in Natural Engineer.

JCL Objects can be extracted and loaded into the repository and will then be grouped by type of JCL.

- JCL Members.

- JCL Procedures.

- JCL Includes.

Global JCL Properties

The Global JCL Properties option provides details about Global JCL that help to identify it within Natural Engineer.

The Global JCL Properties option provides the facility to define specific characteristics to be applied during the Extract process within Natural Engineer for Global JCL.

Global JCL Properties includes:

- Application description, owner name and contact details.

- Directory information. To identify where the Global JCL is located.

- File suffixes to provide selective Extract information.

How to Invoke the Global JCL Properties Option

Use the following navigation in the site workplace:

- Select the Job Control Language node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: Global JCL Properties.

Global JCL Properties Window

The Global JCL option uses a single screen to control all of the property settings available.

The following Figure 8-1 illustrates the Global JCL Properties screen.
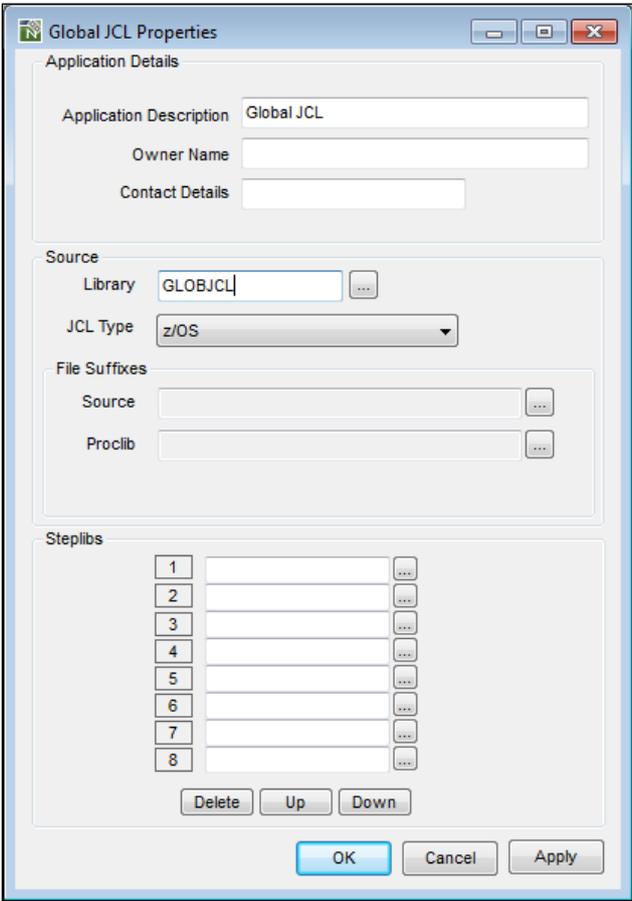
Figure 8-1 Global JCL Properties screen

SCREEN ITEMS	DESCRIPTION

Application Details group:

Application Description	The application description. This needs to be input manually up to a maximum of 253 characters.
Owner Name	The name of the owner of the application. For example: department name, manager's name, project team. This needs to be input manually up to a maximum of 65 characters.
Contact Details	The contact details of the application. For example: telephone number, email address. This needs to be input manually up to a maximum of 65 characters.

Source group:

Directory	The actual name of the directory where the Global JCL is located.
JCL Type	The type or version of the JCL language used by the application.

File Suffixes group:

Note: A maximum of 10 suffixes can be specified for each group type. The file suffixes can be specified using the File Suffixes pop-up window. For more information refer to section File Suffixes.

Source	The file suffixes to be included during the Extract process for source objects.
Proclib	The file suffixes to be included during the Extract process for proclib objects.

BUTTON NAME	DESCRIPTION
Source group:	
Directory Selection [….]	Invokes the General Selection screen, listing all the JCL Libraries.
File Suffixes group:	
Source Selection [….]	Invokes the File Suffixes screen.
Proclib Selection [….]	Invokes the File Suffixes screen.
Global JCL Properties screen:	
OK	Save changes and close the current screen.
Cancel	Cancel the Global JCL Properties process and return back to the main Natural Engineer screen.
Apply	Save changes and retain the current screen. *Note: This button is only enabled if any changes have been made.*

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

Job Control Language Options

The options for Global JCL are similar to the options available for JCL objects at an Application level. The Global JCL (Job Control Language Node) is treated as an Application. Depending on the type of JCL Object certain reports may not be available.

For further details please refer to the following sections;

Options available from Job Control Language Node:

Global JCL Properties

Extract & Load   Extract and Load Selection Criteria

                                                            Extract Global JCL

                                                            Load Global JCL

                                                            Extract Missing Objects

Display Filter

Refresh Global JCL

Object Documentation

Entry Point Structure Diagram

Object Cross Reference Diagram

Delete Global JCL

Validate Objects

Global JCL Analysis

Global JCL Data Set Viewer

Database Access in Global JCL

Objects Referenced in Global JCL

Quality Logs

Reports

Options available from JCL Object Node:

Object Reference

Object Overview

Object Documentation

Entry Point Structure Diagram

Object Cross Reference

JCL Viewer

JCL Flow Chain

JCL Diagram

View Source

Delete Object

Reports

MANAGING CICS REGIONS

Chapter Overview

This chapter describes how to select and manage global CICS Regions for processing in Natural Engineer.

Natural Engineer will analyze data derived from a CICS SYSTEM DEFINITION (CSD) file, create an XML file and then load the definitions into the Repository. This information is located under the CICS Region node of the site workspace.

Information displayed includes;

- Transactions

- Programs

- Files

- Transient Data Queues (TDQs)

- Temporary Storage Queues (TSQs)

It is then possible to associate a CICS Region/Transaction combination to an application.

A CSD file may be created on the mainframe by using the CICS utility, DFHCSDUP. The output file should then be transferred to the PC for utilization by the extract CICS Regions process of Natural Engineer.

Open a CICS Region

CICS regions can be opened by selecting them from the CICS region node in the site workspace.

CICS regions can be expanded and collapsed by clicking on the plus or minus signs in front of the CICS region node.

If a CICS region node is not displaying a plus sign in front of it, this indicates that the region has not yet been loaded into the Repository.

How to Create a new CICS Region

New CICS regions can be created by using the following site workspace navigation:

- Select the top level CICS region node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **New**.

This will create a new CICS region with a default name, which can be renamed by over typing the default.

CICS Region Filter

The list of CICS regions displayed under the CICS region node may be tailored to your requirements by using the CICS Region Filter option.

How to Invoke the CICS Region Filter

Use the following navigation in the site workspace:

- Select the top level CICS regions node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **CICS Region Filter**.

Specifying CICS Region Filter

FILTER OPTION	DESCRIPTION
CICS Region Filter	Reposition the list of CICS regions to start from a particular region name.

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

Possible reposition values are:

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

Display Filter

The list of Transactions, Programs, Files, TDQs and TSQs displayed under the CICS region node can be tailored to your requirements by using the Display Filter option.

How to Invoke the Display Filter

Use the following navigation in the site workspace:

- Select the CICS region required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Display Filter**.

Specifying Display Filter

FILTER OPTION	DESCRIPTION
Object Name	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.

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.

Refresh CICS Region

This option will refresh the list of objects in the site workspace for the selected CICS region.

How to Invoke the Refresh Region

CICS regions can be refreshed by using the following site workspace navigation:

- Select the CICS region required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Refresh Region**

Delete a CICS Region

CICS Regions can be deleted by using the following site workspace navigation:

- Select the CICS region to be deleted.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Delete Region**.

All region data will be removed from the Natural Engineer Repository.

Note: Cross-reference data associating the region with applications is not removed. This must be modified/remove by using the Applications Properties screen for affected applications.

Delete CICS Object

Objects can be deleted by using the following site workspace navigation:

- Select the object to be deleted.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Delete CICS Object**.

The deletion will remove all data for the object.

Note: If the object is to be deleted permanently from the CICS region, you must create a new CSD extract, so that it is not re-extracted by error in the future.

CICS Region Properties

The CICS Region Properties option provides details about an application that help to identify it within Natural Engineer. The details specified are region description, owner name and contact details.

How to Invoke the CICS Region Properties Option

Use the following navigation in the site workspace:

- Select the CICS region required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Region Properties**.

CICS Region Properties Window

The CICS Region Properties option uses a single screen to control all of the property settings available.

The following Figure 9-1 illustrates the CICS Region Properties screen.
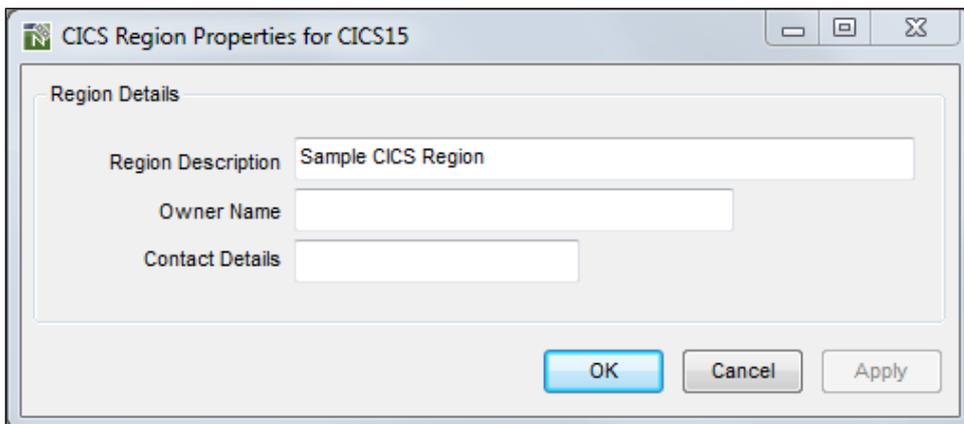
Figure 9-1 CICS Region Properties screen

SCREEN ITEMS	DESCRIPTION
Region Details group:	
Region Description	The description of the CICS Region.
	This needs to be input manually up to a maximum of 253 characters.
Owner Name	The name of the owner of the CICS Region.
	For example: department name, manager's name, project team.
	This needs to be input manually up to a maximum of 65 characters.
Contact Details	The contact details of the CICS Region.
	For example: telephone number, email address.
	This needs to be input manually up to a maximum of 65 characters.

