Asset Management GASB 34 Compliance Phase III (HYDRA+)

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16. Abstract

The development and deployment of the Highway Yearly Data Reduction and Analysis (HYDRA+) system provides a pavement condition asset management tool for the Alabama Department of Transportation. This implementation of HYDRA+ provides:

1. Data integrity modules designed to monitor the integrity of data received, generate exception reports for potentially invalid data, permit administrator changes to the data, support automated and manual data input, and generate a transaction log recording alterations to data;
2. A set of budget calculator tools designed to provide estimated future budgets and target conditions;
3. Extension of the database to provide overlay-centric query and reporting capabilities;
4. Generation of refined Preliminary Prioritization Reports and ad-hoc reports, given static yearly routes and overlay tables;
5. *Ad hoc* reporting through Crystal Reports™;
6. Process and numerical verification for 2003 and 2004 GASB34 condition ratings for the network-wide flexible pavement system, including meetings with State Auditors; and
7. Knowledge Transfer for the resulting pavement management system (HYDRA+).

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Executive Summary

The Alabama Department of Transportation (ALDOT) is faced with critical challenges as it attempts to maintain a desirable level of pavement condition despite ever increasing traffic load, increasing heavy-load truck traffic, resurfacing costs outpacing inflation, and only modest increases in their maintenance budgets.   Thus as this project began, management of the State's transportation assets required information system refinements to continue to build and *effectively* maintain the state's transportation network. To meet this challenge the Highway Yearly Data Reduction and Analysis (HYDRA+) system was developed as a network level digital database and reporting pavement system.

Phase III of the HYDRA+ development and deployment delivers:

1. Modules designed to monitor the integrity of data received, generate exception reports for potentially invalid data, permit administrative changes to the data, support automated and manual data input, and generate a transaction log;
2. A set of budget calculator tools to estimate future budgets and target conditions;
3. Extension of the database to provide overlay-centric query and reporting capabilities;
4. Generation of refined Preliminary Prioritization Reports and ad-hoc reports, given static yearly routes and overlay tables;
5. Ad hoc reporting through Crystal Reports™;
6. Process and numerical verification for 2003 and 2004 GASB34 condition ratings for the network-wide flexible pavement system, including meetings with State Auditors; and
7. Knowledge Transfer to ALDOT staff for the resulting pavement management system (HYDRA+).

Introduction

Faced with the critical challenges of maintaining a desirable level of pavement condition despite an ever increasing traffic load, increasing heavy-load truck traffic, resurfacing costs outpacing inflation, and only modest increases maintenance budgets   Thus as this project began, management of the State's transportation assets required information system refinements to continue to build and *effectively* maintain the state's transportation system and to meet the following challenges.

The University of Alabama's Aging Infrastructure Systems Center of Excellence   (AISCE), working with the Alabama Department of Transportation (ALDOT), developed the Pavement Asset Management system to meet this challenge. This roadway maintenance management system is known as the Highway Yearly Data Reduction and Analysis (HYDRA+) system. HYDRA+ provides a network level digital database and reporting pavement system. Pavement physical characteristics and conditions are validated and stored; augmented with traffic data, these parameters are transformed into distress indices; and structured to be accessible for reporting. A set of standard reports have been created to aid in prioritizing resurfacing projects and for GASB 34 reporting.

Project Deliverables

HYDRA+ Phase III Deliverables:

Built on the foundation provided by HYDRA+ Phase II capabilities, the development and deployment of HYDRA+ Phase III system enhancements ensure the effective utilization and long-term viability of the system. This is accomplished through the completion of the following deliverables.

1. *Refinement and Deployment of Phase II Components*
   o   An administrative console for the HYDRA+ system to update application variables and algorithms, modify historical data and adjust security privileges (See Appendix B: User's Manual);
   o   Role-based restricted access to system data and functions (administrator, supervisor or tester) (See Appendix A: Technical Operations Manual: Figure A.3, Figure A.11);
   o   Data analysis and custom *ad-hoc* reporting using Crystal Reports™ (Appendix A: Technical Operations Manual: Figure A.2; Appendix B: HYDRA+ System User's Manual);
   o   Data set creation and export to enable generation of network-level maps and graphic charts to enhance what-if analysis, reporting and decision-making capabilities

2. *Development and Deployment of Data Validation Support Components*

- o Assess and validate the data types, ranges, completeness and relationships among required fields associated with the following data (See Appendix A: Technical Operations Manual; Appendix B: User's Manual):
    - o Counties and Divisions
    - o New Overlays
    - o Condition ratings
    - o Friction ratings
    - o Traffic counts
- o Generate exception reports to alert administrator of potential data integrity problems (See Appendix B: User's Manual)
- o Enable administrator to insert or change required data (See Appendix B: User's Manual)
- o Alert system users of potential data integrity problems that occur during the manual data input operations (See Appendix B: User's Manual)
- o Create a transaction log detailing system user changes to data inputs as required for audits and user accountability (See Appendix B: User's Manual)

3. *Creation of Pavement Budget and Target Condition Calculator* (See Appendix D: Cost-Budget Calculators)

The contract proposal specified a database modification to support overlay structure. The Project Advisory Committee (PAC) requested that this work be removed, and replace by a budget and target condition calculator be substituted.

- o The target condition component of the Pavement Maintenance Cost Analysis Budget Calculator allows the user to enter a cost per lane mile for state routes and interstate routes, the rating decay rate, the desired rating to be achieved, the budget inflation rate, and the number of years to achieve the desired rating. The calculator displays the current ratings for every division in the state, plus an average for all divisions. Once the forecast is generated, the calculator will display the budget for each year in each division that must be allotted to achieve the desired rating. The calculator also displays the percentage of the budget that will be allotted to each division and the total that must be spent on that division.
- o The budget forecasting component provides estimated future condition values. The user enters a budget amount per division, cost per lane mile for state routes and interstate routes, the rating decay rate, and the budget inflation rate. The calculator displays the state's budget for state and interstate routes, and also the deflation budget for state and interstate routes. It also displays the percentage of state budget allocated to each division. Resultant ratings by division are shown according to the percentage of budget allocation.

4. *Refinement and Deployment of Report Generation and Historical Querying Capabilities*

- o Enable user-defined dates (as-of date and projected number of years) to enable the generation of refined Preliminary Prioritization Reports and ad-hoc reports, given static yearly routes and overlay tables (See Appendix B: User's Manual; Appendix E: Tester's Manual)
- o Compare the roadway characteristics of overlays or larger roadway segments across user-defined time periods (See Appendix B: User's Manual)

5. *Verification of the Process and Calculation of 2003 GASB 34 Condition Ratings*

- o Calculate, document and report the roadway condition ratings for 2003 following the procedure developed in the GASB 34 Phase II (See Appendix F: GASB 34)
- o Verify results and documentation with ALDOT personnel and State Auditors (See Appendix F: GASB 34)
- o Generate GASB 34 reports for 2003 using 2002 algorithms (See Appendix D: Cost-Budget Calculator)
- o Extend project scope to provide the capability to use 2002 algorithms to allow for generation of GASB 34 reports for 2004 (See Appendix F: GASB 34)
- o Document all deviations from the procedures used in the prior year
- o Met with state auditors to review the 2003 and 2004 GASB 34 roadway condition rating report as required
- o Data sets required for maps were developed by Materials and Test personnel and transferred to GIS personnel for mapping based on specific formats coordinated by the GIS personnel to ensure the appropriate format is generated for a specific mapping application GIS toolsets.

6. *Knowledge Transfer for the HYDRA+ System*

- o Delivered design specifications for manual and automated workflow to enhance the efficiency, effectiveness, and integration of activities associated with data acquisition, validation, querying, and reporting of roadway assets (See Appendix A: Technical Operations Manual)
- o Conduct training for advanced query development and custom report generation
- o Delivered design capabilities to integrate facets of the roadway data repository (e.g. traffic volume, functional route status, NHS designation, etc.)
- o Refined, in collaboration with ALDOT personnel, the HYDRA+ Technical Operations Manual and User's Manual (See Appendix A: Technical Operations Manual; Appendix B: User's Manual)
- o Established feedback procedures to identify potential system enhancements

7. *Modifying the Database Structure*

Modifications have been made to the software and database to enable the "as-of" time aspect to the system's querying and reporting capabilities and present a more overlay-centric view of the state's roadway assets given a static yearly routes and overlay tables (See Appendix A: Technical Operations Manual).

Appendix *A*: Technical Operations Manual

System Overview

The HYDRA+ system is implemented using a multi-tier client/server architecture. This appendix provides the technical details for its implementation. The client component to the Oracle connection is detailed in Section 1: HYDRA+ Client. The server engine is Oracle 9i. The server manages data storage and most report generation business logic and is implemented in stored procedures. The client component provides user interfaces (input and output) plus initial data value for pavement condition values. Configuration details for the server side are detailed in Section 2: Oracle Installation.

Section 3 provides system hierarchical functional decomposition; that is the graphical flow of the HYDRA+ system. In addition, Section 3 provides the database structural organization in the form of Entity Relation Diagrams (ERD). Section 4 provides documentation for forms, packages, procedures and triggers.

Section 1: HYDRA+ Client

HYDRA+ Program Installation Instructions:

Step 1:
- o   Insert the HYDRA+ Installation CD

Step 2:
- o   The program should begin installing automatically after a few seconds
  - ▪   If auto-run is disabled, open windows explorer and navigate to the CD-drive
  - ▪   Double-click on "setup.exe"
  - ▪   The installation should now begin

Step 3:
- o   Navigate to C:\Program Files\Common Files\System\Ole DB\Data Links\
- o   Open the file HYDRA+.udl by double-clicking
- o   The Data Source should be set to "HYDRA+DB"
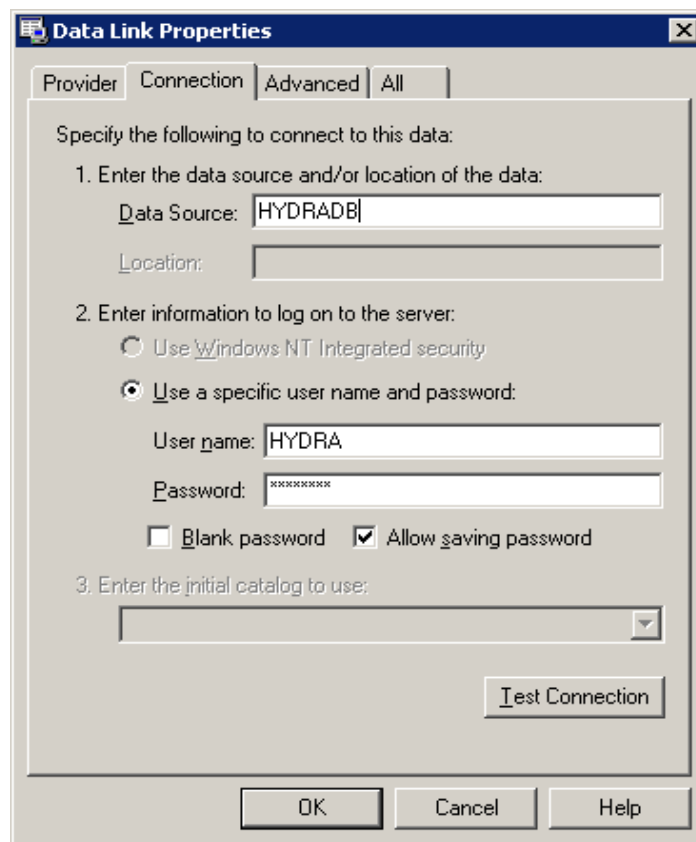
Figure A.1: Data link properties

Step 4:

- o Click the "Test Connection" button.
- o If the connection was successful, the message "Test connection succeeded." will appear in a message box, and the installation is complete
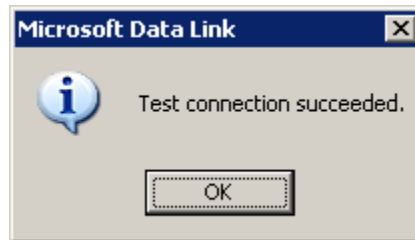
Figure A.2: Test connection succeeded

Step 5:

- o If a Microsoft Data Link Error occurs, perform the following steps
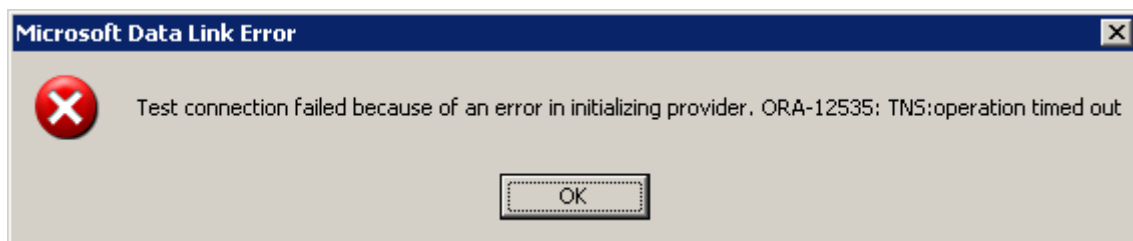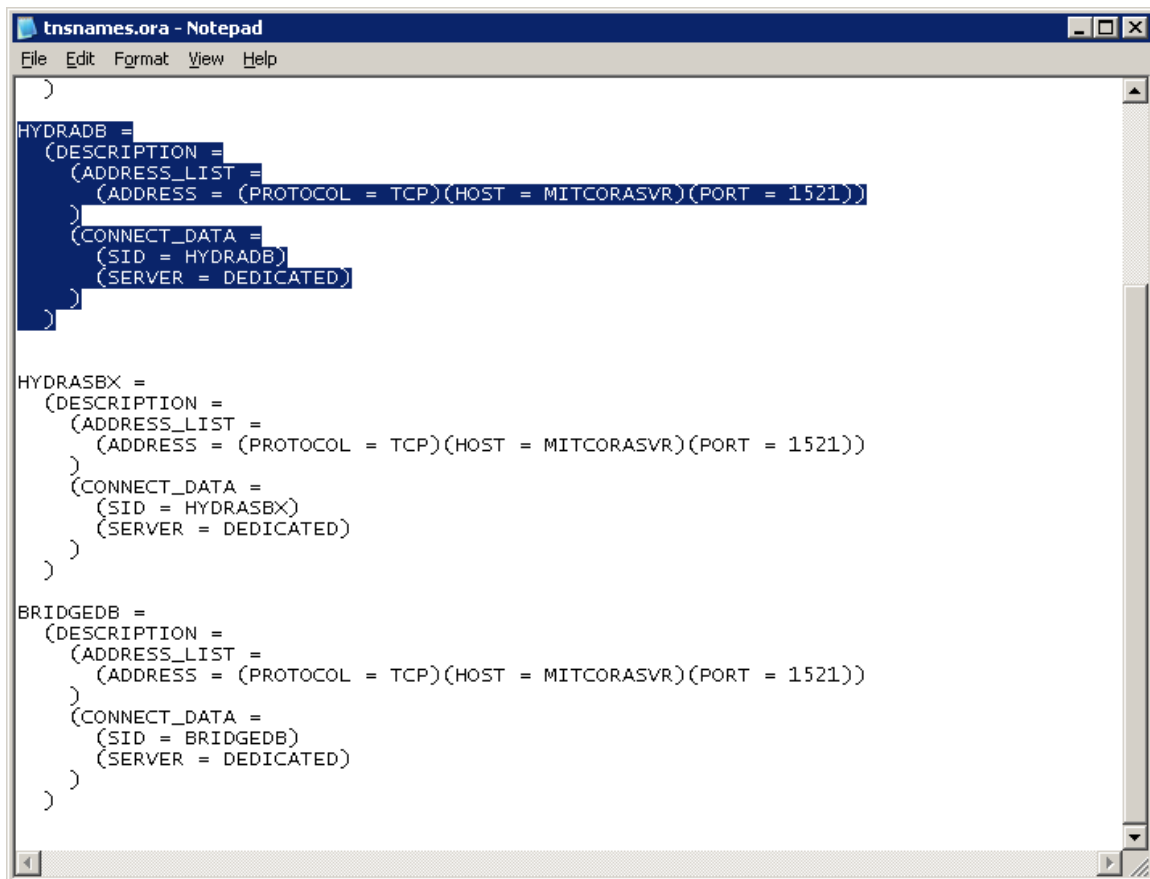
Figure A.3: Microsoft data link error

Step 6:

- o Navigate to C:\Oracle\network\ADMIN
- o Double click on "tnsnames.ora" and open in Notepad
- o If the following text is not located in the file, copy and paste the following into the Notepad window:

```
HYDRA+DB =
 (DESCRIPTION =
  (ADDRESS_LIST =
   (ADDRESS = (PROTOCOL = TCP)(HOST = MITCORASVR)(PORT = 1521))
  )
  (CONNECT_DATA =
   (SID = HYDRA+DB)
   (SERVER = DEDICATED)
```


Figure A.4: Tsnames.ora

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<u>Step 7:</u>

- o Return to C:\Program Files\Common Files\System\Ole DB\Data Links\ and open the "HYDRA+.udl" file.

<u>Step 8:</u>

- o Test the connection again
- o If the connection was successful, the message "Test connection succeeded." will appear in a message box
- o Installation is now complete
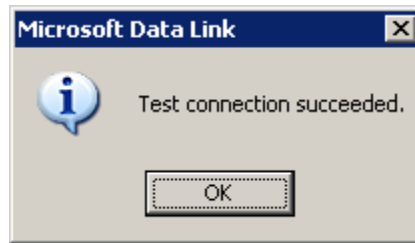
Figure A.5: Test connection succeeded

Section 2: Oracle Installation

Oracle Database Installation Outline

- **<u>Delete an Oracle Database</u>**.
  - o   Refer to *<u>Delete Oracle Database</u>*

- **<u>Use Universal Installer to install Oracle products</u>**.
  - o   Refer to *<u>Install Oracle Products</u>*

- **<u>Create the Oracle service. Meaning create the instance of Oracle on the host.</u>**
  - o   Refer to *<u>Create Oracle Database Instance</u>*

- **<u>Check services to see if Oracle created the listener</u>**
    (e.g. OracleOraHome92TNSListenerTESTDB)

- **<u>If listener is not present, proceed to Net Configuration Assistant and create a listener with Listener configuration</u>**.
  - o   Refer to *<u>Create Oracle Database Listener</u>*

- **<u>Complete Naming Methods configuration in Net Configuration Assistant</u>**.
  - o   Refer to *<u>Create Naming Methods for Oracle Database</u>*

- **<u>Complete Local Net Service Name configuration in Net Configuration Assistant</u>**.
  - o   Refer to *<u>Create Local Net Service Name for Oracle Database</u>*

- **<u>Go to Enterprise Mgr Console</u>**
  - o ***<u>Add database to the tree</u>***
    - ▪ Logon as SYSTEM, because only user that has permissions at this time, until DBA creates new users

  - o ***<u>Create Tablespace, because each user needs a default tablespace</u>***
    - ▪ Refer to *<u>Create Tablespace in Oracle Database</u>*

  - o ***<u>Create User for HYDRA+</u>***
    - ▪ Refer to *<u>Create User in Oracle Database</u>*

  - o ***<u>Import Data</u>***
    - ▪ Refer to *<u>Exporting HYDRA+ Database</u>*

  - o ***<u>Export Data</u>***
    - ▪ Refer to *<u>Exporting HYDRA+ Database</u>*

Install Oracle Products:

Step 1:
- o **_Extract Oracle files_**:
  - a. Create folders "disk1", "disk2", "disk3" all in the same folder (example "C:\Temp\ disk1", "C:\Temp\ disk2", "C:\Temp\ disk3")
  - b. Insert Oracle disk 1, 2, or 3
  - c. Extract each .zip files to its respective folder (Example: Oracle disk 1 goes in "C:\Temp\disk1")
  - d. Repeat a, b, and c for all three disks

Step 2:
- o Run "setup.exe" located in the "disk1" folder (NOTE: All Oracle files must be uninstalled before starting the process. Use the Oracle Universal Uninstaller to accomplish this. Refer to "Delete an Oracle Database.doc" for detailed instructions.