Extract CICS Region Data

This process will analyze a CICS SYSTEM DEFINITION (CSD) file, creating a neutral view of the Programs, Transactions, Files, TSDs and TSQs contained within.

The CSD file may be created on the mainframe by using the CICS utility, DFHCSDUP. The output file should then be transferred to the PC. This file can then be selected by the user for utilization by the extract CICS Regions process of Natural Engineer.

The Extract process writes out a XML that contains the neutral CICS Region Data records and an error log if errors are found during the extract process.

The structure of the output file name in the DATA directory is 'DATA*application-name*_CICS.XML'.

The structure of the log file name in the DATA directory is 'DATA*application-name*_CICSLOG.LOG'.

How to Invoke the Extract CICS Region Option

Use the following navigation in the site workplace:

- Select the CICS Region required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Extract & Load**. This will open a sub-menu of further options.

- Select the option: **Extract CICS Region Data**.

Extract CICS Region Data Window

This allows the user to select the location of the CSD file that is to be used during the extract process and then initiate the extract process. If an error occurs then a View Error Log button will become available.

The following Figure 9-2 illustrates the Extract CICS Region Data screen.
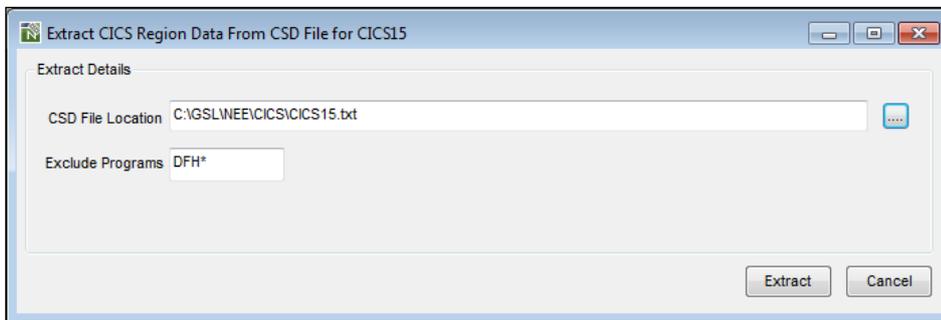
Figure 9-2 Extract CICS Region Data screen

SCREEN ITEMS	DESCRIPTION
Extract Details group:	
CSD File Location	The location of the CSD file for extraction.
Exclude Programs	The object name to be excluded from the extract process.
	The object name can be input using either a complete name or part name using an '*' (asterisk) wildcard.
	For example:
	Object 'DFHCSDUP' would be excluded from the extract.
	Object 'DFH*' would exclude any objects prefixed with DFH. This is the default and is designed to exclude CICS system programs.

BUTTON NAME	DESCRIPTION
Source group:	
CSD File Location [….]	Invokes a selection screen allowing for the selection of the CSD file location.
Global CICS Region Data screen:	
Extract	Extract the data from the supplied CSD file.
Cancel	Cancel the Extract CICS Region Data screen and return back to the main Natural Engineer screen.
View Error Log	If the Extract process receives an error then the View Error Log button will come available allowing the user to interrogate the errors received.

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

Load CICS Region Data

This process will load previously extracted CICS Region Data into the Natural Engineer Repository for a particular CICS Region.

How to Invoke the Load CICS Region Data Option

Use the following navigation in the site workplace:

- Select the CICS Region required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Extract & Load**. This will open a sub-menu of further options.

- Select the option: **Load CICS Region Data**.

Linked Applications

The Linked Application option allows you to review all applications that have been linked to a selected CICS Region. Applications are linked to a CICS Region/Transaction via the CICS tab of the Application Properties screen.

How to Invoke the Linked Applications Option

Use the following navigation in the site workplace:

- Select the CICS Region required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Linked Applications**.

Linked Applications Window

For the selected CICS Region, a list of the linked applications defined to Natural Engineer is listed in the linked application list box along with the associated CICS Transactions.

The following Figure 9-3 illustrates the Linked Applications screen.
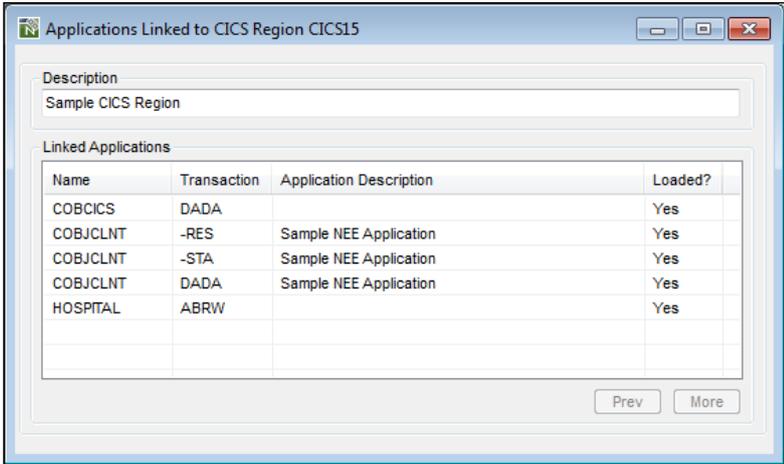
Figure 9-3 Linked Applications screen

SCREEN ITEMS	DESCRIPTION	
Description	The description of the CICS Region as defined in the CICS Region Properties screen.	
Linked Applications	Lists all the applications linked to the CICS Region.	
	The columns available are:	
	Name	The name of the application (as defined to Natural Engineer).
	Transaction	The name of the linked transaction.
	Application Description	The description of the Application.
	Loaded?	Indicates if the application has been loaded into Natural Engineer.

BUTTON NAME	DESCRIPTION
Prev	Scrolls the application 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 application 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.

DDM Usage

The DDM Usage option allows you to review all DDMS that are used by applications that have been linked to a selected CICS Region. Applications are linked to a CICS Region/Transaction via the CICS tab of the Application Properties screen.

How to Invoke the DDM Usage Option

Use the following navigation in the site workplace:

- Select the CICS Region required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **DDM Usage**.

DDM Usage Window

For the selected CICS Region, a list of the linked applications defined to Natural Engineer is listed in the linked application list box along with the associated DDM names.

The following Figure 9-4 illustrates the DDM Usage screen.
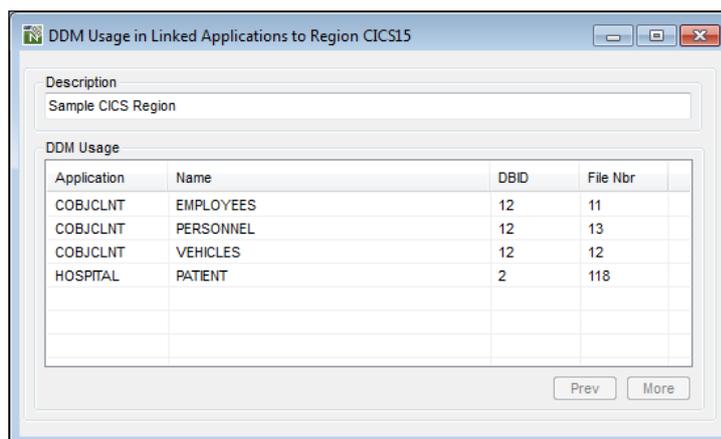
Figure 9-4 DDM Usage screen

SCREEN ITEMS	DESCRIPTION		
Description	The description of the CICS Region as defined in the CICS Region Properties screen.		
DDM Usage	Lists all the DDMs used in applications linked to the CICS Region.		
	The columns available are:		
	Application	The name of the application (as defined to Natural Engineer).	
	Name	The name of the DDM.	
	DBID	The database number of the DDM.	
	File Nbr	The file number of the DDM.	

BUTTON NAME	DESCRIPTION
Prev	Scrolls the application 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 application 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.

CICS Transaction Viewer

The CICS Transaction Viewer option allows you to select and review information for a selected CICS Transaction. Information displayed includes the associated program and any linked applications. Applications are linked to a CICS transaction via the CICS tab of the Application Properties screen.

How to Invoke the CICS Transaction Viewer Option

Use the following navigation in the site workplace:

* Select the CICS Transaction required.

* Single click with the right hand mouse button to invoke the context menu.

* Select the option: **CICS Transaction Viewer**.

CICS Transaction Viewer Window

For the selected CICS Transaction, the associated program and any linked applications is shown.

The following Figure 9-5 illustrates the CICS Transaction Viewer screen.
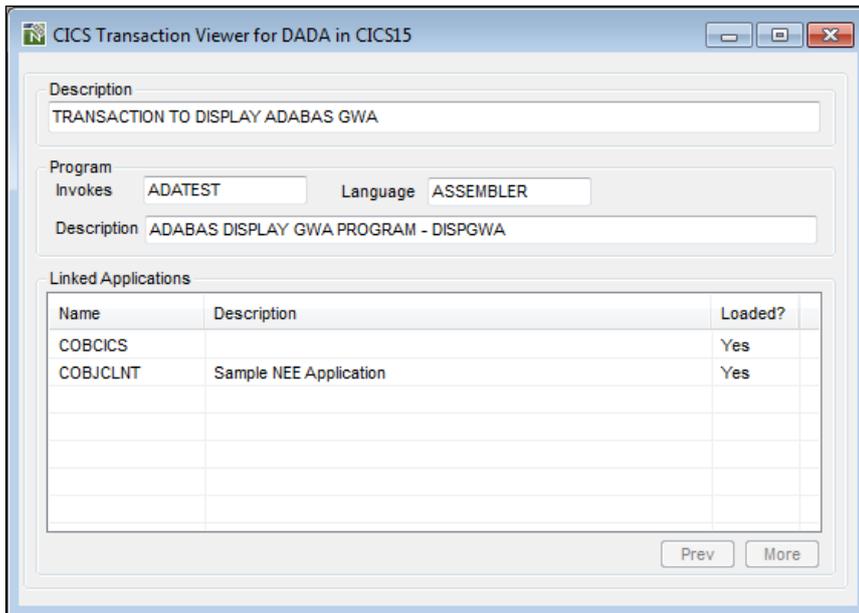
Figure 9-5 CICS Transaction Viewer screen

SCREEN ITEMS	DESCRIPTION
Description	The description of the CICS Transaction.
Program	Lists the name and type of program that is associated with the CICS Transaction.
Invokes	The name of the program.
Language	The programming language that the program is written in.
Description	The description of the program.
Linked Applications	Lists all the applications linked to the CICS Transaction. The columns available are:

SCREEN ITEMS	DESCRIPTION	
	Name	The name of the application (as defined to Natural Engineer).
	Transaction	The name of the linked transaction.
	Application Description	The description of the Application.
	Loaded?	Indicates if the application has been loaded into Natural Engineer.

BUTTON NAME	DESCRIPTION
Prev	Scrolls the application 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 application 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.

CICS Program Viewer

The CICS Program Viewer option allows you to select and review information for a selected CICS Program. Information displayed includes the associated transaction and description.

How to Invoke the CICS Program Viewer Option

Use the following navigation in the site workplace:

- Select the CICS Program required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **CICS Program Viewer**.

CICS Program Viewer Window

For the selected CICS Program, the associated transaction and description is shown.

The following Figure 9-6 illustrates the CICS Program Viewer screen.
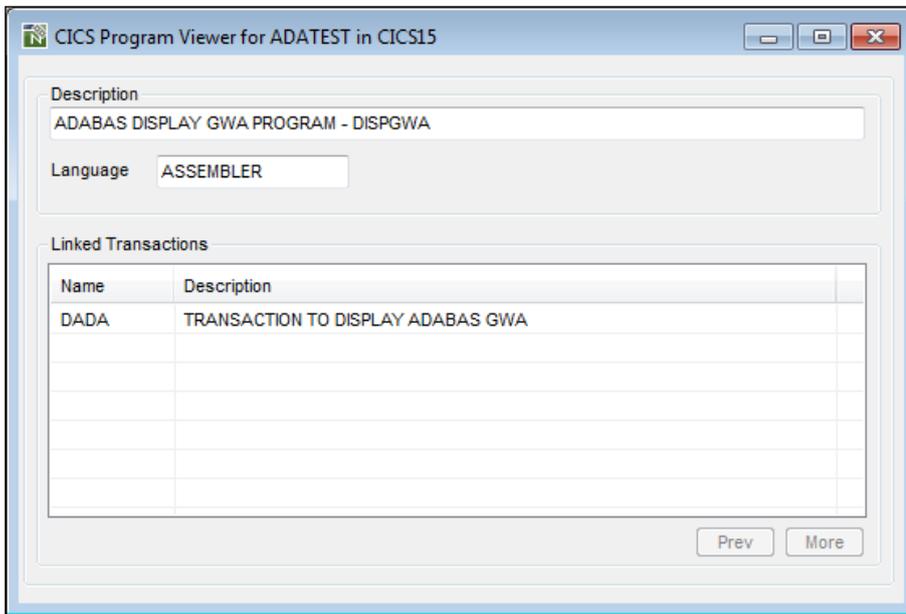
Figure 9-6 CICS Program Viewer screen

SCREEN ITEMS	DESCRIPTION
Description	The description of the CICS Program.
Language	The programming language that the program is written in.
Linked Transactions	Lists all the associated transactions linked to the CICS program. The columns available are:

	Name	The name of the CICS Transaction.
	Description	The description of the linked transaction.

BUTTON NAME	DESCRIPTION
Prev	Scrolls the transaction 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 transaction 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.

CICS File Viewer

The CICS File Viewer option allows you to select and review information for a selected CICS File. Information displayed includes the associated transaction and description.

How to Invoke the CICS File Viewer Option

Use the following navigation in the site workplace:

- Select the CICS File required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **CICS File Viewer**.

CICS File Viewer Window

For the selected CICS File, the file details and the usage of the selected file within any selected linked applications is shown.

If you select one of the linked applications, all the statement details for the selected file usage are displayed in the source code list box.

The following Figure 9-7 illustrates the CICS File Viewer screen.
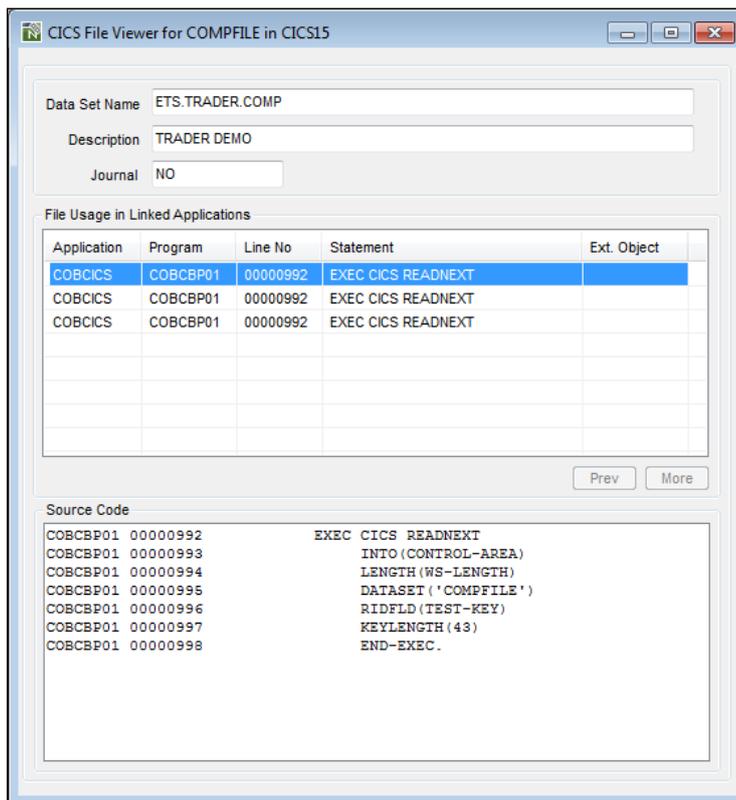
Figure 9-7 CICS File Viewer screen

SCREEN ITEMS	DESCRIPTION	
Data Set Name	The name of the data set associated with the CICS file.	
Description	The description of the CICS file.	
Journal	If the dataset is a Journal dataset or not.	
File Usage in Linked Applications	Lists the statements referenced by the selected CICS File in applications that have been linked to the CICS Region.	
	A context menu is available to navigate between the CICS File Viewer screen and the View Source screen by using the **right hand mouse button** on a selected program.	
	The columns available are:	
	Application	The name of the linked application.
	Program	The name of the program containing references to the selected CICS file.
	Line No.	The statement line number for the reference within the program.
	Statement	The statement referencing the selected CICS file.
	Ext. Object	The name of the object that contains the definition if the data item is defined externally, such as in a copybook.
Source Code	The Source Code of the selected statement.	

BUTTON NAME	DESCRIPTION
Prev	Scrolls the application 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 application 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.

CICS Transient Data Queue Viewer

The CICS Transient Data Queue Viewer (TDQ) option allows you to select and review information for a selected CICS TDQ. Information displayed includes the description, type and usage in any linked applications.

How to Invoke the CICS Transient Data Queue Option

Use the following navigation in the site workplace:

- Select the CICS TDQ required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **CICS Transient Data Queue Viewer**.

CICS Transient Data Queue Viewer Window

For the selected CICS TDQ, the details and the usage of the selected TDQ within any selected linked applications is shown.

If you select one of the linked applications, all the statement details for the selected TDQ usage are displayed in the source code list box.