Step 3:
- o The setup process begins with the "Welcome" screen:
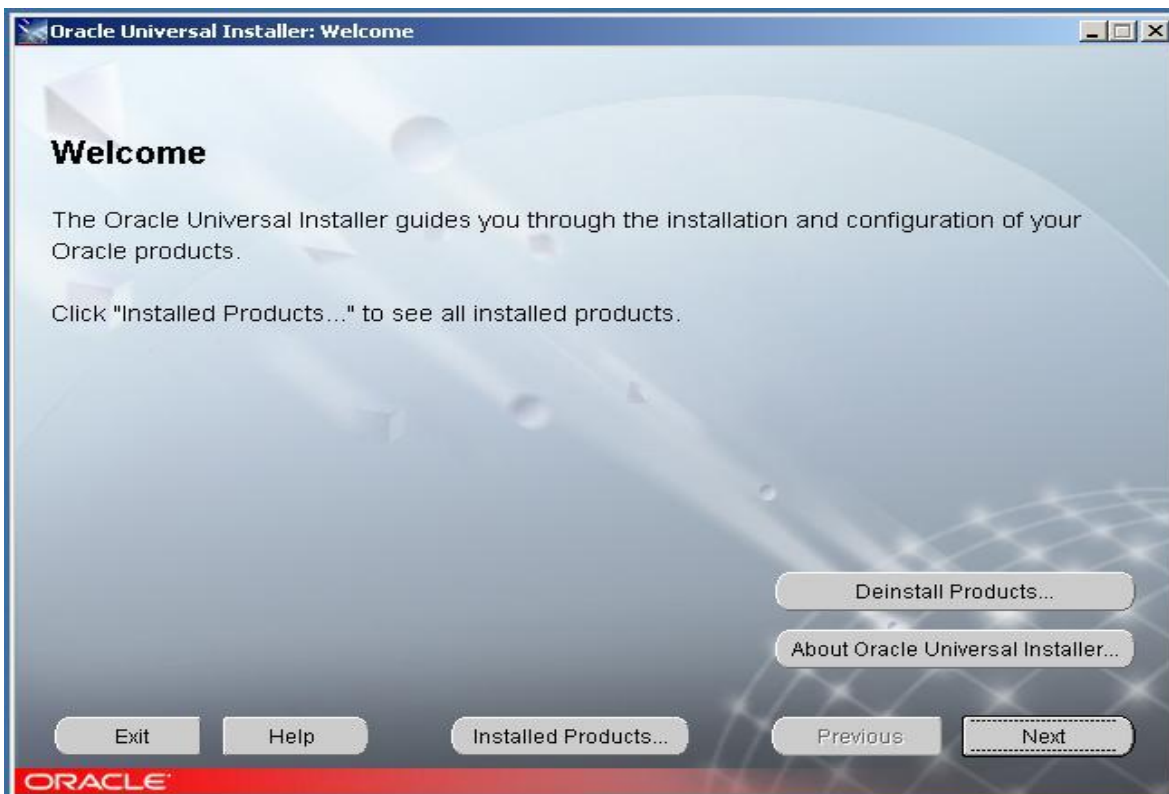
Figure A.6: Welcome screen to universal installer

Step 4:
- o Click "Next" on the "Welcome" screen to get to the "File Locations" screen

Step 5:
- o If you want to change the path for Oracle from the default settings, do so here
- o When you are finished, click next
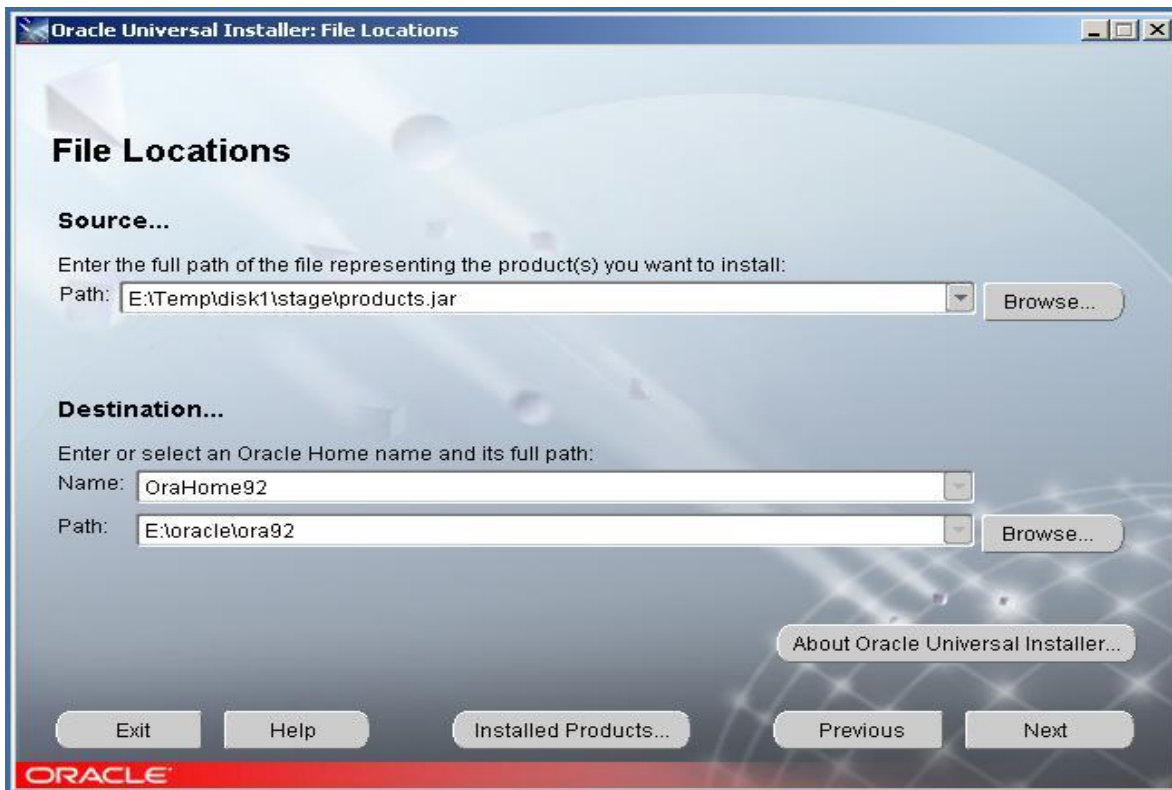
Figure A.7: File locations

Step 6:
   o The products will begin loading now. Wait for the "Product Selection" screen…
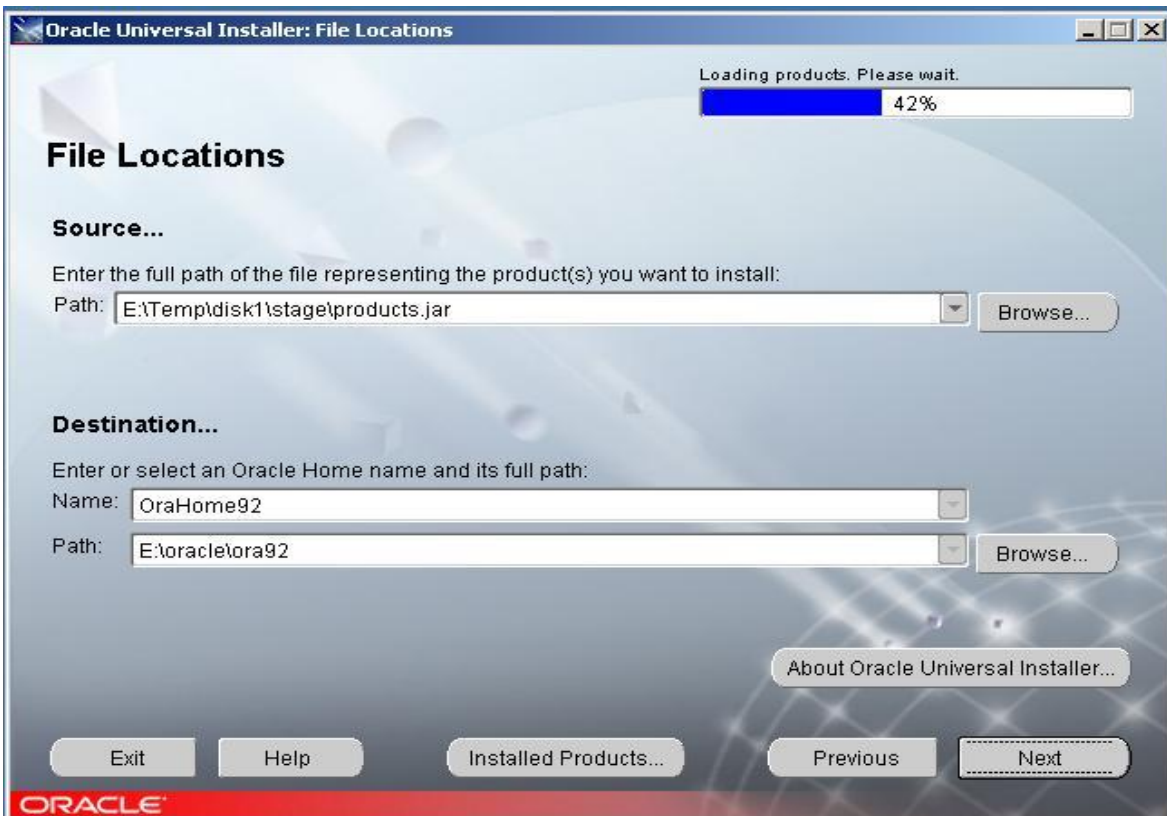
Figure A.8: Loading from file location

Step 7:

- o When the "Available Products" screen appears, choose "Oracle 9i Database 9.2.0.1.0" and click "Next"

Figure A.9: Available products

Step 8:

- o You will now be on the "Installation Types" screen
- o Select "Enterprise Edition" on the "Installation Types" screen and click "Next"
- o The installation program will load the necessary files
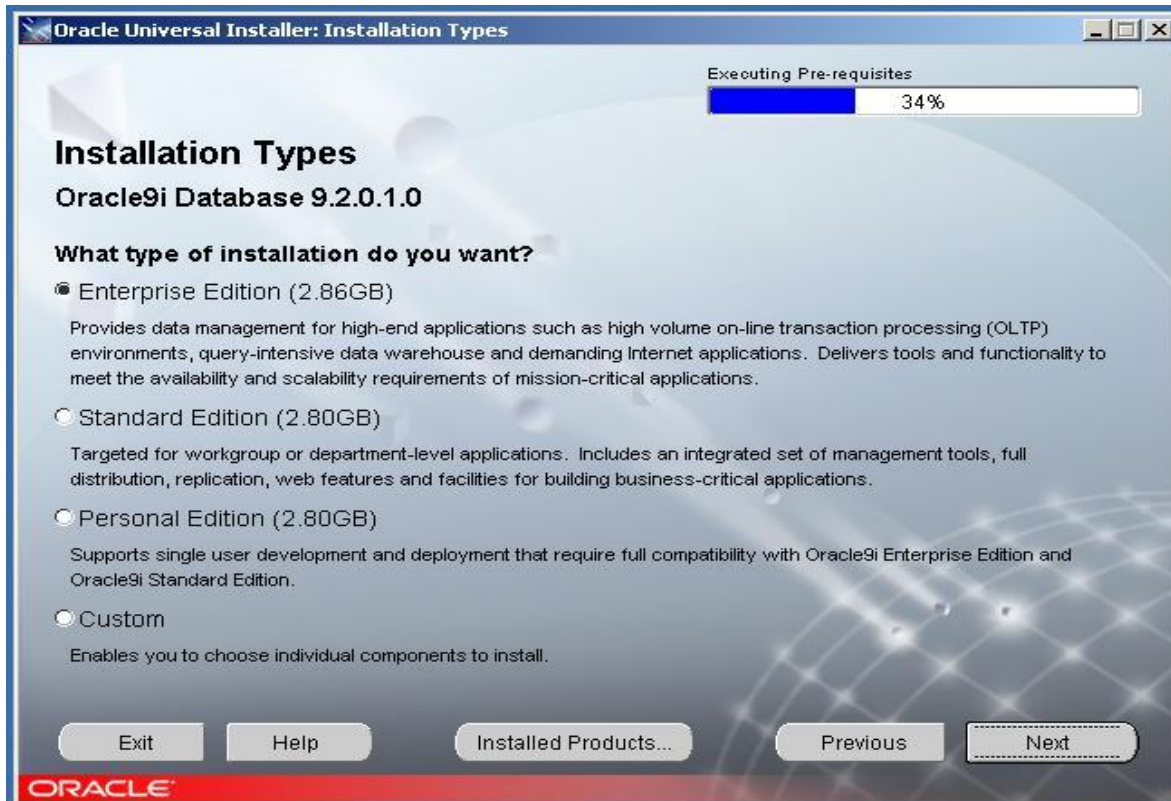
Figure A.10: Loading installation types

Step 9:

- o On the "Database Configuration" screen, choose "Software Only" and click "Next"
- o Wait for the "Oracle Services for Microsoft Transaction Server" screen…
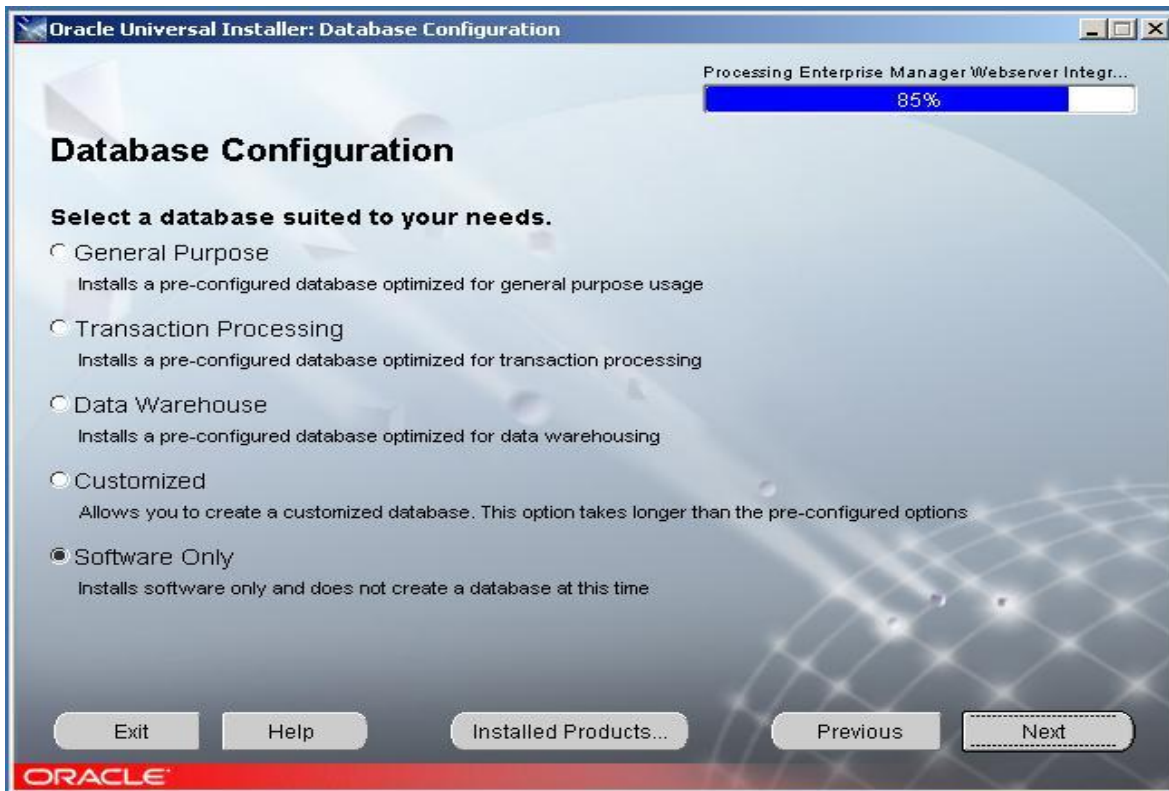
Figure A.11: Software only database configuration

Step 10:

- o When the "Oracle Services for Microsoft Transaction Server" screen appears, use the default port number 2030 and click "Next"
- o Wait for the "Summary" screen to appear
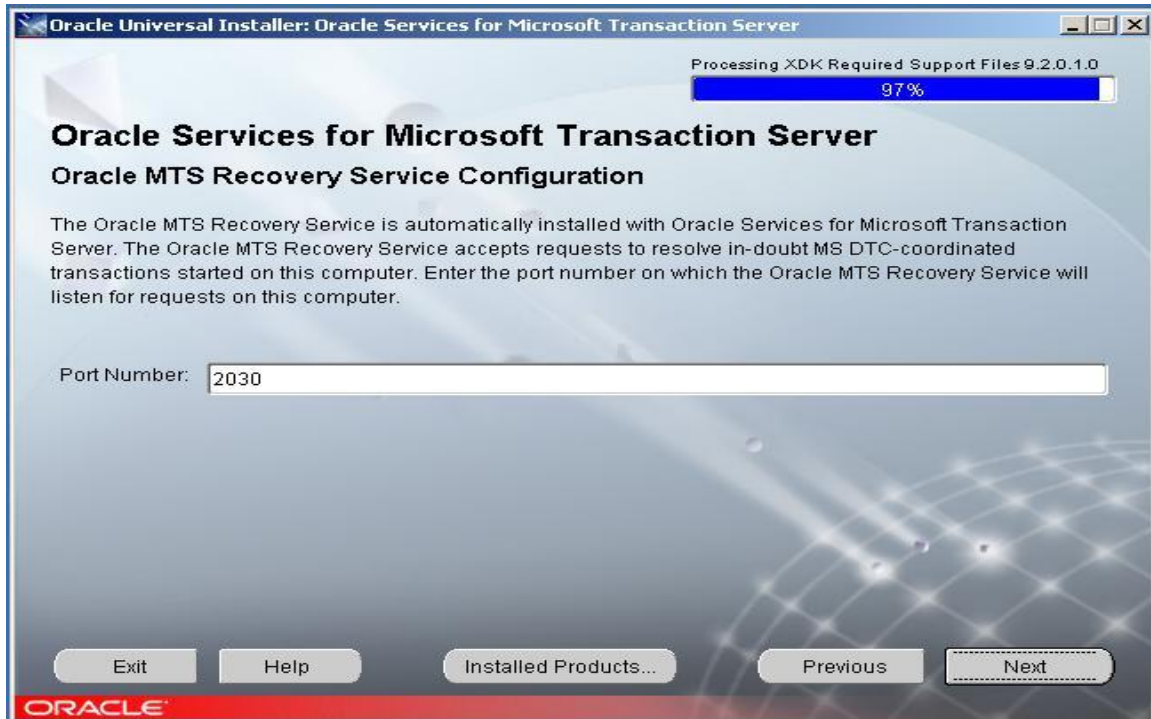
Figure A.12: Oracle services for Microsoft transaction server