The following Figure 9-8 illustrates the CICS Transient Data Queue Viewer screen.
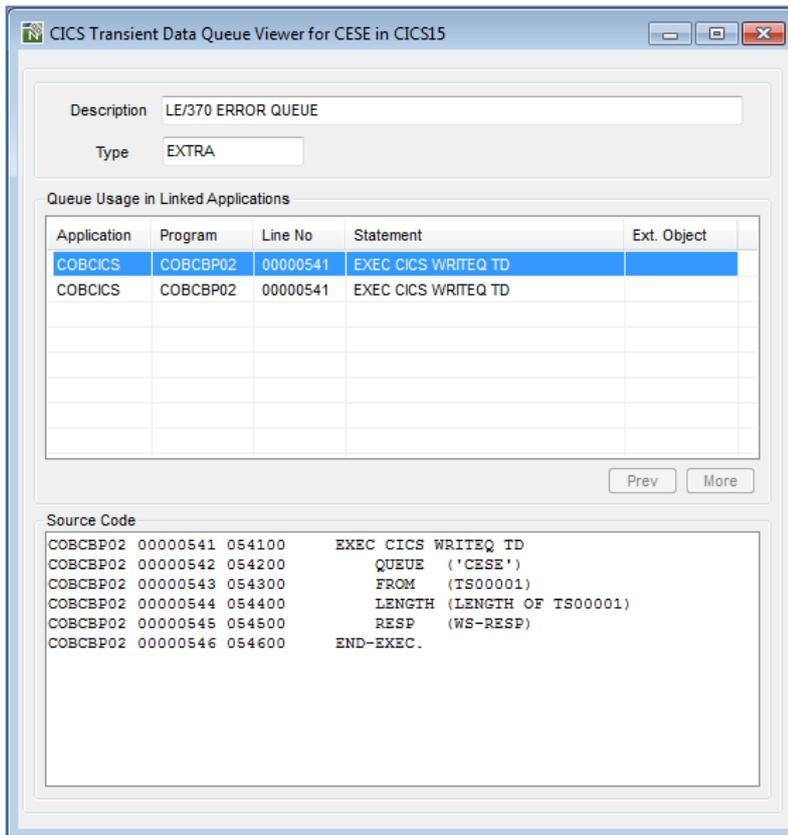
Figure 9-8 CICS Transient Data Queue Viewer screen

SCREEN ITEMS	DESCRIPTION
Description	The description of the TSQ.
Type	The type of the TDQ.
Queue Usage in Linked Applications	Lists the statements referenced by the selected TDQ in applications that have been linked to the CICS Region.
	A context menu is available to navigate between the CICS Transient Data Queue Viewer screen and the View Source screen by using the **right hand mouse button** on a selected program.
	The columns available are:

Application	The name of the linked application.
Program	The name of the program containing references to the selected CICS TDQ.
Line No.	The statement line number for the reference within the program.
Statement	The statement referencing the selected CICS TDQ.
Ext. Object	The name of the object that contains the definition if the data item is defined externally, such as in a copybook.

BUTTON NAME	DESCRIPTION
Prev	Scrolls the application 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 application 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.

CICS Temporary Storage Queue Viewer

The CICS Temporary Storage Queue Viewer (TSQ) option allows you to select and review information for a selected CICS TSQ. Information displayed includes the description, type and usage in any linked applications.

How to Invoke the CICS Temporary Storage Queue Option

Use the following navigation in the site workplace:

- Select the CICS TSQ required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **CICS Temporary Storage Queue Viewer**.

CICS Temporary Storage Queue Viewer Window

For the selected CICS TSQ, the details and the usage of the selected TSQ within any selected linked applications is shown.

If you select one of the linked applications, all the statement details for the selected TSQ usage are displayed in the source code list box.

The following Figure 9-9 illustrates the CICS Temporary Storage Queue Viewer screen.
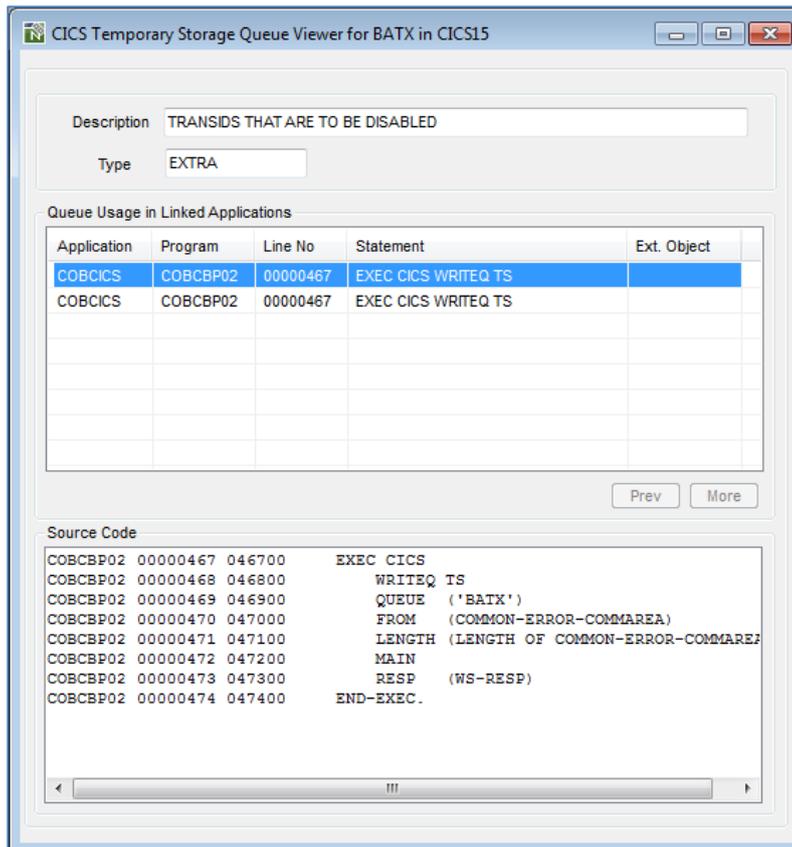
Figure 9-9 CICS Temporary Storage Queue Viewer screen

SCREEN ITEMS	DESCRIPTION
Description	The description of the TSQ.
Type	The type of the TSDQ.
Queue Usage in Linked Applications	Lists the statements referenced by the selected TSQ in applications that have been linked to the CICS Region.
	A context menu is available to navigate between the CICS Temporary Storage Queue Viewer screen and the View Source screen by using the **right hand mouse button** on a selected program.
	The columns available are:

	Application	The name of the linked application.
	Program	The name of the program containing references to the selected CICS TSQ.
	Line No.	The statement line number for the reference within the program.
	Statement	The statement referencing the selected CICS TSQ.
	Ext. Object	The name of the object that contains the definition if the data item is defined externally, such as in a copybook.

BUTTON NAME	DESCRIPTION
Prev	Scrolls the application 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 application 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.

10

MANAGING SQL TABLES

Chapter Overview

This chapter describes how to select and manage SQL Tables for processing in Natural Engineer.

Natural Engineer will analyze data derived from a SQL Data Definition Language (DDL) file, create an XML file and then load the SQL Table definitions into the Repository. This information is located under the SQL Tables node of the site workspace.

In order for the SQL Tables to be cross referenced with any applications that use them they should be extracted and loaded prior to the relevant application.

SQL Tables Options

The SQL Tables nodes have the ability to invoke various screens to show related SQL Tables information or to invoke SQL Table management processes.

For further details please refer to the following sections;

Options available from SQL Tables node:

SQL Table Name Filter

Extract & Load

        Extract Selection Criteria

        Extract SQL Tables

        Load SQL Tables

Refresh SQL Tables

Delete SQL Tables

Quality Logs

Options available from SQL Table sub-nodes:

SQL Table Viewer

Database Access (CRUD) by Application

Object Documentation

Delete SQL Table

SQL Table Name Filter

The list of SQL Tables displayed under the SQL Tables node may be tailored to your requirements by using the SQL Table Name Filter option.

How to Invoke the SQL Table Name Filter

Use the following navigation in the site workspace:

- Select the top level SQL Tables node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **SQL Table Name Filter**.

Specifying SQL Table Name Filter

FILTER OPTION	DESCRIPTION
SQL Table Name Filter	Reposition the list of SQL Table Names to start from a particular table name.

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

Possible reposition values are:

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

Extract Selection Criteria - SQL Tables

You use this option to select a DDL file for extraction.

You can specify individual tables, select several tables using wildcards, and ranges of tables using the Extract and Load Selection Criteria screen illustrated below.

The default for Extract and Load Selection Criteria is to extract all objects from the DDL file specified.

How to Invoke the Extract Selection Criteria - SQL Tables Option

Use the following navigation in the site workplace:

- Select the SQL Table Names node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Extract & Load**. This will open a sub-menu of further options.

- Select the option: **Extract Selection Criteria**.

Extract Selection Criteria - SQL Tables Window

The Extract and Load Selection Criteria window controls all the settings required for this option. It allows the definition of the DDL file containing the table definitions and allows the refinement of the tables to be extracted by allowing individual table names and wildcards to be specified.

The following Figure 10-1 illustrates the Extract Selection Criteria - SQL Tables screen.
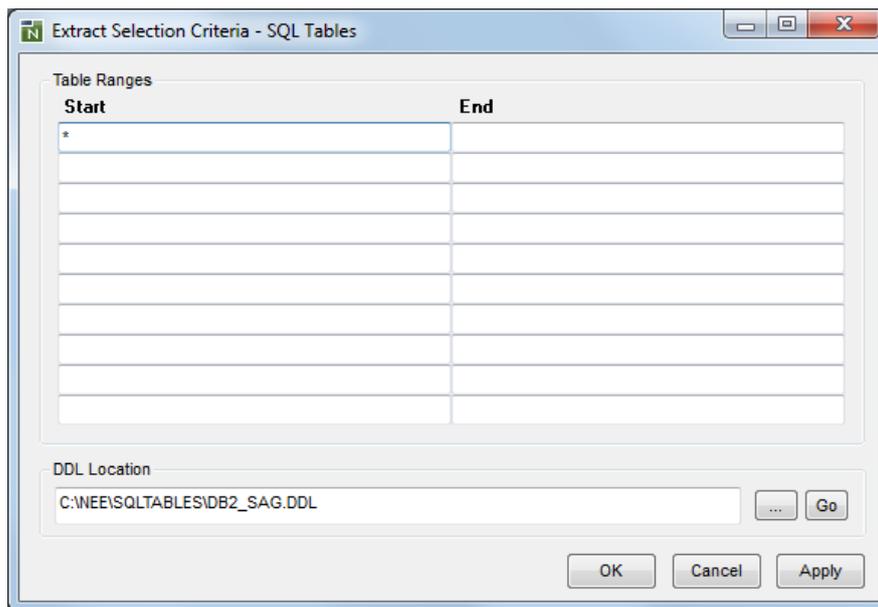
Figure 10-1 Extract Selection Criteria - SQL Tables screen

SCREEN ITEMS	DESCRIPTION
Table Rows group:	
Start	The name of the first table to be extracted. This can be a single object name or part of a range of objects if an end table has been specified.
	Note: Refer to the section Specifying Table Names below for more information on how to specify table names and ranges.
End	The name of the last table to be extracted. This is only valid if a start table has been specified.
	Note: Refer to the section Specifying Table Names below for more information on how to specify table names and ranges.
DDL Location group:	
DDL Location	This allows the user to specify a file containing the table definitions of the tables to be extracted.
	The file name can be typed in or, if executing purely on the PC, selected by using the DDL Location Selection button […].

BUTTON NAME	DESCRIPTION
DDL Location group:	
DDL Location Selection […]	Invokes the standard Windows 'Open File' dialog, where the DDL File can be selected.
	Note: This button is unavailable if Natural Engineer is executing in a remote development environment.
Go	Will open the specified file using the appropriate program associated with the file extension of the document.
	For example DDL_SAG.doc would be opened by MS Word.
	Note: This button is unavailable if Natural Engineer is executing in a remote development environment.
Extract Selection Criteria Screen:	
OK	Save changes and close the current screen.
Cancel	Cancel the Extract Selection Criteria process and close the current screen.
Apply	Save changes and retain the current screen.
	Note: This button is only enabled if any changes have been made.

Specifying Table Names

The table names specified in the Start table and End table columns on the Extract Selection Criteria – SQL Tables screen use the following standard conventions. If the namespace is used in the definitions e.g., DB2COP.O* then that should be specified if non-standard criteria are used.

All Tables

Enter an asterisk (*) in the Start Table list (standard default).

Single Table Name

Enter full table names in Start Table list.

Multiple Table Group

Enter partial table name in Start Table list, with an asterisk (*). This will allow you to process all tables starting with the values before the asterisk.

Multiple Table Range

Enter a Start Table name and an End Table name in the same row. This will process all tables in alphanumeric order starting from the Start Table and ending with the End Table.

Combination Selection Types

You can enter multiple rows with different criteria, including multiple single tables, groups and ranges.

Examples:

Start Table	End Table	Result
*		Process all tables.
SQL-PATIENT		Process single table 'SQL-PATIENT'.
SQL-PAT*		Processes all tables with names prefixed with 'SQL-PAT'.
SQL-PATIENT	SQL-PATIENT9	Processes all objects in the alphabetic range starting from SQL-PATIENT and ending at SQL-PATIENT9.

Extract SQL Tables

This process will analyze SQL Data Definition Language (DDL) file and writes out a XML file that contains the neutral SQL Table Name records and an error log if errors are found during the extract process.

The structure of the output file name in the DATA directory is 'SQLTABLES.XML'.

The structure of the log file name in the DATA directory is 'SQLTABLES_EXTRACT.LOG'.

If an error occurs then a View Error Log button will become available on the Extract SQL Tables processing window. The error log may also be viewed by selecting Quality Logs, Extract from the main SQL Tables node.

How to Invoke the Extract SQL Tables Option

Use the following navigation in the site workplace:

- Select the SQL Table Names node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Extract & Load**. This will open a sub-menu of further options.

- Select the option: **Extract SQL Tables**.

Load SQL Tables

This process will load previously extracted SQL Table Data into the Natural Engineer Repository.

How to Invoke the Load SQL Tables Option

Use the following navigation in the site workplace:

- Select the SQL Tables node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Extract & Load**. This will open a sub-menu of further options.

- Select the option: **Load SQL Tables**.

Quality Logs

The Quality Logs provides information on errors that have occurred during both the Extract and Load processes for SQL Tables.

How to Invoke the Quality Logs Option

Use the following navigation in the site workplace:

*   Select the main SQL Tables node.

*   Single click with the right hand mouse button to invoke the context menu.

*   Select the option: **Quality Logs**. This will open a sub-menu of further options.

*   Select the report required.

Quality Log Reports

The following list illustrates the Quality Log reports that are available for SQL Tables:

- Extract
- Load

The Extract quality log relate to the Extract process and show information on the tables that have been extracted as well as any errors that have occurred during the Extract execution.

The Load quality log relates to the Load process and is only available if there has been a problem during the Load execution.

Refresh SQL Tables

This option will refresh the list of SQL tables in the site workspace.

How to Invoke the Refresh SQL Tables

SQL Table Names can be refreshed by using the following site workspace navigation:

- Select the SQL Tables Node required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Refresh SQL Tables**

Delete SQL Tables

All SQL Tables can be deleted by using the following site workspace navigation:

- Select the SQL Tables node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Delete SQL Tables**.

All SQL Tables will be removed from the Natural Engineer Repository.

Delete SQL Table

An individual SQL Table can be deleted by using the following site workspace navigation:

- Select the SQL Table to be deleted.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Delete SQL Table**.

The deletion will remove data for the SQL Table.

SQL Table Viewer

The SQL Table Viewer option allows you to select and review column information for individual SQL Tables.

How to Invoke the SQL Table Viewer Option

Use the following navigation in the site workplace:

- Select the SQL Table required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **SQL Table Viewer**.

SQL Table Window

For the selected SQL Table, a list of the columns referenced by the SQL Table is listed in the column list box along with their definitions and attributes.

The following Figure 10-2 illustrates the SQL Table Viewer screen.

Figure 10-2 SQL Table Viewer screen

SCREEN ITEMS	DESCRIPTION
Column Details	Lists all the columns referenced by the selected SQL Table.
	The fields available are:

	Name	The name of the column.
	Definition	The datatype and definitions of the column.
	Attribute	The comparable ADABAS attribute of the column.
	Key Usage	Will be set to Y of column is used as a key.

BUTTON NAME	DESCRIPTION
Prev	Scrolls the column 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 column 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.

SQL Table Viewer Context Menu

The SQL Table Viewer context menu is invoked by placing the cursor on any of the fields listed and using the right hand mouse button with a single click.

The following Figure 10-3 illustrates the SQL Table Viewer context menu
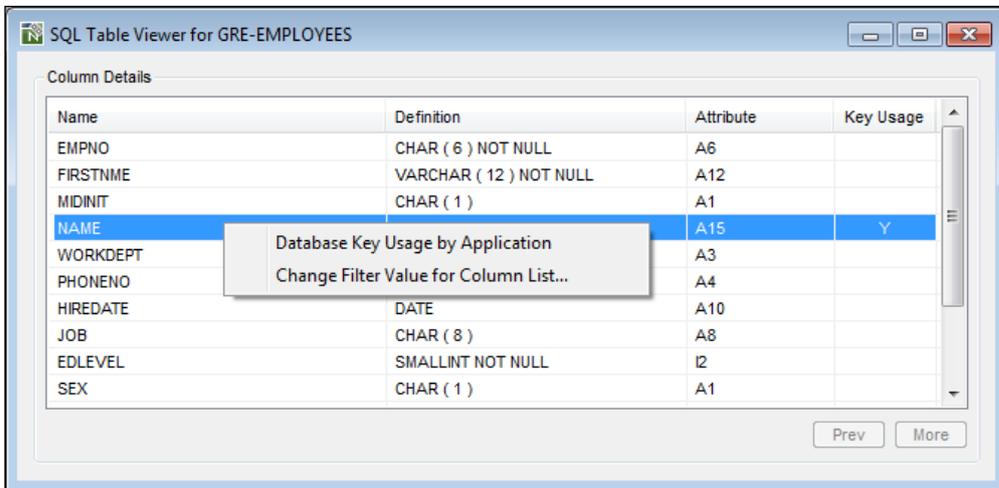
Figure 10-3 SQL Table Viewer context menu

CONTEXT MENU ITEM	DESCRIPTION
Database Key Usage by Application	Will invoke the <u>Database Key Usage</u> diagram for the selected column. *NB: This is only available if the column is used as a key.*
Change Filter Value for Column List…	Reposition the list of columns to start from a particular column 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 column details list title to highlight the type of repositioning being applied.

MANAGING SERVICES

Chapter Overview

This chapter describes how to select and manage Services for processing in Natural Engineer.

Services are a set of related components, provided in support of one or more business or information technology processes. They are typically organized and held in a central repository such as a service catalogue.

The Service options in Natural Engineer give the ability to cross-reference the Natural and COBOL objects and database files that are utilized by the Service.

Services may be manually added into Natural Engineer or imported from a service catalogue by using the Natural Engineer API, NEEAPI2. Any links between Services and objects/other services may be imported by using Natural Engineer API, NEEAPI3.

Note: For more information on available Natural Engineer APIs please refer to Chapter 3 in the Natural Engineer Concepts and Facilities manual.