Step 11:
- o   When the "Summary" screen appears, click "Install"
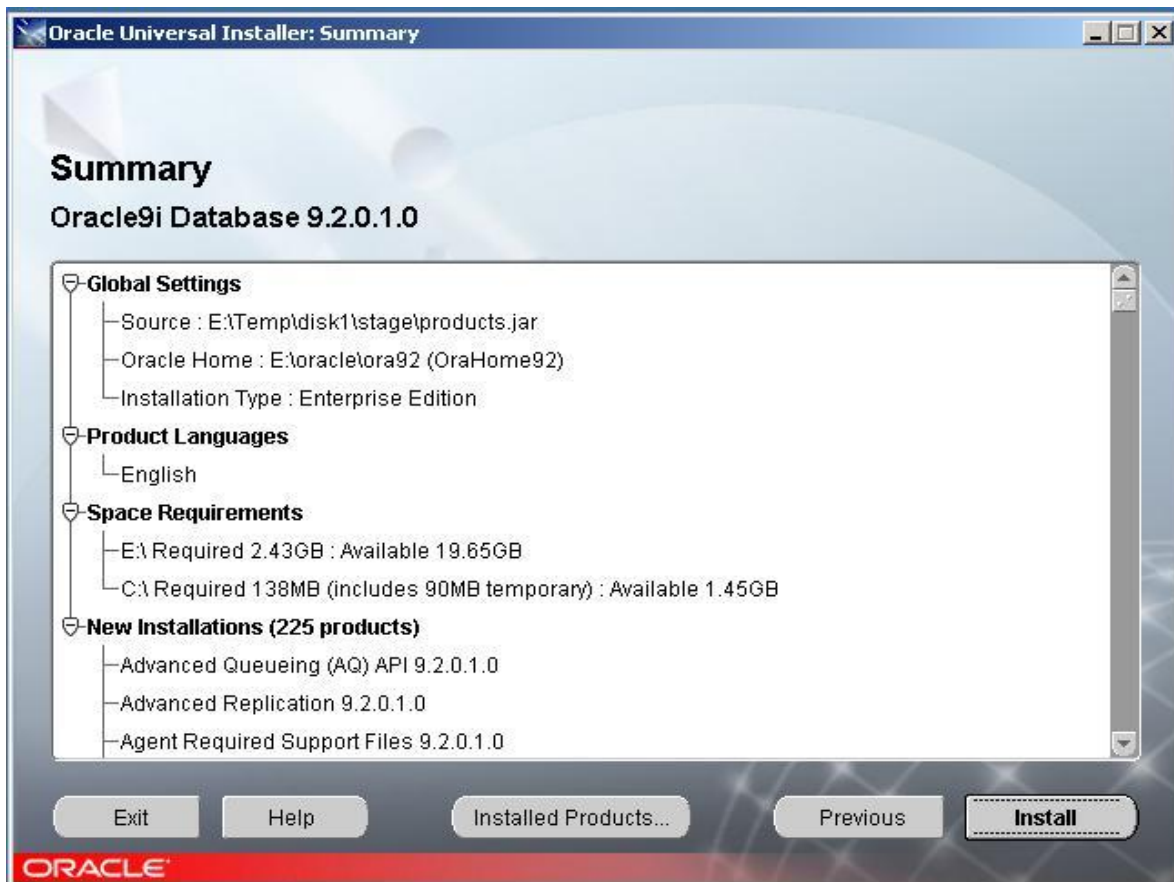
Figure A.13: Installation summary screen

Step 12:

- o Wait while Oracle installs
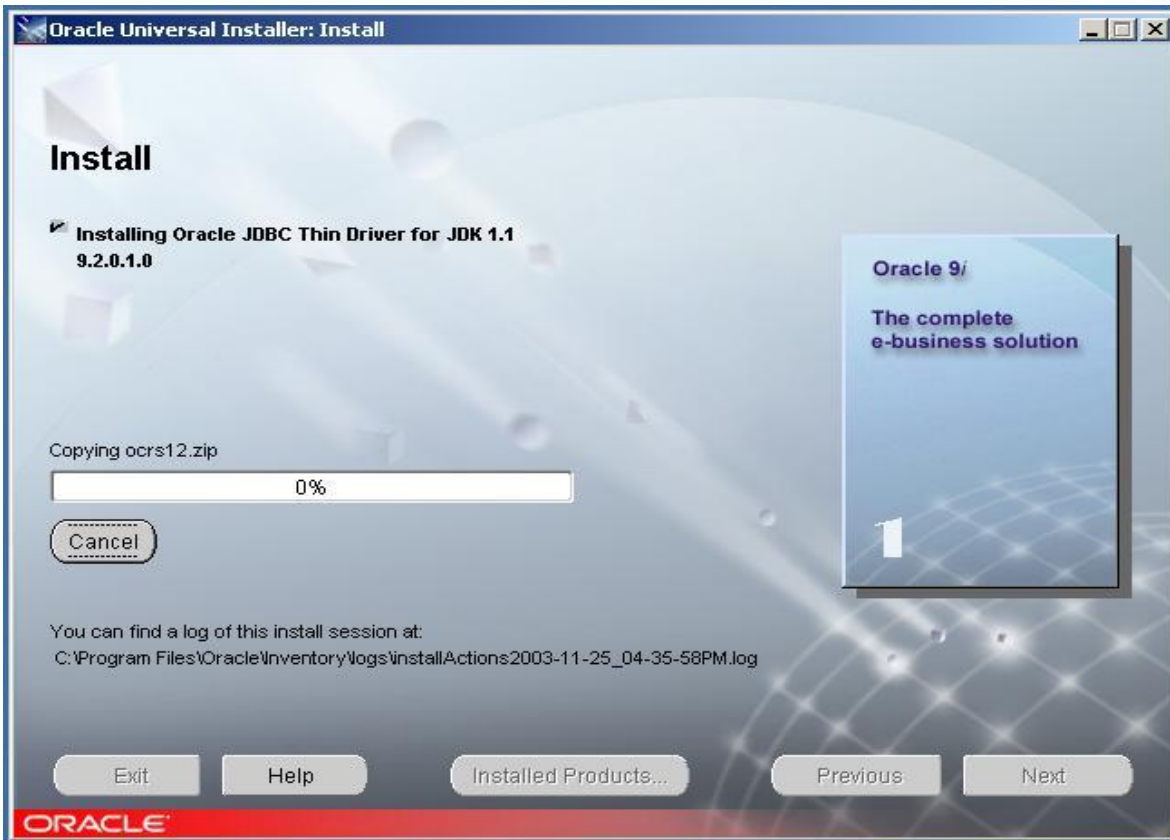
Figure A.14: Oracle installation progress screen

Step 13:
- o "End of Installation" screen appears
- o Click "Exit", and then "Yes" when the confirmation box opens
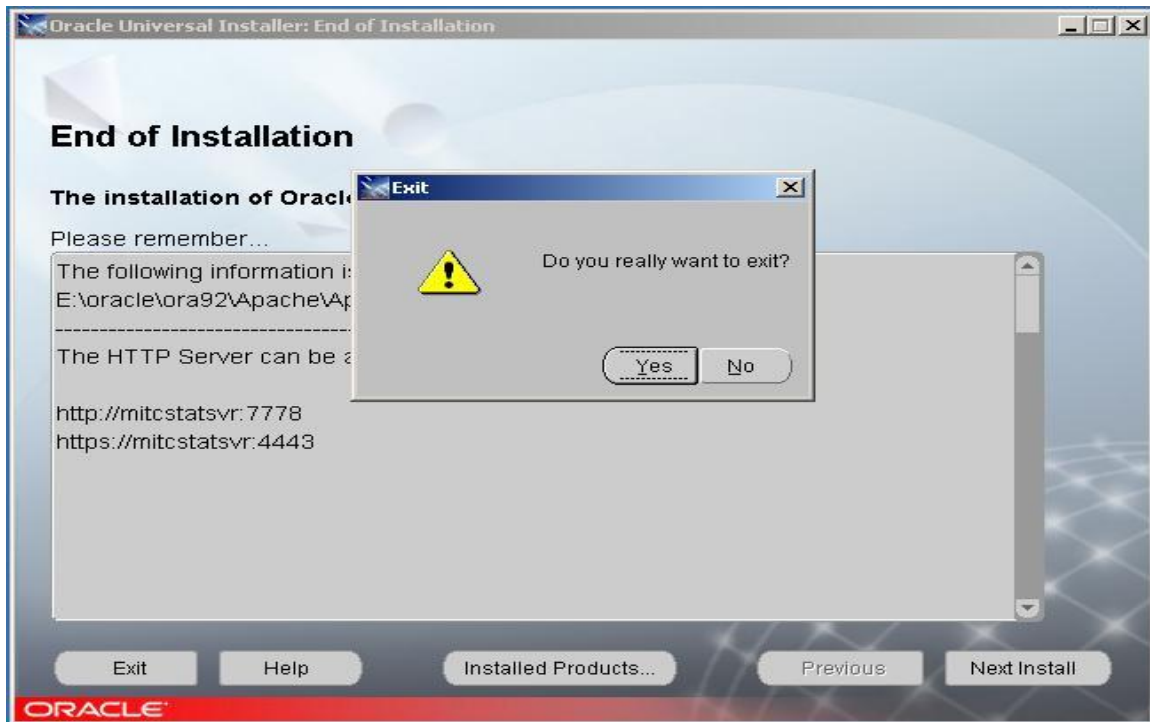
Figure A.15: Confirm completion of installation

Step 14:
- o Disable the Oracle Web Server
  - a. Go to Start->Settings->Control Panel->Administrative Tools->Services
  - b. Right click on "OracleOraHome92HTTPServer"
    1. Choose "Properties"
    2. Select "General" tab
    3. Change startup type to "Disable"
    4. Click "Apply"
    5. Click "Ok"
    6. Exit Services+

Create Oracle Database Instance

Step 1:

o   Navigate to "Start->Programs->Oracle-OraHome92->Configuration and Migration Tools->Database Configuration Assistant"

Step2:

o   When the "Welcome" screen appears, click "Next"
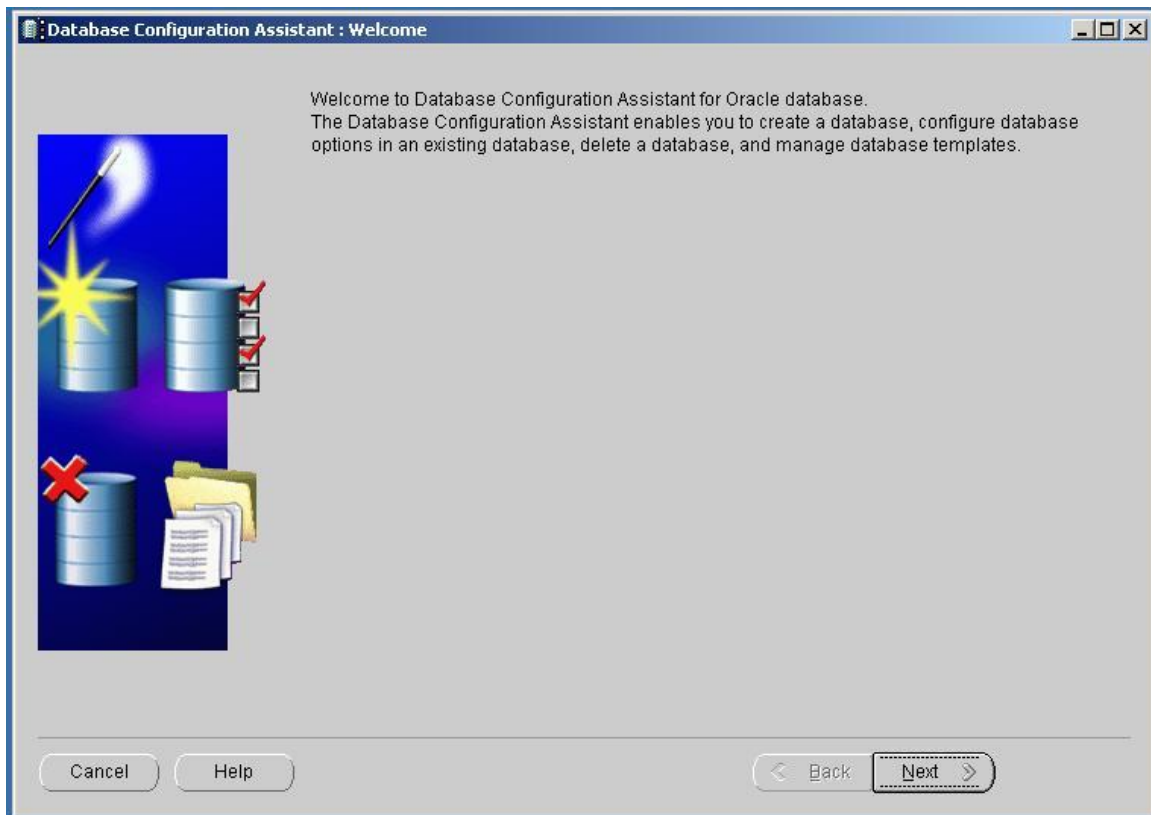
Figure A.16: Welcome screen for database configuration assistant

Step 3:

- o   On the "Operations" screen, select "Create a database" and then click "Next"
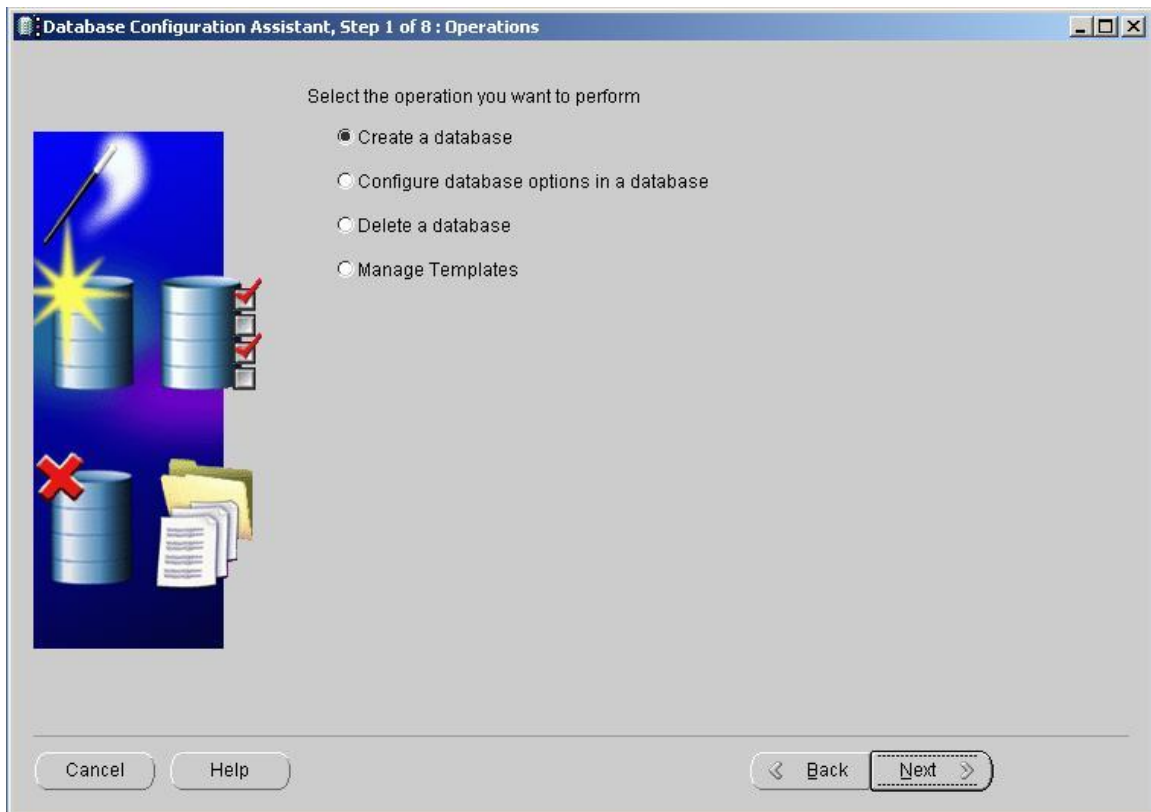
Figure A.17: Database creation operations

Step 4:
- o Select Template Name "New Database" with the "Include Datafiles?" option equal to "No"
- o Click "Next"
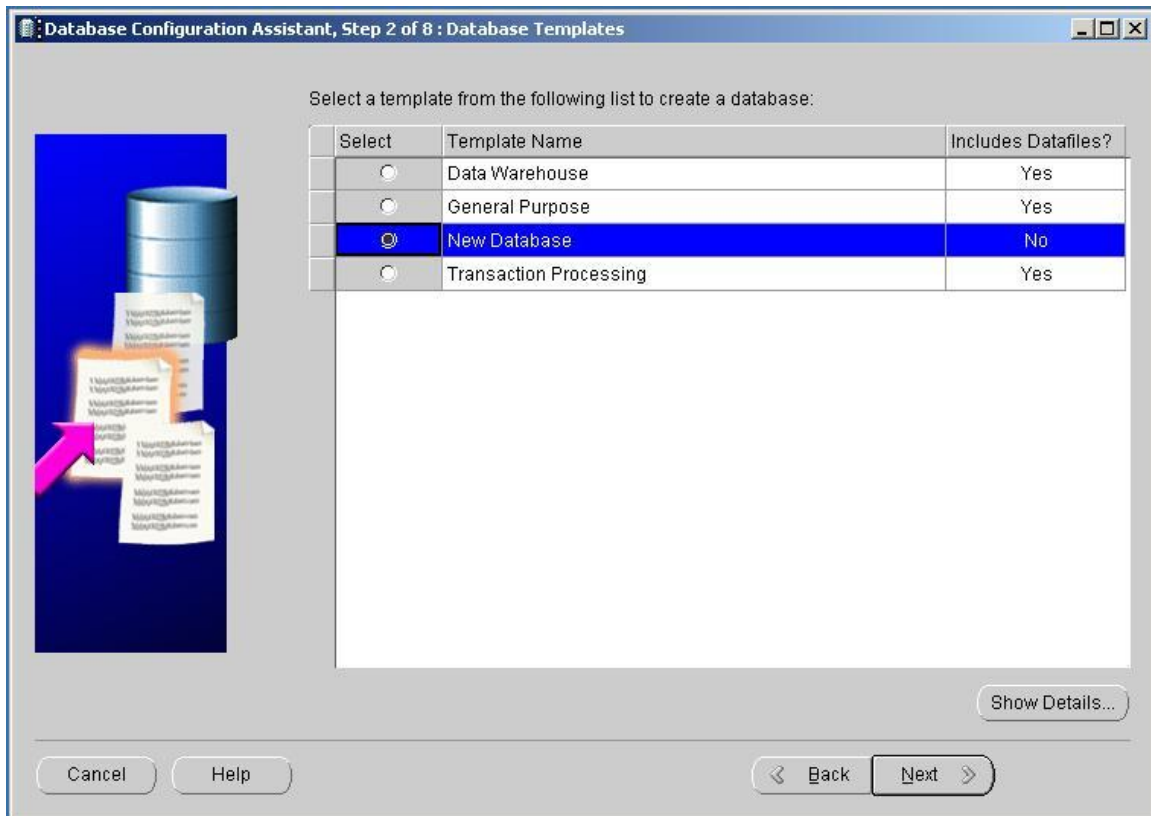
Figure A.18: Database templates

Step 5:

- o Enter "HYDRA+DB" as the Global Database Name
- o Enter "HYDRA+DB" as the SID
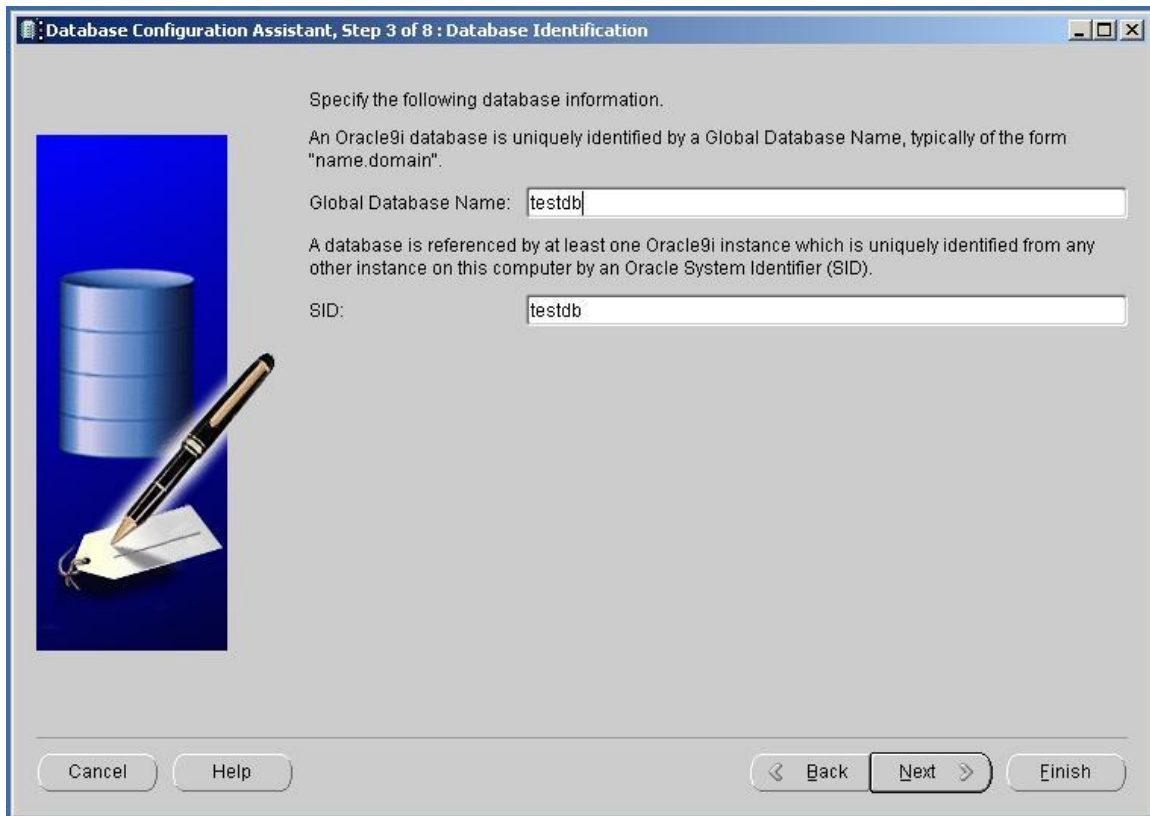
Figure A.19: Specify database information

Step 6:
- o In the "Database Features" screen, deselect each feature available (NOTE: When deselected, some of the features will ask to delete the tablespace for the feature. When this occurs, select "Yes" as prompted.)
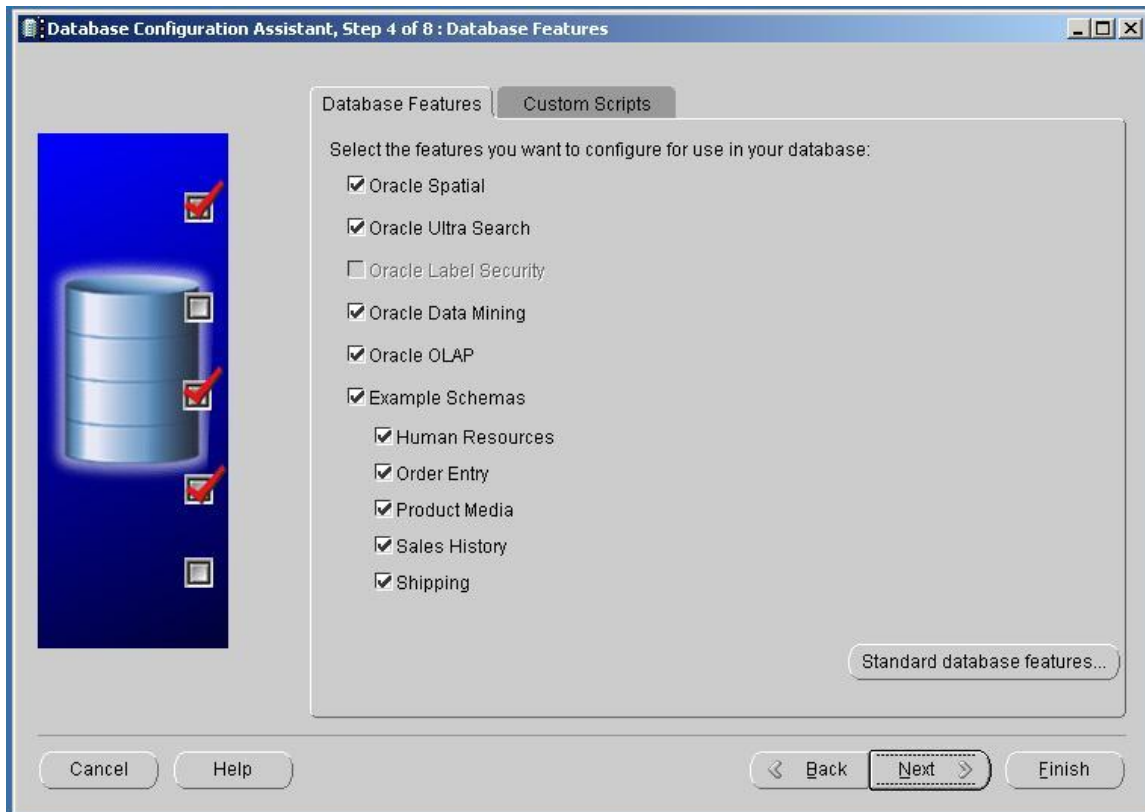
Figure A.20: Select database features (before screenshot)
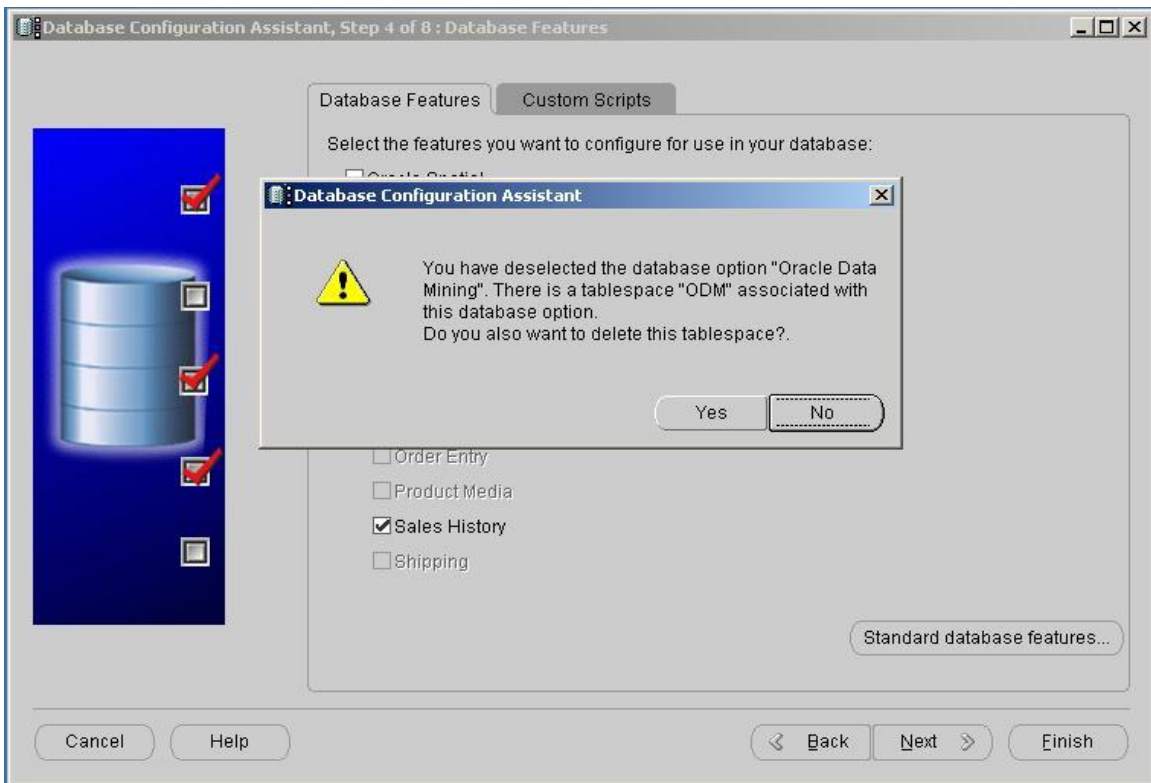
Figure A.21: Database feature selection, delete ODM tablespace
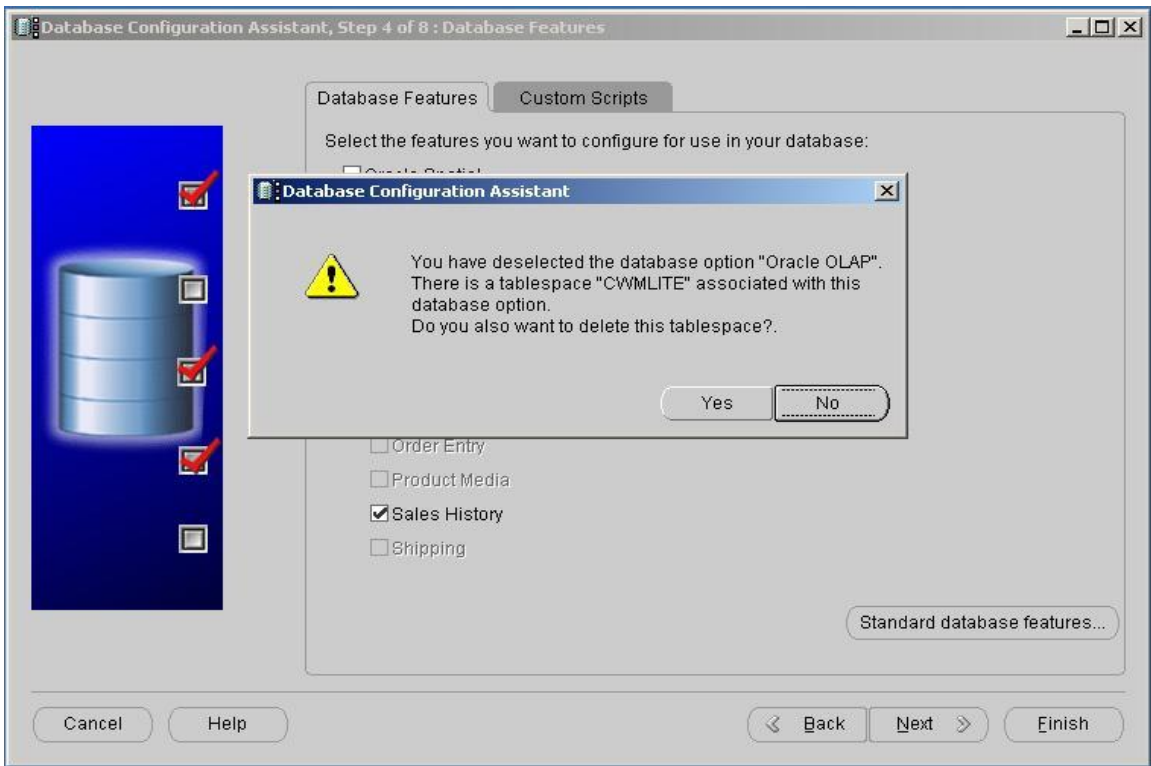
Figure A.22: Database feature selection, delete CWMLITE tablespace
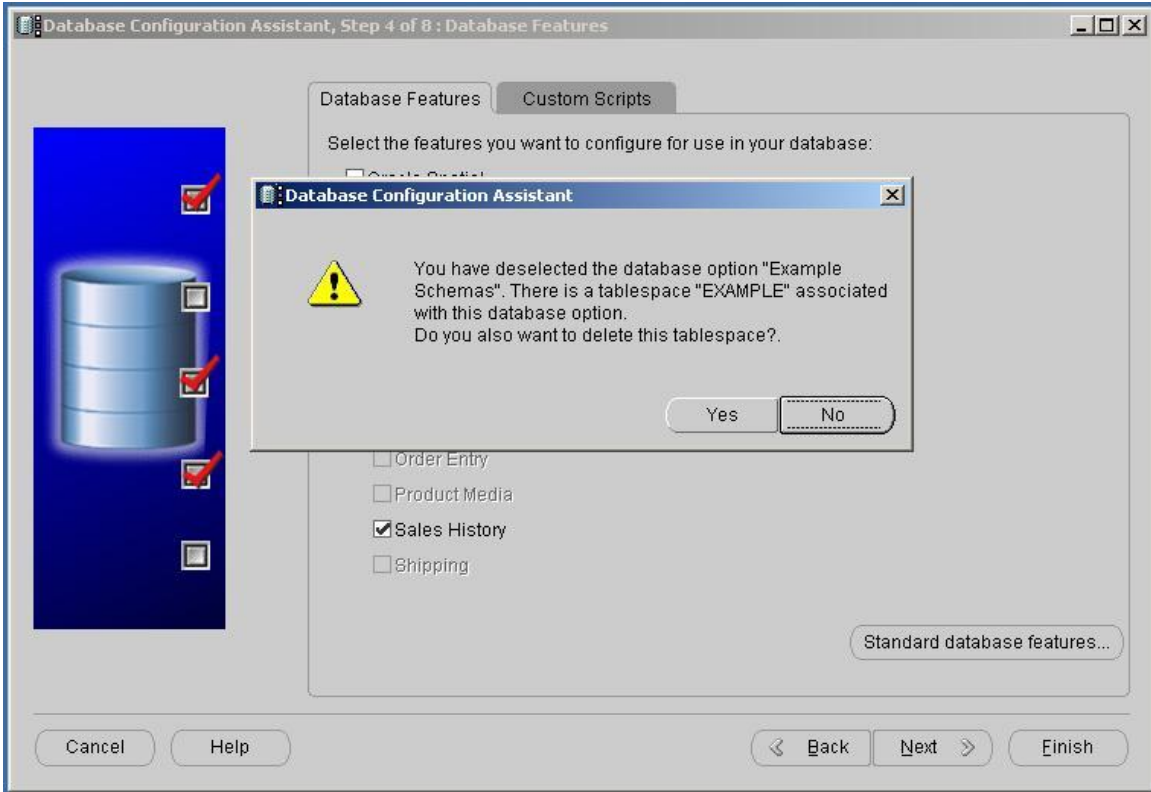
Figure A.23: Database feature selection, delete EXAMPLE tablespace
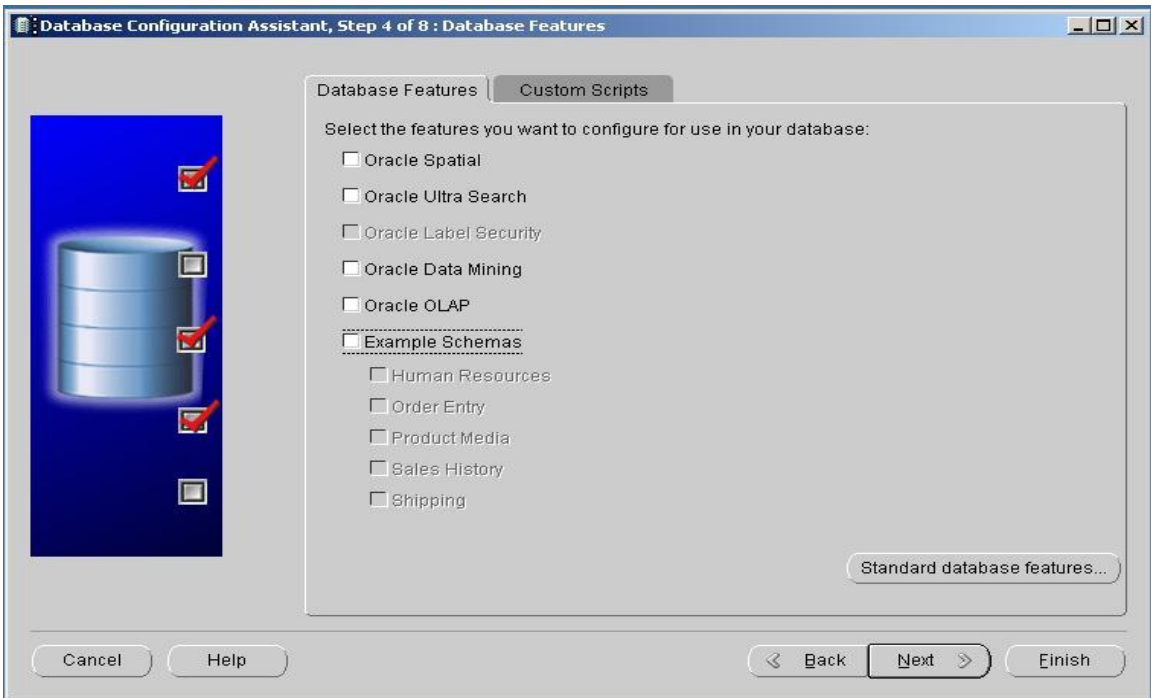
Figure A.24: Database feature selection, deselected database features

Step 7*:*

- o Click the "Standard database features…" button in the lower right-hand side of the window
- o Deselect all of the "Standard database features" (NOTE: When deselected, some of the features will ask to delete the tablespace for the feature. When this occurs, select "Yes" as prompted.)
- o When all the features have been deselected, click "Ok"
- o Then click "Next" to proceed to the next step
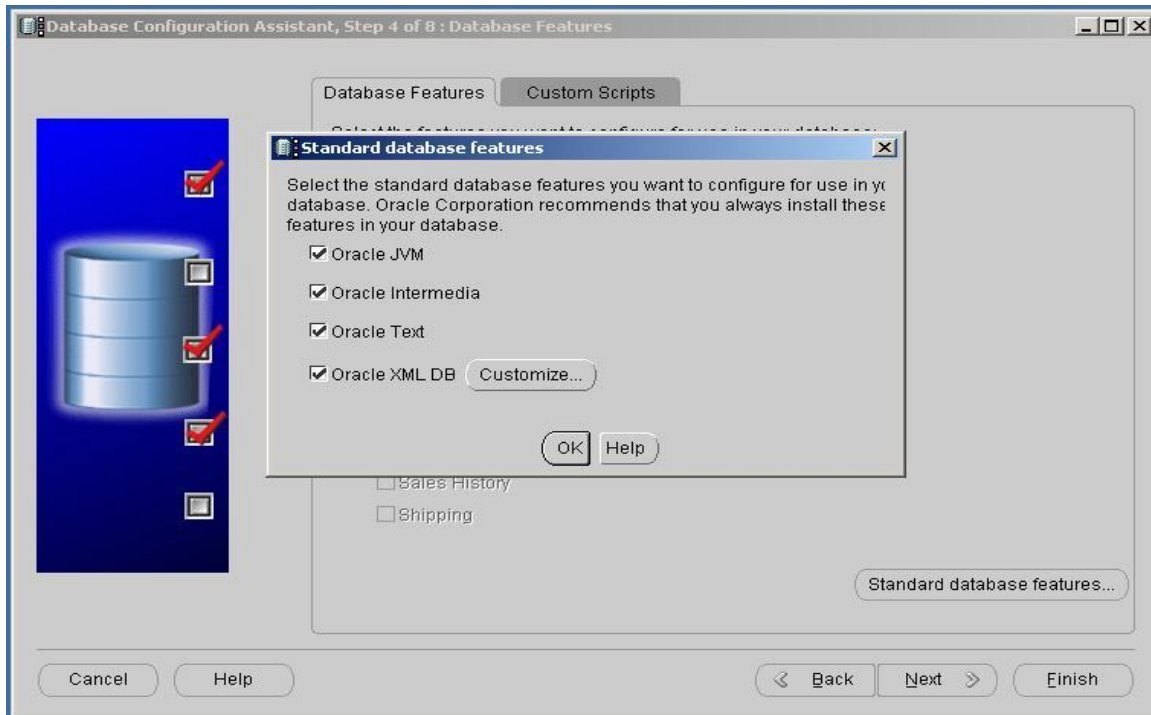
Figure A.25: Standard database features
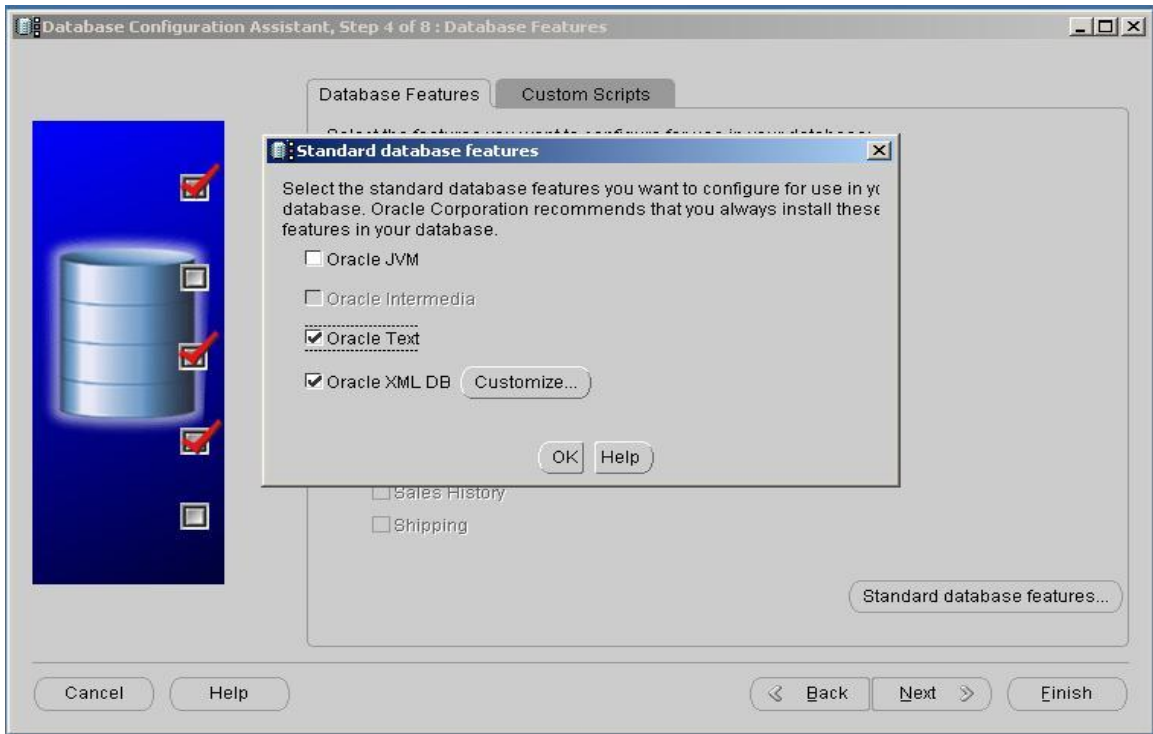
Figure A.26: Standard database features, deselect Oracle JVM feature
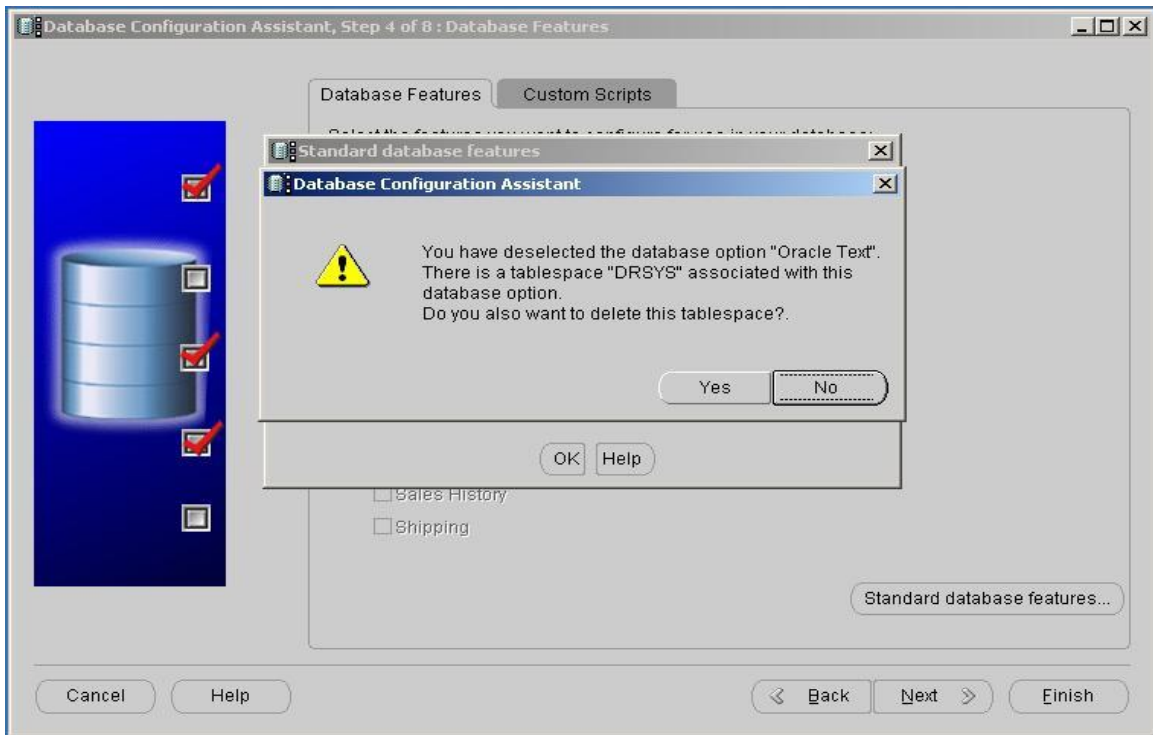
Figure A.27: Standard database features, delete "DRSYS" tablespace
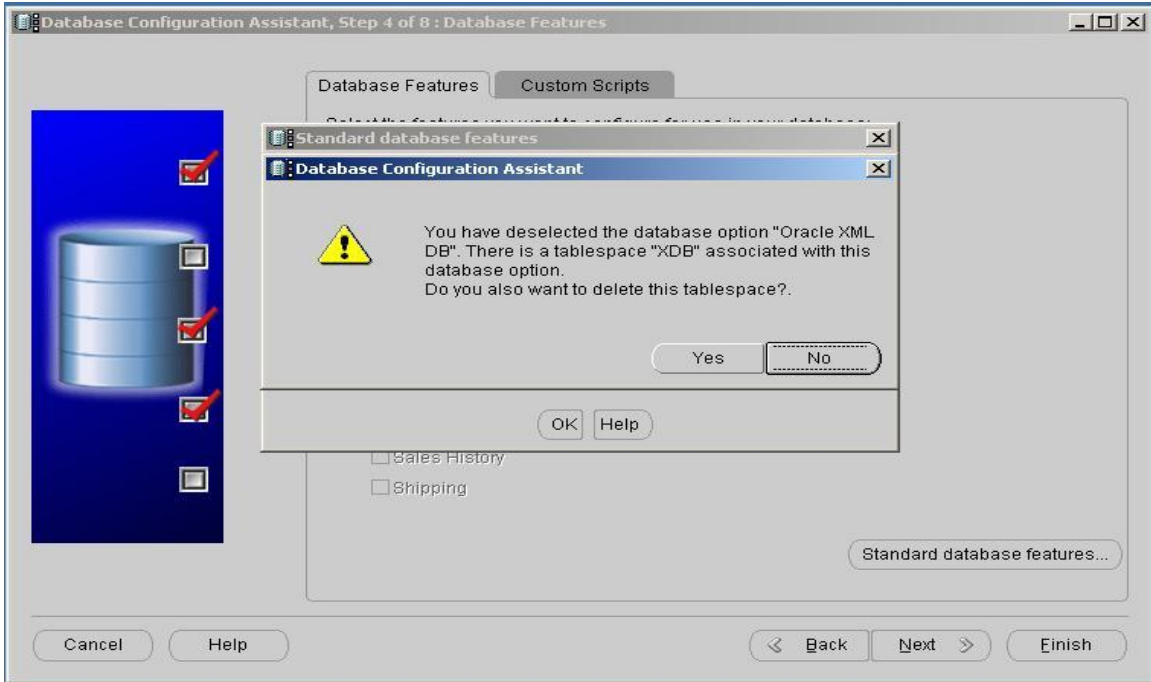
Figure A.28: Standard database features, delete "XDB" tablespace
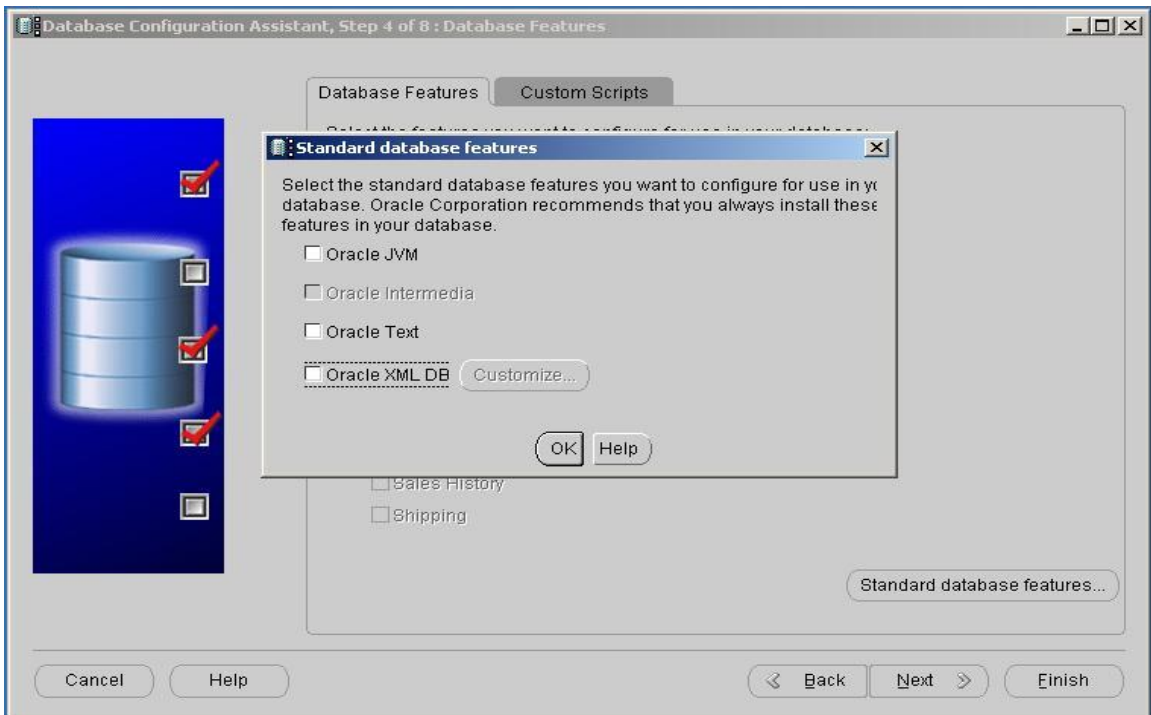
Figure A.29: Standard database features, shows deselected standard database features

Step 8:

- o Select "Shared Server Mode" to configure for multiple users
- o Click "Edit Shared Connections Parameters…"
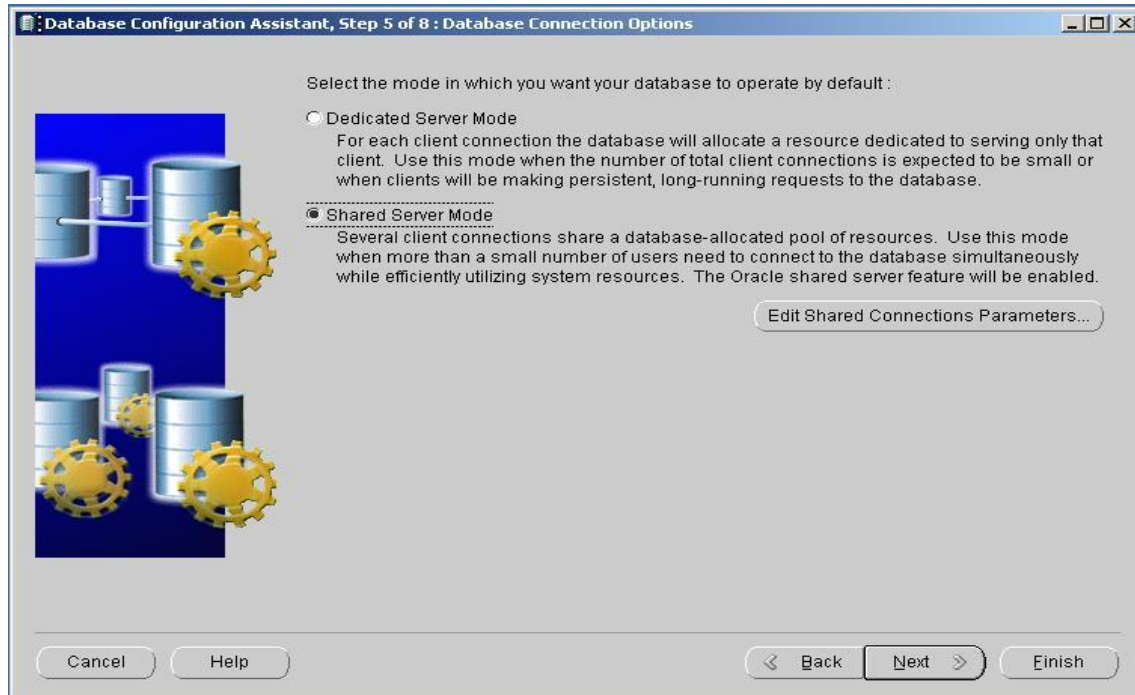
Figure A.30: Database configuration options

Step 9:

- o A "Shared Server Mode" window will open, and the "Basic" basic tab is selected by default
- o Choose the "Advanced" tab, and change "Multiplexing" to "On"
- o Click "Ok" to return to the "Database Connection Options" screen
- o On the "Database Connection Options" screen, click "Next" to proceed to the next step
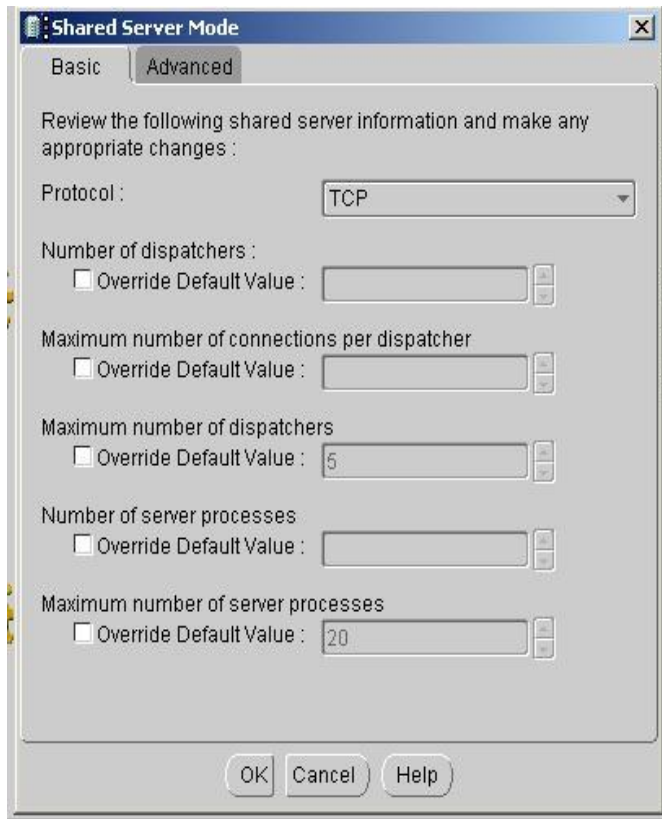
Figure A.31: Shared server mode options, basic tab
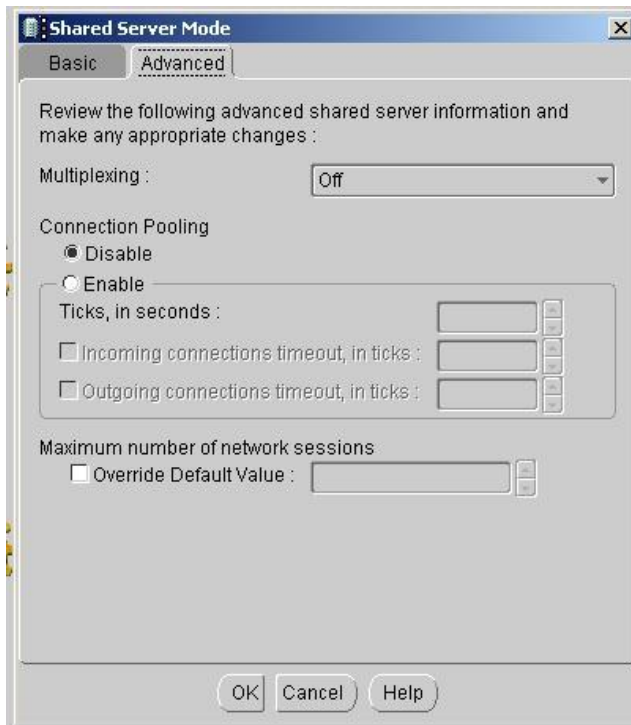
Figure A.32: Shared server mode options, advanced tab (before)
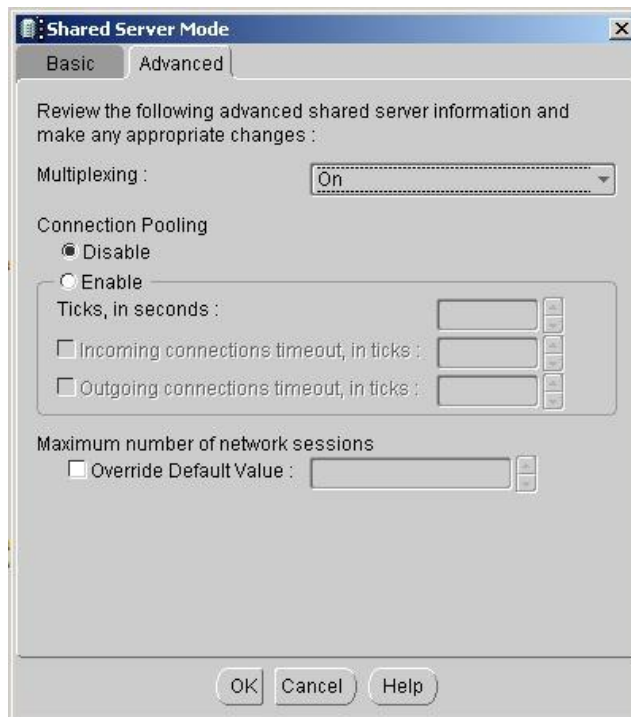
Figure A.33: Shared server mode options, advanced tab (after)

34

Step 10:

- o On the "Initialization Parameters" screen, select the "Memory" tab
- o Select "Typical"
- o Set "Percentage of physical memory" to 60%
- o Set "Database Type" to "Multipurpose"
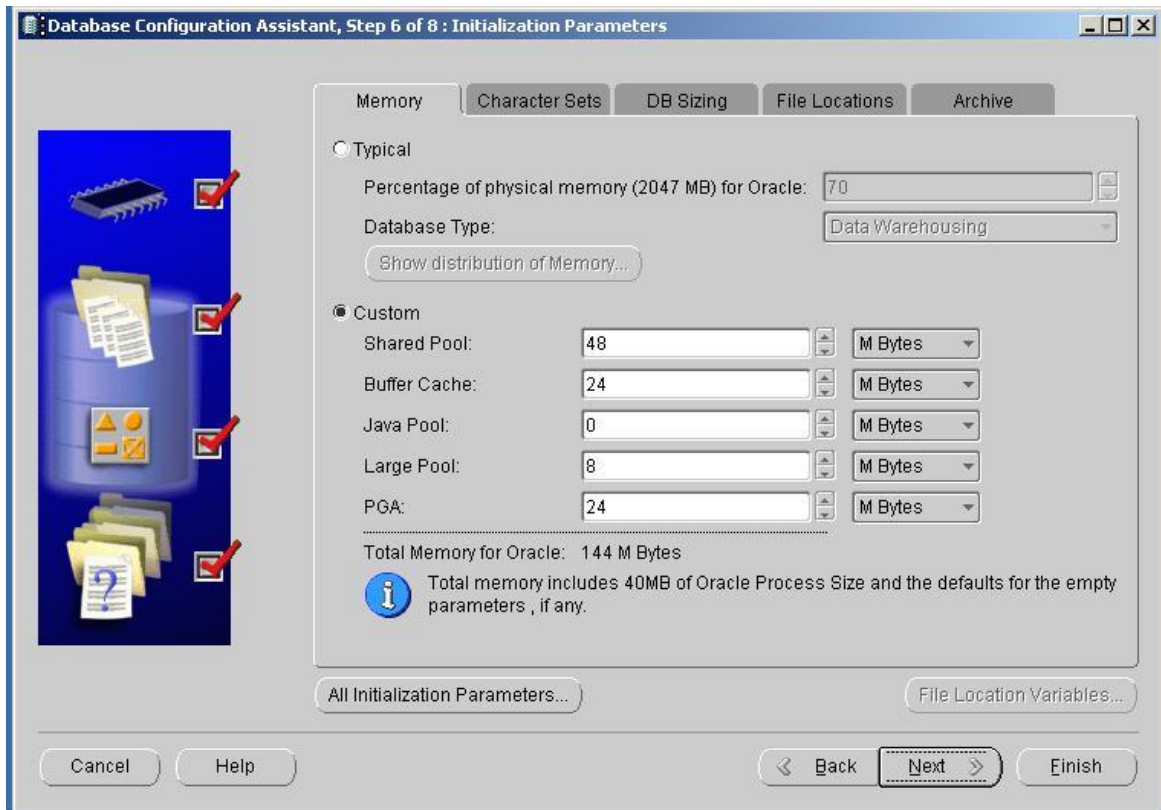
Figure A.34: Initialization parameters (before), memory tab
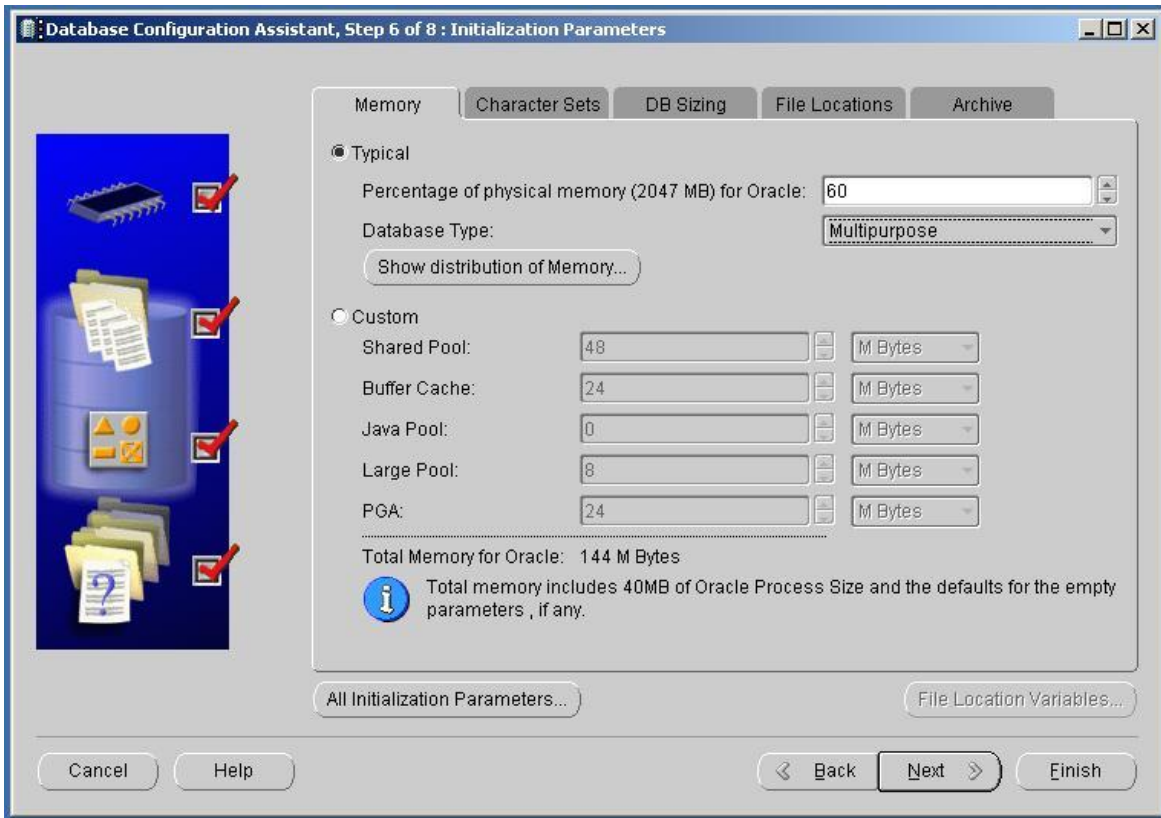
Figure A.35: Initialization parameters (after), memory tab

Step 11:
  o Select the "Character Sets" Tab
  o Select "Use the default"
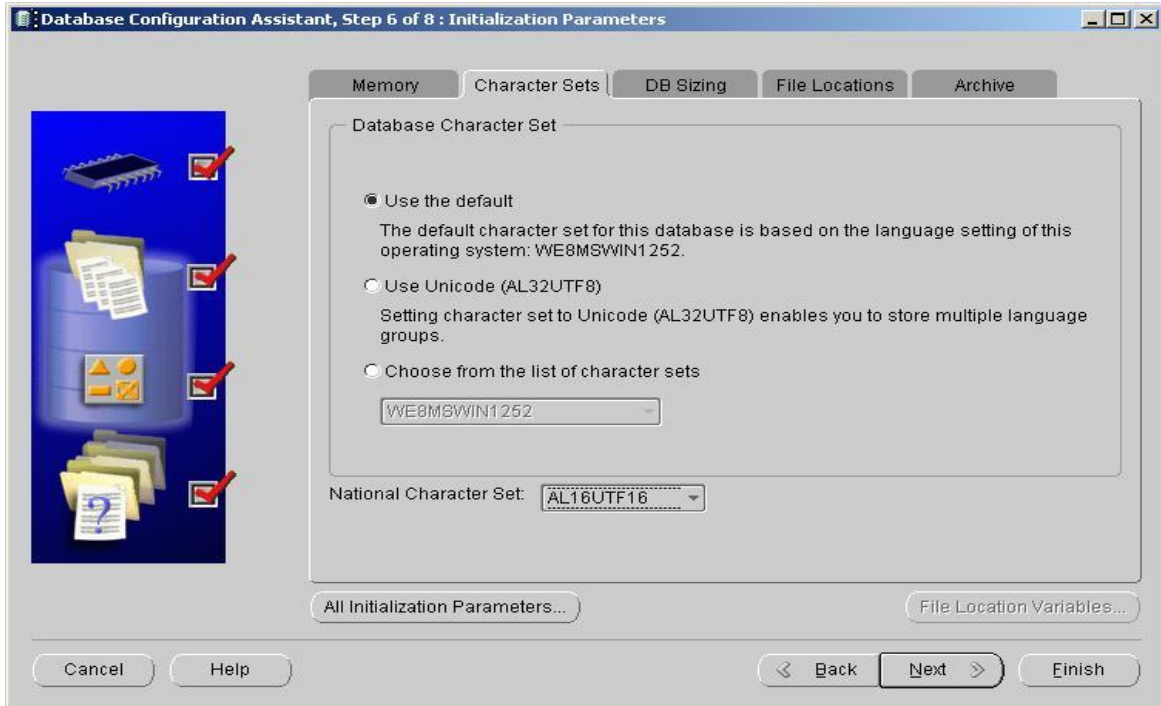
Figure A.36: Initialization parameters, character sets tab

Step 12:

- Select the "DB Sizing" tab
- Change the "Block Size" to 8192 Bytes
- Change the "Sort Area Size" to 50 "M Bytes"
- Click "Next" to proceed to the next step
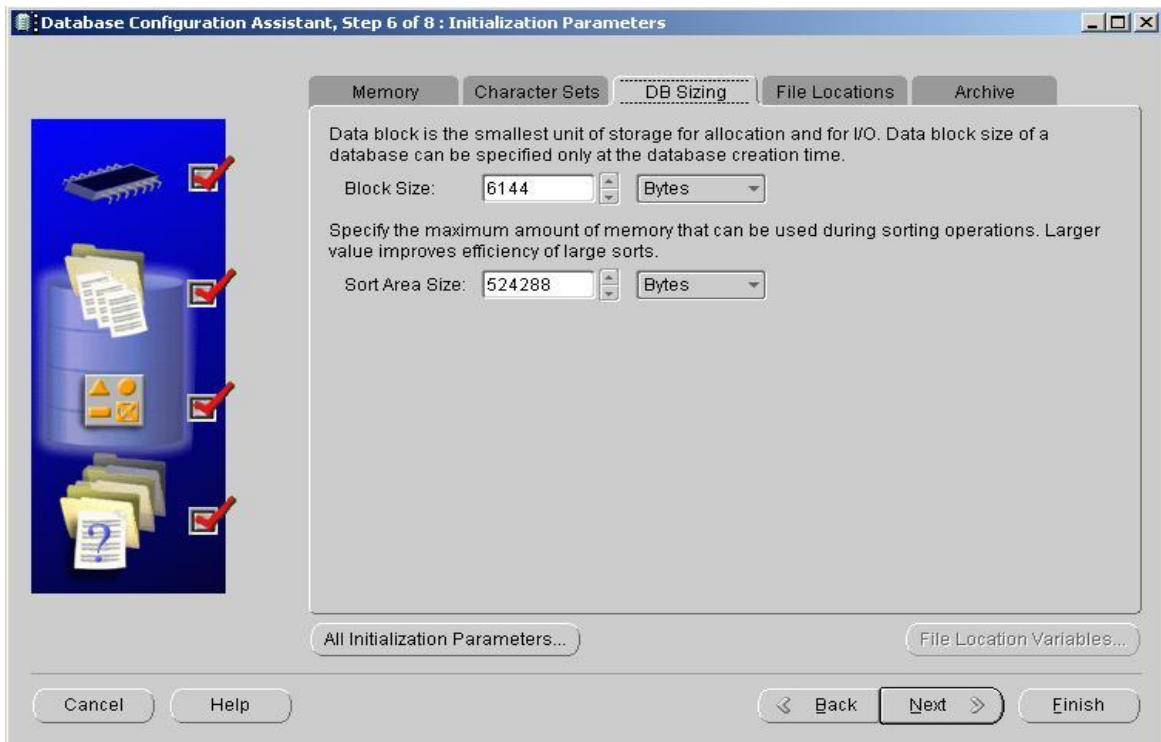
Figure A.37: Initialization parameters (before), DB sizing tab
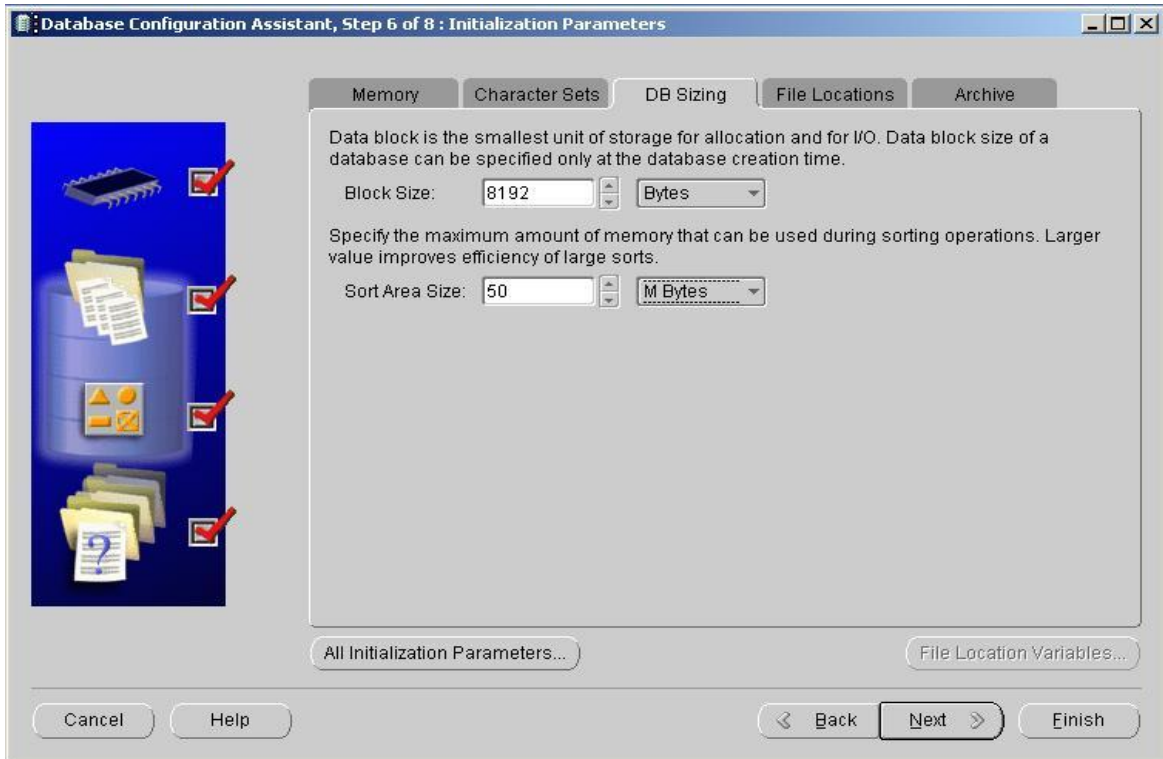
Figure A.38: Initialization parameters (after), DB sizing tab

Step 13:

- o The "Database Storage" screen should now be displayed
- o For the following "Database Storage" steps, the location of the items for the database needs to be specified. These will show where the drive location was changed (in this example, the drive location was "d:\")
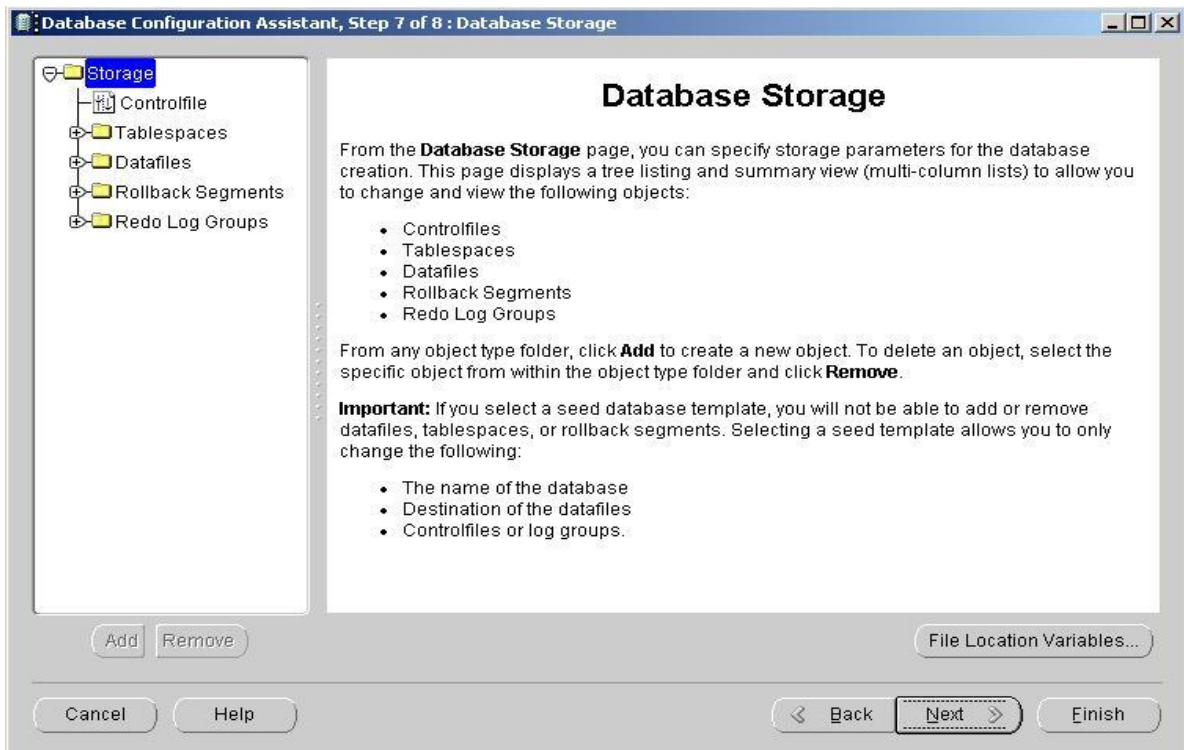
Figure A.39: Database storage