Services Options

The Services nodes have the ability to invoke various screens to show related Service information or to invoke Service management processes.

For further details please refer to the following sections;

Options available from Services node:

Service Filter

Refresh Services

Service Documentation

Objects Referenced in Services

Service Analysis

Options available from Services sub-nodes:

Delete Service

Service Viewer

Entry Point

Related Options:

Maintain Alternate Key

Maintain Called Services

Service Filter

The list of Services displayed under the Services node may be tailored to your requirements by using the Service Filter option.

How to Invoke the Service Filter

Use the following navigation in the site workspace:

- Select the top level Services node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Service Filter**.

Specifying Service Filter

FILTER OPTION	DESCRIPTION
Service Filter	Reposition the list of Services to start from a particular Service name.
	The reposition value can be input using either a complete name or part name using an '*' (asterisk) wildcard.
	Possible reposition values are:

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

Note: The Service Filter is case-sensitive.

Refresh Services

This option will refresh the list of Services in the site workspace.

How to Invoke the Refresh Services

Services can be refreshed by using the following site workspace navigation:

- Select the Services Node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Refresh Services**

Delete Service

A specific Service can be deleted by using the following site workspace navigation:

- Select the required Service.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Delete Service**.

The Service will be removed from the Natural Engineer Repository.

Maintain Services

The Maintain Services option allows you to manually add, select and review related information for Services.

Services may also be imported from a Service Catalogue by using the Natural Engineer API, NEEAPI2.

Note: For more information on available Natural Engineer APIs please refer to Chapter 3 in the Natural Engineer Concepts and Facilities manual.

How to Invoke the Maintain Services Option

Use the following navigation in the site workplace:

• Select the Service Node.

• Single click with the right hand mouse button to invoke the context menu.

• Select the option: **Maintain Services**

Maintain Services Window

A list of the Services defined to Natural Engineer is listed in the Service list. Selecting a Service will display all the information that is associated with that Service. This information may be added, modified or deleted as required. It is possible to invoke the Service Viewer for a selected Service via a context menu or invoke the Entry Point Structure Diagram for a specified Entry Point for a Service.

The following Figure 11-1 illustrates the Maintain Services screen.

Figure 11-1 Maintain Services screen

SCREEN ITEMS	DESCRIPTION
New Service	Allows you to define the name of a new Service. This is only available when the ADD button has been activated to add a new Service.
Search Keyword	Allows you to input search keywords to refine the list of Services displayed in the Service list. The search keywords associated with a Service need to be manually added using the Maintain Keywords button.
Services List	List of all the Services defined. The list of Services can be tailored to your requirements using the option 'Change Start Position of Service List…' from the context menu which is invoked by using the **right hand mouse button** on a selected Service
Service Title	Provides the input of a Service Title. The default is the Service name. The input is in free format style allowing a maximum of 70 characters to be input. Standard PC Copy, Paste and Cut functions are available.
Alternate Key	Shows any Alternate Key that has been defined. The Alternate Key may be modified by invoking the <u>Maintain Alternate Key</u> screen via the Maintain Alt. Key button.
Entry Point	Allows a Natural or COBOL component to be defined that is invoked by the Service. *NB: An Entry Point or a Called Service may be added but not both.*
Called Services	Shows any other Services that have been defined that are called by this Service e.g. a Flow Service or an Adapter Service. The Called Services list may be modified by invoking the <u>Maintain Called Services</u> screen via the Maintain Called Srv. button. *NB: An Entry Point or a Called Service may be added but not both.*
Keywords	List of search keywords that have been specified for the Service. Up to 20 search keywords may be added by using the Maintain Keywords button. *NB: When Service Documentation is saved a default *ALL* keyword is added. This allows any 'orphaned' documentation to be identified by using the Keyword Catalogue.*
Comments	Provides the ability to input any required comments to document the Service. The input is in free format style allowing a maximum of 250 lines, each of which can have a maximum of 70 characters to be input. Standard PC Copy, Paste and Cut functions are available.

SCREEN ITEMS	DESCRIPTION
Extended Documentation	Provides the ability to specify a location of any supporting documentation that you wish to associate with the Service. For example: Program specification, execution instructions.
	The location can be typed in, or selected by the Extended Description Selection button [….]. It may point to a file or a URL (if prefixed by http://).
Active Service	Set on if this is an active service e.g. one that is currently in production.

BUTTON NAME	DESCRIPTION
Search	Invoke a search of all the Services defined to locate any Services that have matching search keywords.
Add	Will allow the creation of a new Service.
Keyword Catalogue	Invokes the Keyword Catalogue screen to search for related entities.
	Note: For more information on the Keyword Catalogue refer to Chapter 6 in the Natural Engineer Utilities for Windows manual.
Keywords group:	
Maintain Keywords	Invokes a screen to add/maintain up to 20 search keywords. These keywords may be used to group related entities which can then be identified via the Keyword Catalogue.
Services List group:	
Prev	Scrolls the Services 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 Services list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
Called Services group:	
Maintain Called Srv	Invokes the Maintain Called Services screen to allow the definitions of any other services that may be called by the Service.

BUTTON NAME	DESCRIPTION
Alternate Key group:	
Maintain Alt. Key	Invokes the <u>Maintain Alternate Key</u> screen to allow the definition of an Alternate Key for the Service.
Entry Point/Application Object group:	
Entry Point Application Selection [….]	Invokes the general selection screen where the Application name of the Application containing the entry point can be selected.
Entry Point Object Selection [….]	Invokes the general selection screen where the object name of the entry point in the chosen Application can be selected.
Clear	Will clear any defined Entry Point Application or Object name.
Entry Point Diagram	Will invoke the <u>Entry Point Diagram</u> for the selected application/object combination.
Extended Documentation group:	
Extended Documentation Selection [….]	Invokes the standard Windows 'Open File' dialog, where the documentation can be selected.
Go	Will open the specified file using the appropriate program associated with the file extension of the document.
	For example XX001P01_Spec.doc would be opened by MS Word.
	Note: This button is only enabled if a specified file is present.
Maintain Services screen:	
Delete	Delete the information for the current selected Service only.
OK	Save changes and close the current screen.
Cancel	Cancel the Maintain Services process and close the current screen.
Apply	Save changes and retain the current screen.
	Note: This button is only enabled if any changes have been made.

Maintain Services Context Menus

The context menus are invoked by placing the cursor within the Services list, Object Title or Comments screen items and using the right hand mouse button with a single click.

CONTEXT MENU ITEM	DESCRIPTION
Services List:	
Service Viewer	Invoke the <u>Service Viewer</u> for the selected Service.
Change Start Position of Service List…	Reposition the list of Services to start from a particular 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 Services list title to highlight the type of repositioning being applied.
	Possible reposition values are:

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

Service Title / Comments group:	
Undo	Undo last action.
Cut	Copy the selected data to the clipboard.
Copy	'Cut' out selected data (delete) to the clipboard.
Paste	Paste clipboard data to selected input position.
Delete	Delete selected data.
Select All	Select all the available data.

Objects Referenced in Services

The Objects Referenced in Services option will show a list of all objects and services called by all defined Services for which Service Analysis has been run.

How to Invoke the Objects Referenced in Services Option

Use the following navigation in the site workplace:

- Select the Service Node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Objects Referenced in Services.**

Objects Referenced in Services Window

Shows all Objects and Services that are referenced by other Services for which Service Analysis has been run.

The list of items displayed can be tailored to your requirements by using the Object Types and Language filtering options. Further refinement can be made using the option 'Change Start Position of Object List…' from the Objects Referenced in Services context menu by using the **right hand mouse button**.

Note: For more information on the Objects Referenced in Services context menu, refer to section Objects Referenced in Services Context Menu

The following Figure 11-2 illustrates the Objects Referenced in Services screen.
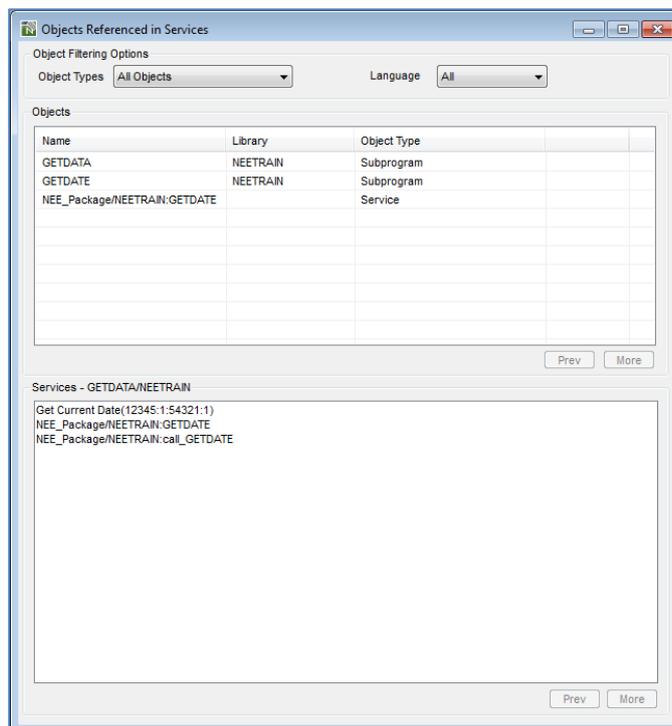
Figure 11-2 Objects Referenced in Services screen

SCREEN ITEMS	DESCRIPTION
Object Filtering group:	
Object Types	Allows you to select the types of object to be listed. The list is tailored to the Objects Types referenced by services for which analysis has been run.
Language	Allows you to select the programming language of the objects to be listed. The list is tailored to the language of the objects referenced by services for which analysis has been run.
Objects group:	
Name	The name of the called object or service.
Library	The library where the called object resides. *Note: This is only applicable to Natural or COBOL objects not called services.*
Object Type	The type of object referenced by the object or service.
Services group:	
Services	The Service that references the called object or service.

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

BUTTON NAME	DESCRIPTION
More	Scrolls the Services forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.

Objects Referenced in Services 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.

Service Analysis

The Service Analysis option provides the facility to analyze which objects or services are referenced by a Service.

How to Invoke the Service Analysis Option

Use the following navigation in the site workplace:

- Select the main Services node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Service Analysis**.

Service Analysis Window

The Service Analysis window controls all the settings required for this option. It is accessed from the context menu of the main Services node.

The following Figure 11-3 illustrates the Service Analysis screen.
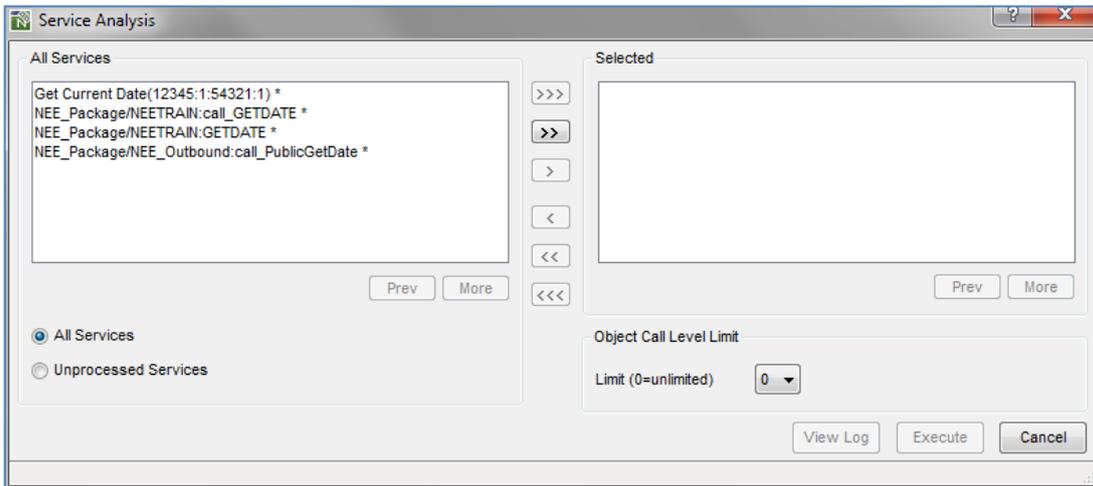
Figure 11-3 Service Analysis screen

SCREEN ITEMS	DESCRIPTION
Service List	List all the Services that are available.
	The list of Services can be tailored to your requirements using the options 'Change Start Position of Service List…' from the Service List context menu.
	The Service List title reflects the Services being listed and will append any reposition values that may have been specified.
	Services can be selected by using a double click with the **left hand mouse button**.
	Note: Any Services listed that have already been processed will have an '' (asterisk) appended to the right hand side of the Service name.*

SCREEN ITEMS	DESCRIPTION
Selected	List all the Services that have been selected for Service Analysis processing.
	Note: At least one Service must be selected to run the analysis.
	Services can be de-selected by using a double click with the **left hand mouse button**.
Object Call Level Limit	Specifies the amount of levels to be checked by the Service Analysis process. Setting this value to 0 (default) will mean no level limit will be used.
	The default value may be changed by setting the value in the ANALYSIS-LEVEL-LIMIT parameter in the JCL section of the NATENG.INI file.

BUTTON NAME	DESCRIPTION
Service List group:	
Prev	Scrolls the Service 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 Service list forward one page.
	This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
All Services	Change the list of Services displayed in the Service List.
	If selected, then all processed and unprocessed Services are listed.
Unprocessed Services	Change the list of Service displayed in the Service List.
	If selected, then only the Service that have not yet been processed are listed.
Selection / De-selection buttons:	
>>>	Select all Services in the Service list (when more than one page is available, as set by the LISTBOXMAX parameter in the NATENG.INI file).
>>	Select all Services on the current page in the Service list.
>	Select all selected Services in the Service list.
<	De-select all selected Services in the selected list.
<<	De-select all Services on the current page in the selected list.

BUTTON NAME	DESCRIPTION
<<<	De-select all Services 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.
Service Analysis screen:	
Exe Batch	Will submit the batch Service Analysis process for the selected Services. This is only available in a SPod environment when running against a mainframe server.
	Note: This button is only enabled if any changes have been made.
View Log	Will show the Service Analysis Log File which details the Services that have been processed along with any exception messages.
Execute	Invoke the Service Analysis process for the selected Services.
	Note: This button is only enabled if any changes have been made.
Cancel	Cancel any Service selection 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.

Service Viewer

The Service Viewer option allows you to view the information defined for a specific Service as well as objects and database files referenced by the service.

How to Invoke the Service Viewer Option

Use the following navigation in the site workplace:

- Select the required Service.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Service Viewer**

Service Viewer Window

A list of the Services defined to Natural Engineer is listed in the Service list. Selecting a Service will display all the information that is associated with that Service.

The following Figure 11-4 illustrates the Service Viewer screen.

Figure 11-4 Service Viewer screen

SCREEN ITEMS	DESCRIPTION
Service Title	Provides the input of a Service Title. The default is the Service name. The input is in free format style allowing a maximum of 70 characters to be input. Standard PC Copy, Paste and Cut functions are available.
Alternate Key	Shows any alternate key that have been defined. The alternate key may be shown by invoking the View Alternate Key screen via the View Alt. Key button.
Active Service ?	Displays if the Service has been designated as active or not.
Entry Point	Displays any application/object name combination that may have been defined as an entry point for the service. The Entry Point diagram may be displayed via the Entry Point Diag button.
Called Services	Displays any Called Services referenced by the Service. The full list of Called Services may be shown by invoking the View Called Services screen via the View Called button.
Keywords	List of search keywords that have been specified for the Service. The full list of search keywords for the service may be viewed by using the Maintain Keywords button. *NB: When Service Documentation is saved a default *ALL* keyword is added. This allows any 'orphaned' documentation to be identified by using the Keyword Catalogue.*
Comments	Displays any comments saved regarding the Service.
Extended Documentation	Shows the location of any supporting documentation that is associated with the Service. For example: Program specification, execution instructions. The documentation may be viewed by selecting the GO button.
Referenced Objects Tab:	
Name	The name of any objects or other services referenced by the object.
Library	The library where the called object resides. *Note: This is only applicable to Natural or COBOL objects not called services.*
Object Type	The type of object or service.
Referenced Files Tab:	
File	The File Name of any files accessed by any of the called objects for the service.

SCREEN ITEMS	DESCRIPTION
DBID	The Database Number of the file referenced.
File Nbr	The File Number of the file referenced.
Create	Will be set to Y if the file is used in a CREATE(STORE) statement in the application.
Read	Will be set to Y if the file is used in a READ(BROWSE) statement in the application.
Update	Will be set to Y if the file is used in an UPDATE statement in the application.
Delete	Will be set to Y if the file is used in a DELETE statement in the application.

BUTTON NAME	DESCRIPTION
Keywords group:	
View Keywords	Invokes a screen to view all the search keywords associated with the service.
Called Services group:	
View Called	Invokes the <u>View Called Services</u> screen to display the full list of any other services that may be called by the Service.
Alternate Key group:	
View Alt. Key	Invokes the <u>View Alternate Key</u> screen to display the Alternate Key for the Service.
Entry Point/Application Object group:	
Entry Point Diag	Invokes the entry point diagram for the selected application/object combination.
Extended Documentation group:	
Go	Will open the specified file using the appropriate program associated with the file extension of the document. For example XX001P01_Spec.doc would be opened by MS Word. *Note: This button is only enabled if a specified file is present.*

Referenced Objects group:

Prev	Scrolls the Referenced Objects 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 Referenced Objects list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.

Referenced Files group:

Prev	Scrolls the Referenced Files 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 Referenced Files list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.

Service Viewer screen:

OK	Save changes and close the current screen.
Cancel	Cancel the Service Viewer process and close the current screen.
Apply	Save changes and retain the current screen.
	Note: This button is only enabled if any changes have been made.

Entry Point for Services

The Entry Point for Services option allows you to view which objects use a service and the objects used by a service using the <u>Entry Point Diagram</u>.

How to Invoke the Entry Point for Services Option

Use the following navigation in the site workplace:

- Select the required Service.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Entry Point**

- Select the sub option**: What I Call/What Calls Me**

Entry Point for Services Examples

Natural Calling Integration Server Flow Service

In this example a Natural subprogram GETDAT-N is a stub module generated in EntireX for the Integration Server Flow Service call_PublicGetDate. The trigger object is NATGWRPC using an alternate key of NEE_Package:call_PublicGetDate. This shows that the Natural program GETDAT-P is using the flow service.

The following Figure 11-4-1 illustrates Entry Point Diagram showing Natural Calling Integration Server Flow Service.
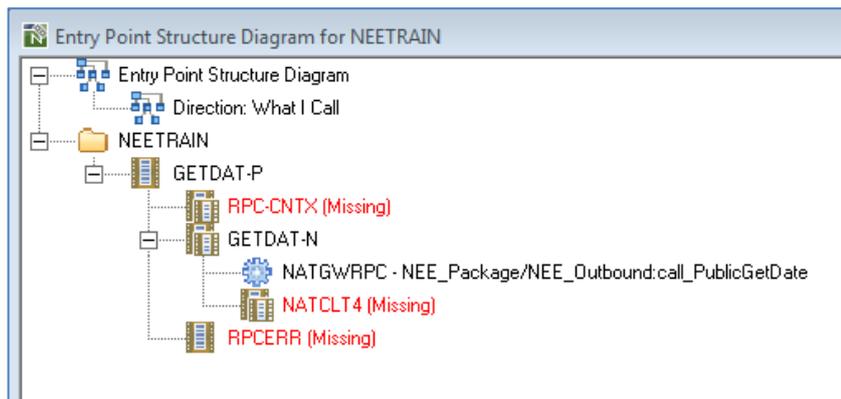
Figure 11-4-1 Entry Point Diagram showing Natural Calling Integration Server Flow Service.

Flow Service using a Natural Object

In this example Flow Service call_GETDATE is using an adapter service GETDATE which in turn uses a Natural subprogram GETDATE from library NEETRAIN. A Flow Service uses other Services and an Adapter Service uses an Entry Point.

The following Figure 11-4-2 illustrates an Entry Point Diagram showing Flow Service using a Natural Object.
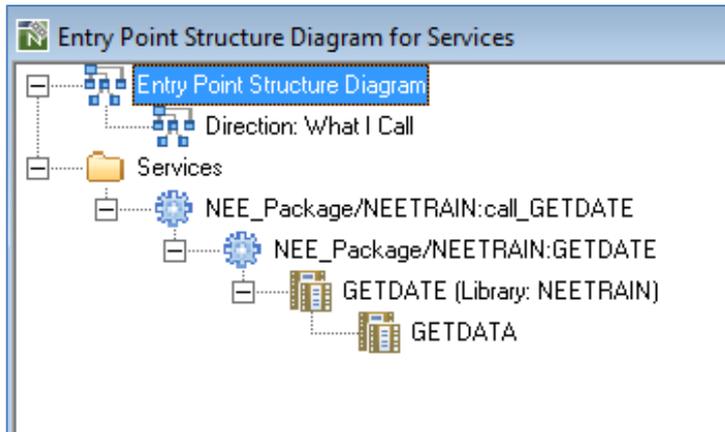
Figure 11-4-2 Entry Point Diagram showing Flow Service using a Natural Object.

Maintain Alternate Key

The Maintain Alternate Key option provides the facility to specify an Alternate key for the service. An Alternate Key is a unique identifier that links Natural and COBOL objects to the service.

It is invoked from the Maintain Services screen via the Maintain Alt. Key button. A read-only version, View Alternate Key, is available from the View Alternate Key button on the Service Viewer screen.

Maintain Alternate Key Window

The Maintain Alternate Key window controls all the settings required for this option

The following Figure 11-5 illustrates the Maintain Alternate Key screen.
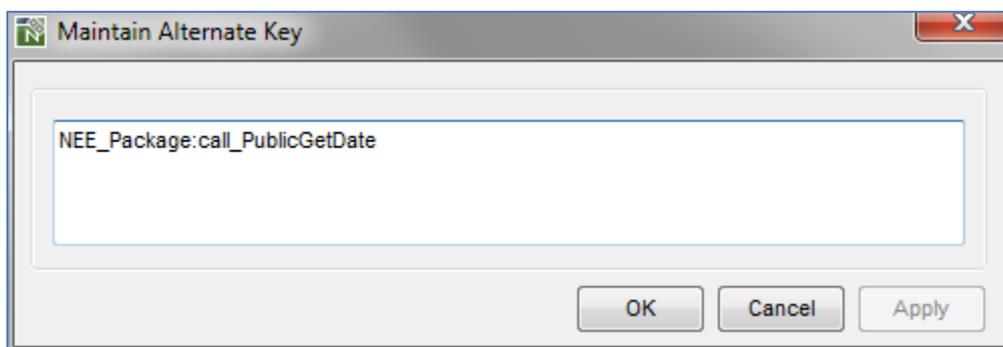
Figure 11-5 Maintain Alternate Key screen

SCREEN ITEMS	DESCRIPTION
Alternate Key	Allows the specification of an Alternate Key. *NB: The Alternate Key is limited to 180 bytes.*

BUTTON NAME	DESCRIPTION
OK	Save changes and close the current screen.

BUTTON NAME	DESCRIPTION
Cancel	Cancel the Maintain Alternate Key process and close the current screen.
Apply	Save changes and retain the current screen.
	Note: This button is only enabled if any changes have been made.

Note: The OK, Cancel and Apply buttons are unavailable on the read-only View Alternate Key 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.

Maintain Called Services

The Maintain Called Services option provides the facility to add any other Services that are referenced by a particular Service e.g. A Flow Service may call one or more other services. These services may be added on this screen. It is invoked from the <u>Maintain Services</u> screen via the Called Services button. A read-only version, View Called Services, is available from the View Called Srv. button on the <u>Service Viewer</u> screen.

Maintain Called Services Window

The Maintain Called Services window controls all the settings required for this option.

The following Figure 11-6 illustrates the Maintain Called Services screen.
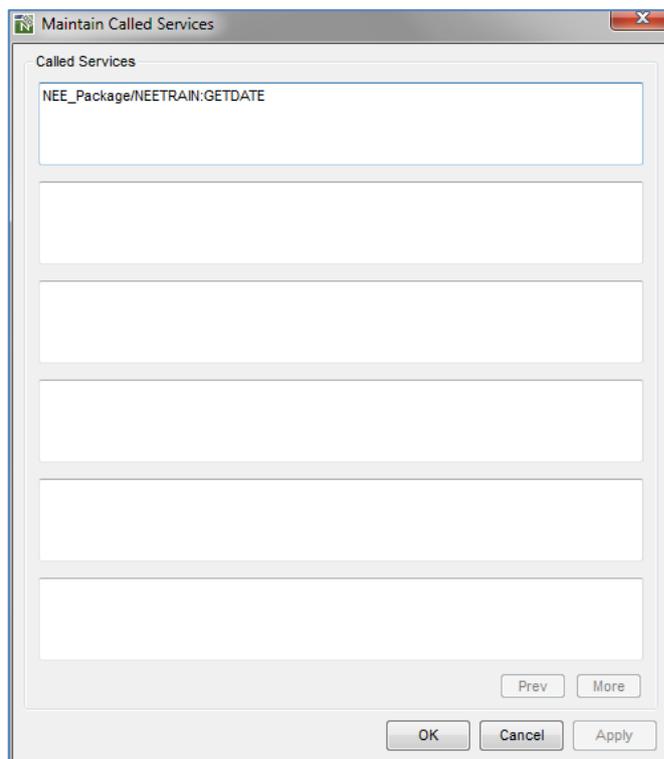
Figure 11-6 Maintain Called Services screen

SCREEN ITEMS	DESCRIPTION
Called Services	Allows the specification of the Called Service name.
	NB: The Called Service Name is limited to 180 bytes.

BUTTON NAME	DESCRIPTION
Maintain Called Services group:	
Prev	Scrolls the Called Services 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 Called Services list forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
Maintain Services Screen:	
OK	Save changes and close the current screen.
Cancel	Cancel the Maintain Called Services process and close the current screen.
Apply	Save changes and retain the current screen.
	Note: This button is only enabled if any changes have been made.

Note: The OK, Cancel and Apply buttons are unavailable on the read-only View Called Services 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.

MANAGING PREDICT USER VIEWS

Chapter Overview

This chapter describes how to select and manage Predict User Views for processing in Natural Engineer.

Whenever an object is loaded into the Natural Engineer repository that uses a Predict User View, e.g., a COBOL object containing EXEC ADABAS statements then Natural Engineer will add an entry to the global Predict User View node. In addition the information will be added to the Application Node as a Predict User View sub-node.

The node is structured as follows;

- Predict User View Header
  - Predict User View1
    - Application1
    - Application2
  - Predict User View2
    - Application1
    - Application2

Note: This option is only available if Natural Engineer is executing in a remote development environment, Natural version 4.2 or above is installed on the mainframe and the Predict file is mapped in the remote environment settings

Predict User Views Filter

The list of Predict User Views displayed under the Predict User Views node may be tailored to your requirements by using the Predict User Views Filter option.

How to Invoke the Predict User Views Filter

Use the following navigation in the site workspace:

- Select the top level Predict User Views node.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Predict User Views Filter**.

Specifying Predict User Views Filter

FILTER OPTION	DESCRIPTION
Predict User Views Filter	Reposition the list of Predict User Views to start from a particular Predict User View name.

Reposition the list of Predict User Views to start from a particular Predict User View name.

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

Possible reposition values are:

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

Refresh Predict User Views

This option will refresh the list of Predict User Views in the site workspace.

How to Invoke the Refresh Predict User Views

Predict User Views can be refreshed by using the following site workspace navigation:

- Select the Predict User Views Node required.

- Single click with the right hand mouse button to invoke the context menu.

- Select the option: **Refresh Predict User Views**

Predict User View Options

The Predict User View nodes have the ability to invoke various screens to show related Predict User View information.

For further details please refer to the following sections;

Options available from Predict User View Name sub-node:

Field List

Database Access (CRUD) by Application

Predict Information

Object Documentation

Options available from Application Name sub-node:

Database Access (CRUD) by Object

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