a. Click "Controlfile" under the "Storage" folder on the left of the screen
b. Change "{Oracle_BASE} to the drive or file location (in this example, the drive location was specified as "d:\")
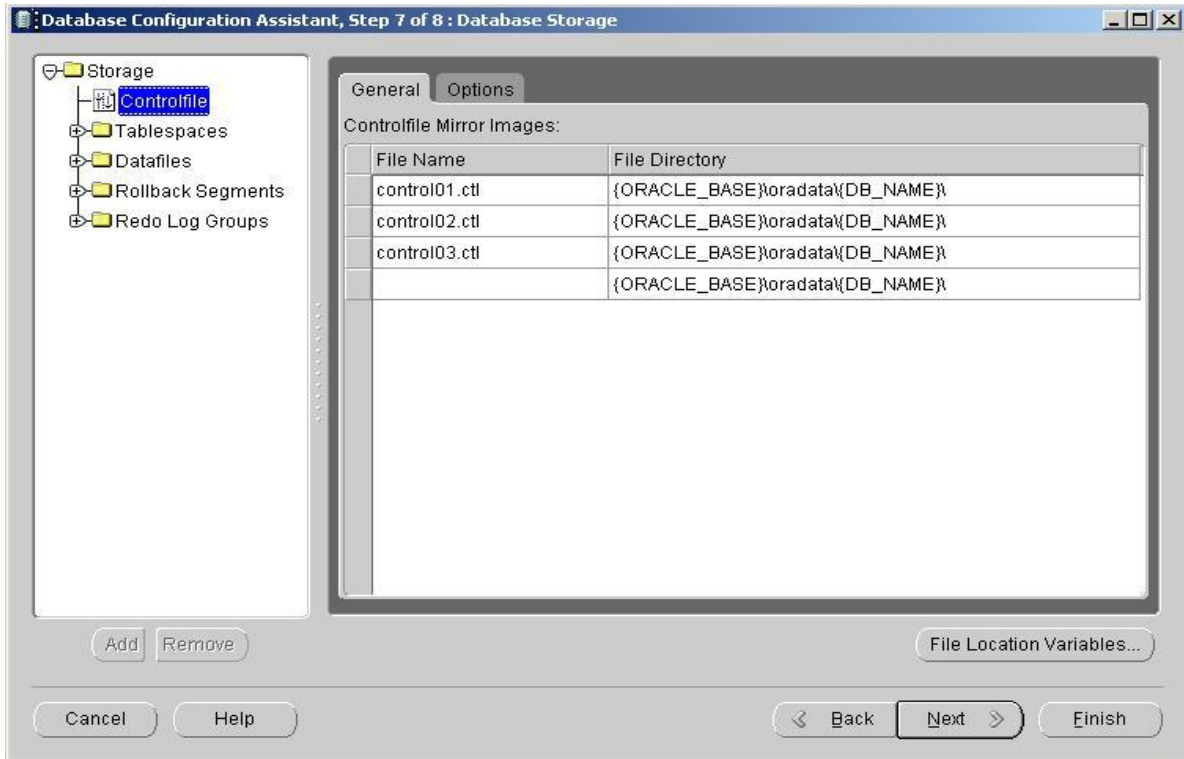
Figure A.40: Database storage (before), control files
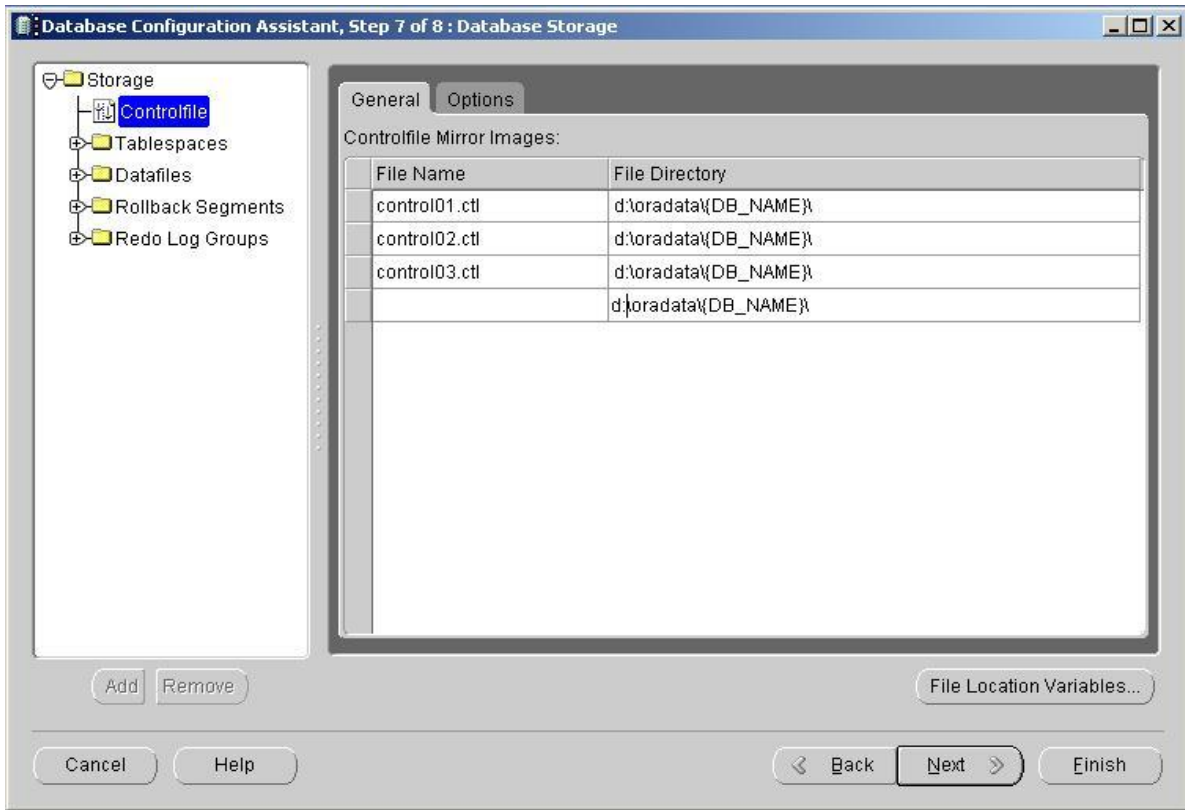
Figure A.41: Database storage (after), control files

c. Click the "Datafiles" folder under the "Storage" folder
   o For each datafile, the drive or file location needs to be specified under "Name" on the "General" tab
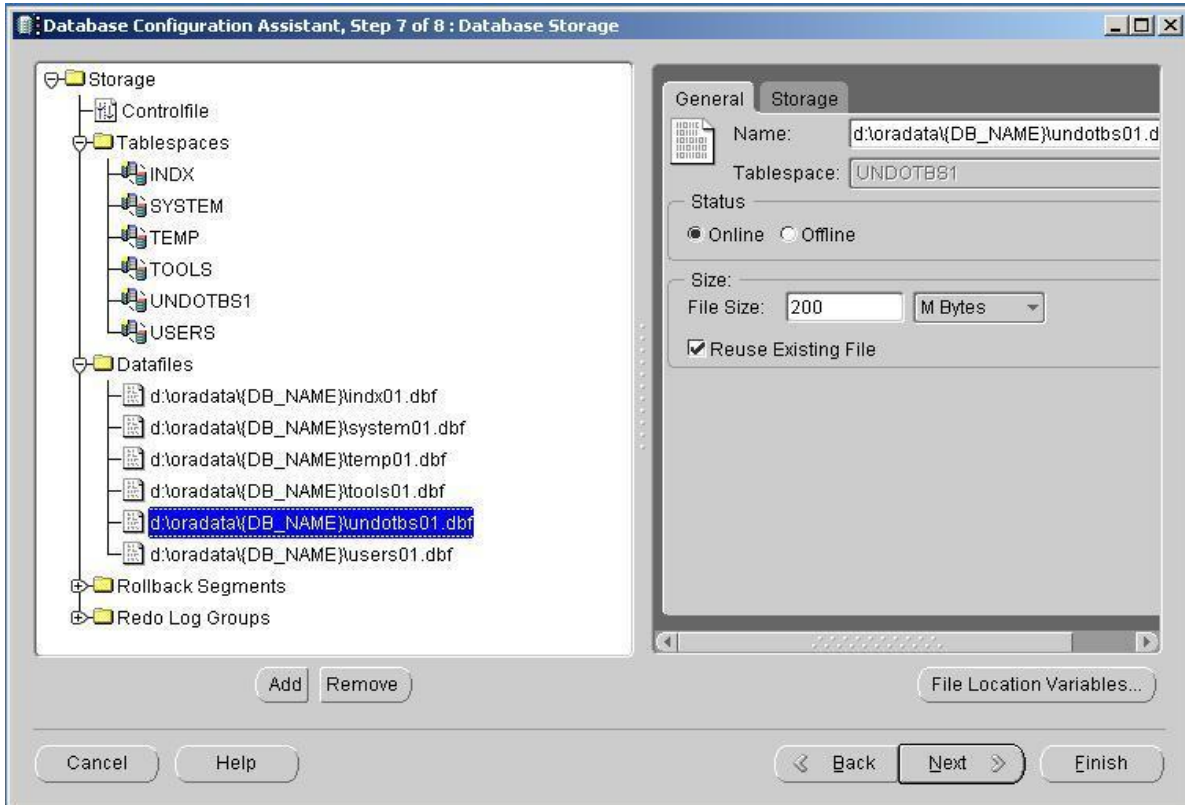
Figure A.42: Database storage, datafiles

d. Click the "Redo Log Groups" folder under the "Storage" folder
   o For each log group (1, 2, 3), change the file or drive location for the "File Directory"
   o Click "Next" once all the log group file directories have been specified
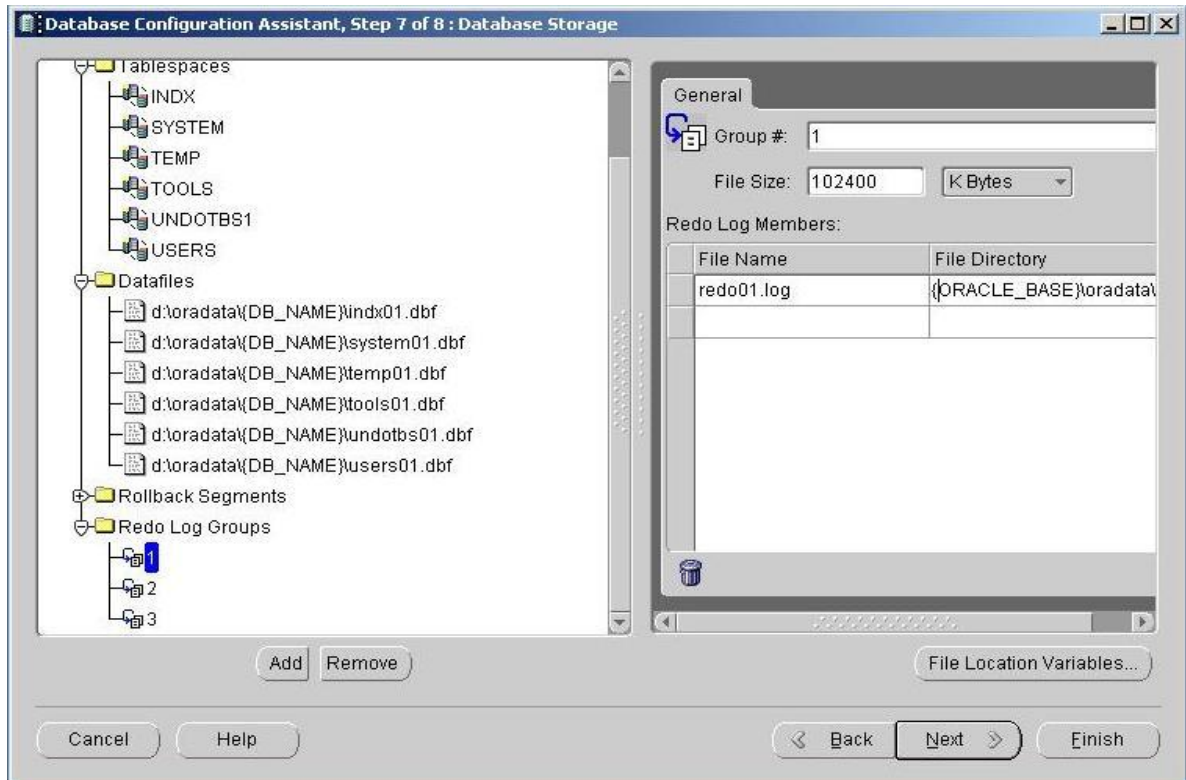
Figure A.43: Database storage (before), redo log groups
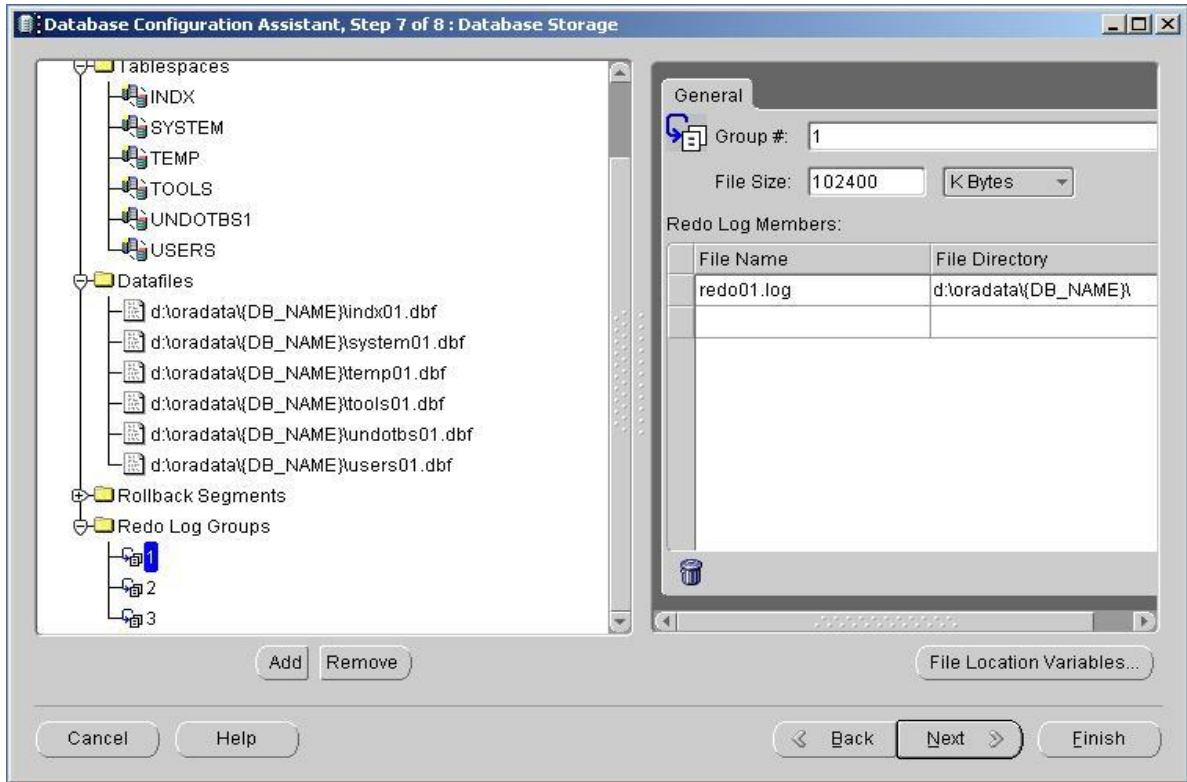
Figure A.44: Database storage (after), redo log groups

Step 14:

o Select "Create Database", and then click "Finish".
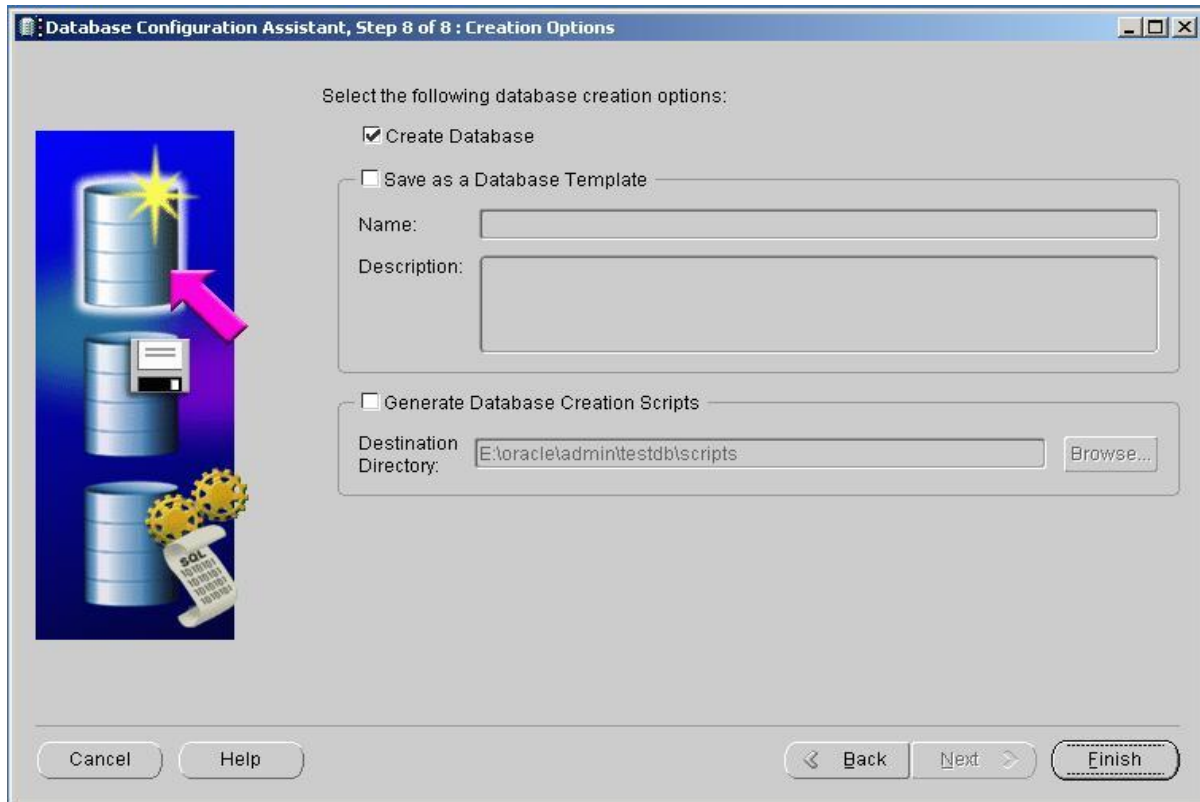
Figure A.45: Database creation options

Step 15:

- o Review Summary of database creation.
- o Next Figures show the summary of the database creation.
- o After reviewing the summary, click "OK"
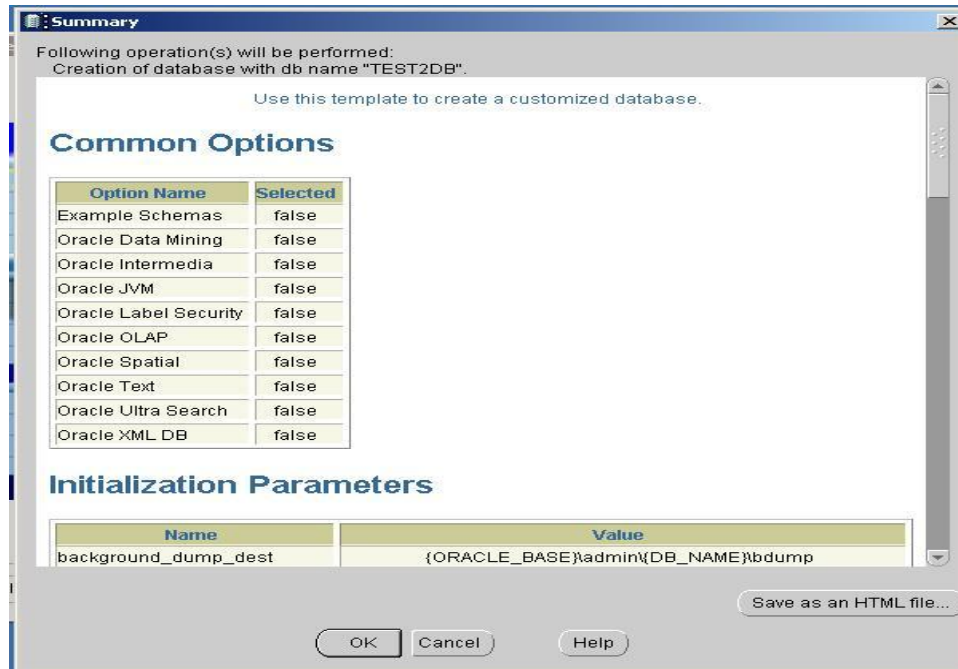
Figure A.46: Database creation summary page1
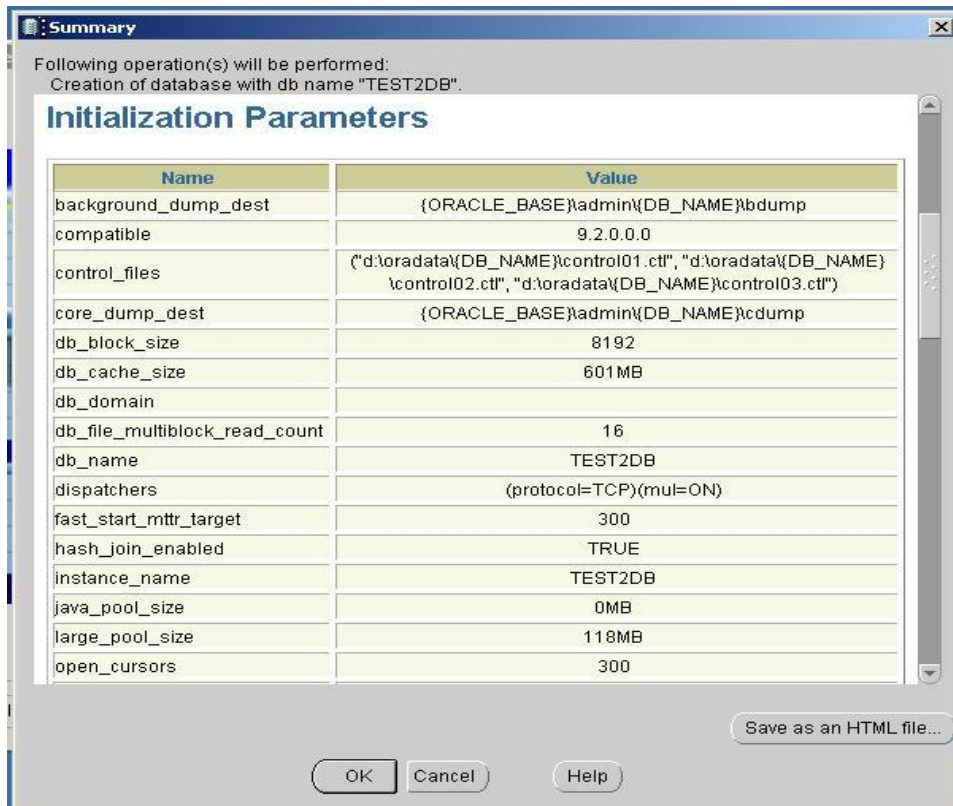
Figure A.47: Database creation summary page 2
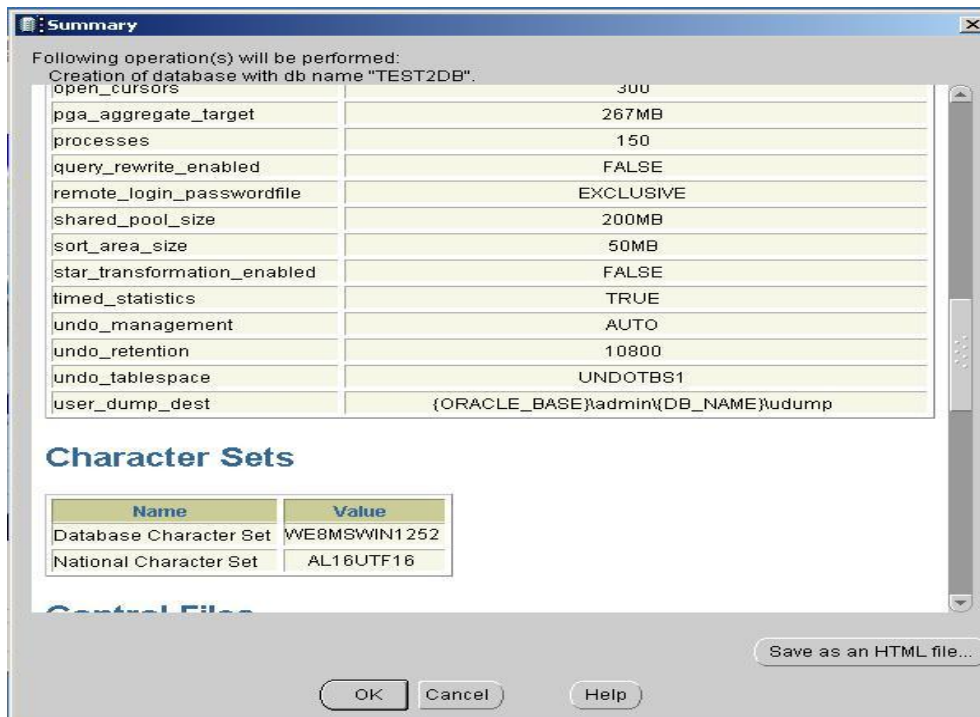
Figure A.48: Database creation summary page 3
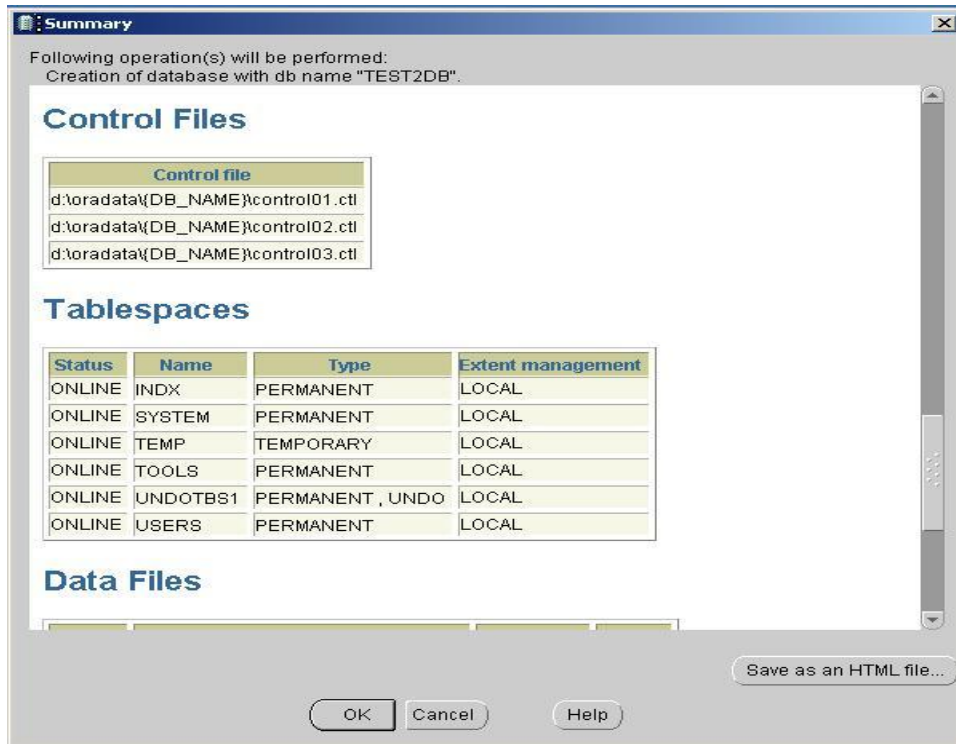
Figure A.49: Database creation summary page 4
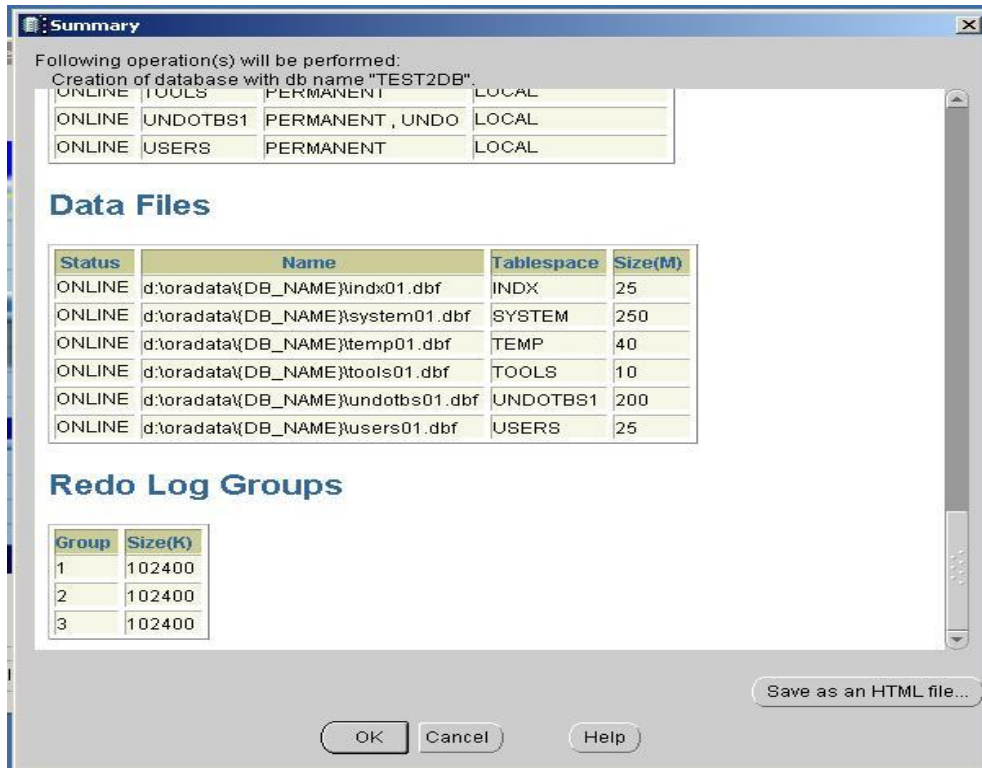
Figure A.50: Database creation summary page 5

Step 16:

o Wait while the database is created…
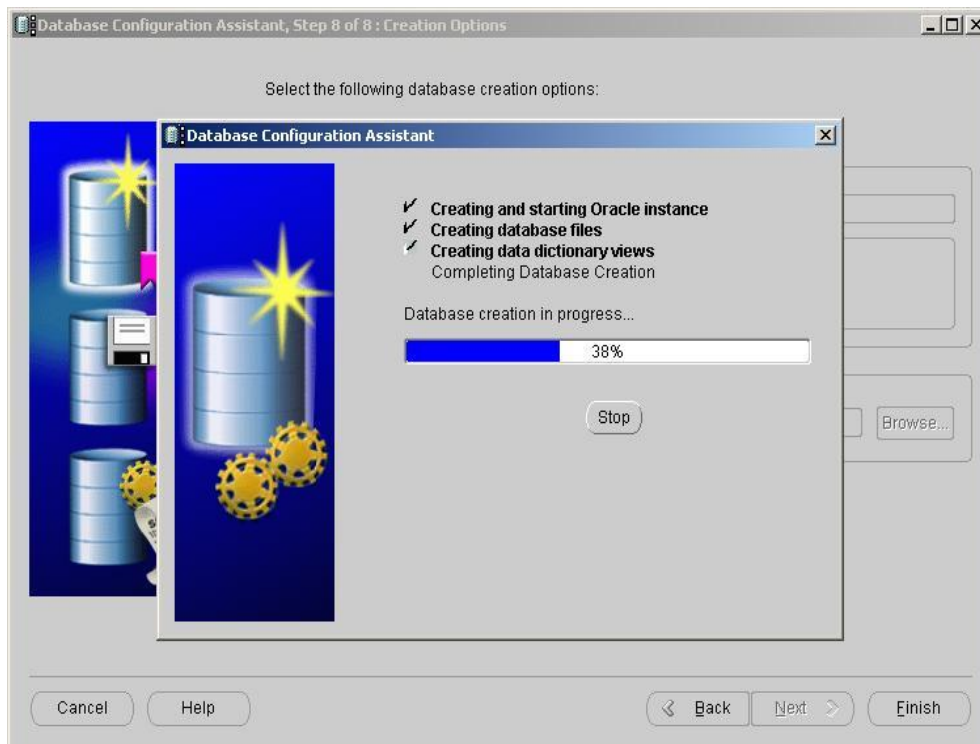
Figure A.51: Database is created

Step 17:

- o Type in the "SYS" and "SYSTEM" passwords (NOTE: Remember these passwords – they will be used to enter the database for the first time)
- o Click "Exit"
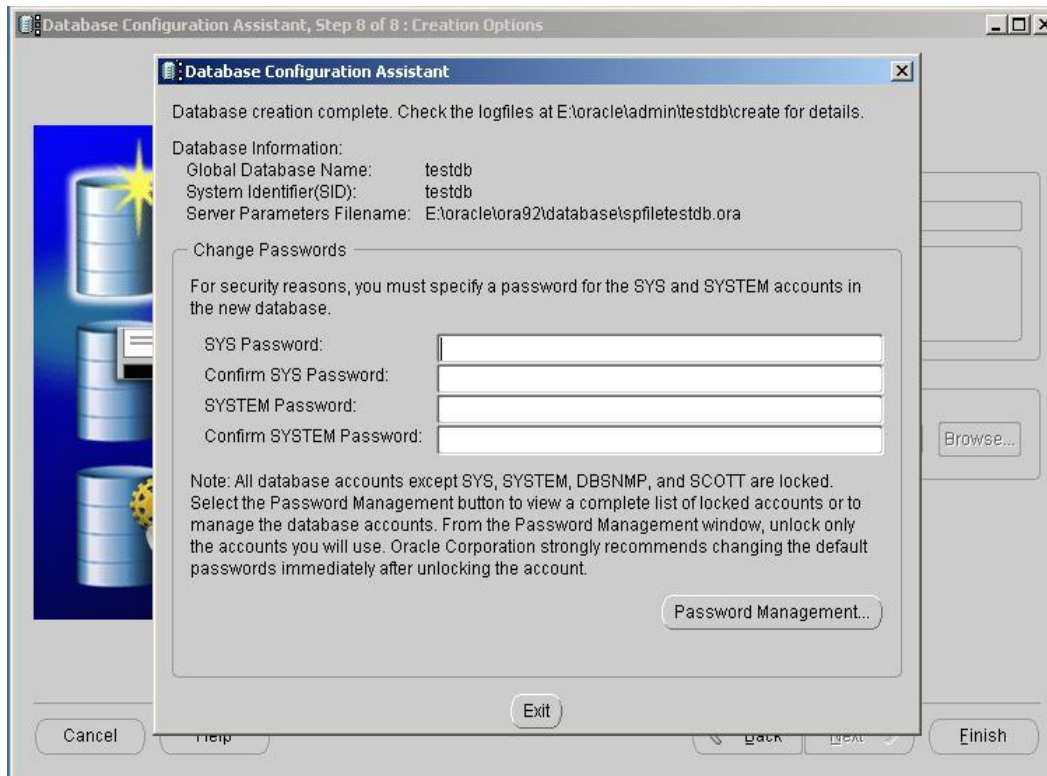
Figure A.52: Creating passwords for the database instance

Create an Oracle Database Listener:

A listener is created to allow the Oracle service to listen for requests from Oracle clients.

Step 1:
- To create a listener, navigate to Start->Programs->Oracle-OraHome92->Configuration and Migration Tools->Net Configuration Assistant
- Select "Listener configuration"
- Click "Next"
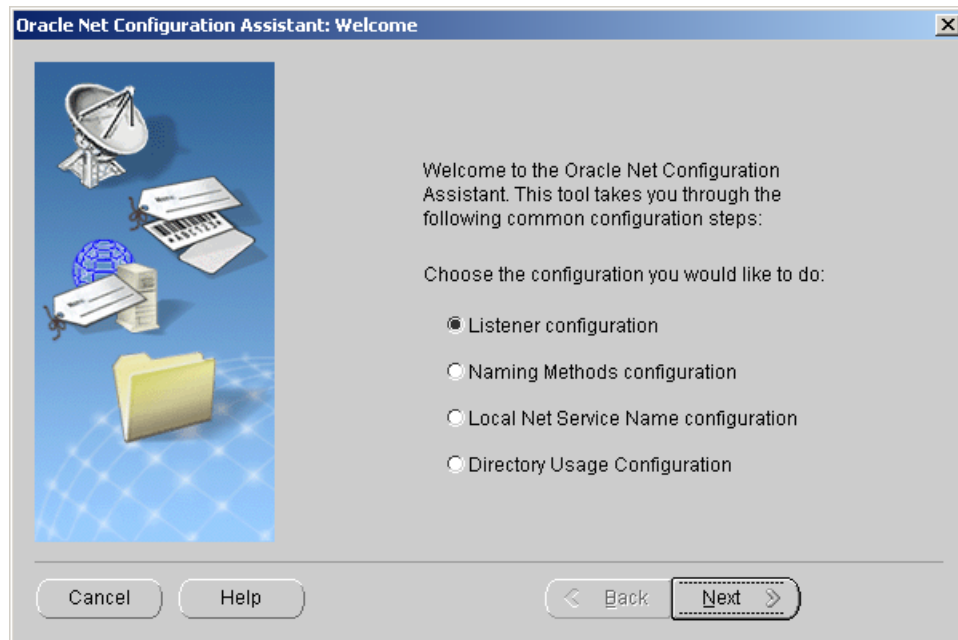
Figure A.53: Net configuration assistant welcome

Step 2:

- o Select "Add"
- o Click "Next"
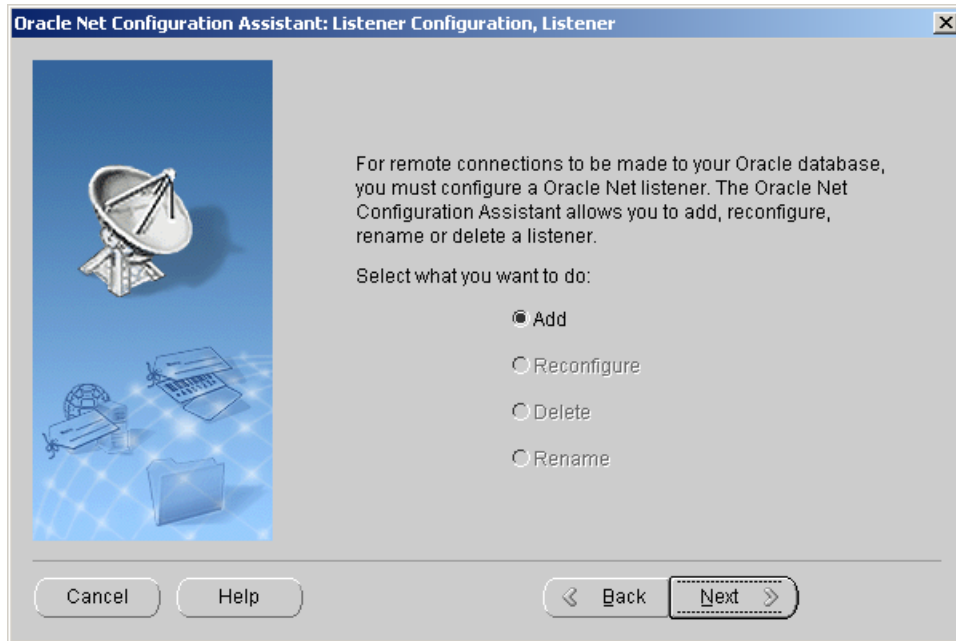
Figure A.54: Listener configuration, listener

Step 3:

- o Type in the service name of the database
- o Click "Next"
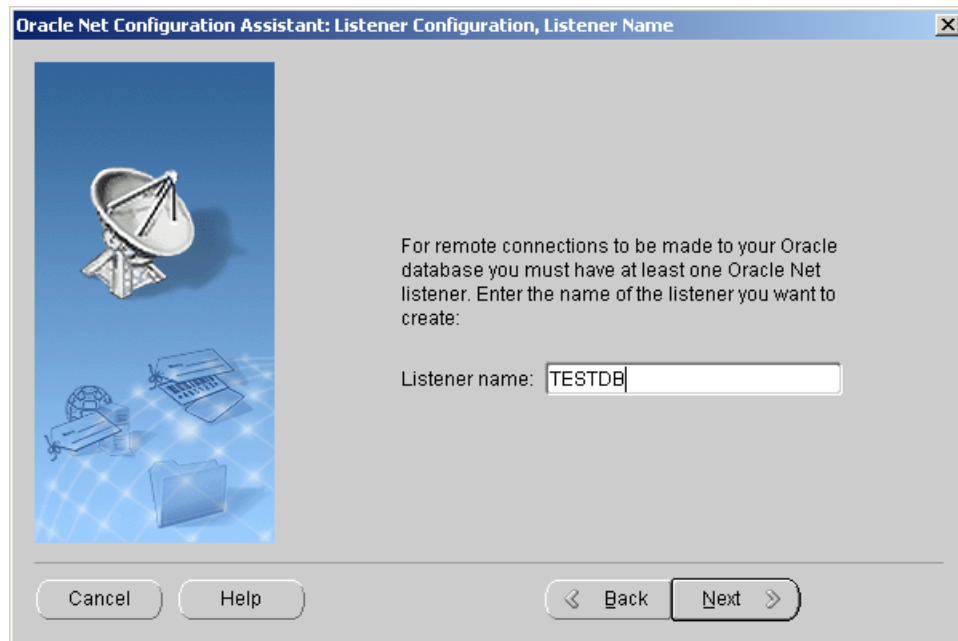
Figure A.55: Listener configuration, listener name

Step 4:
- o Select "TCP" as the network protocol
- o Click "Next"
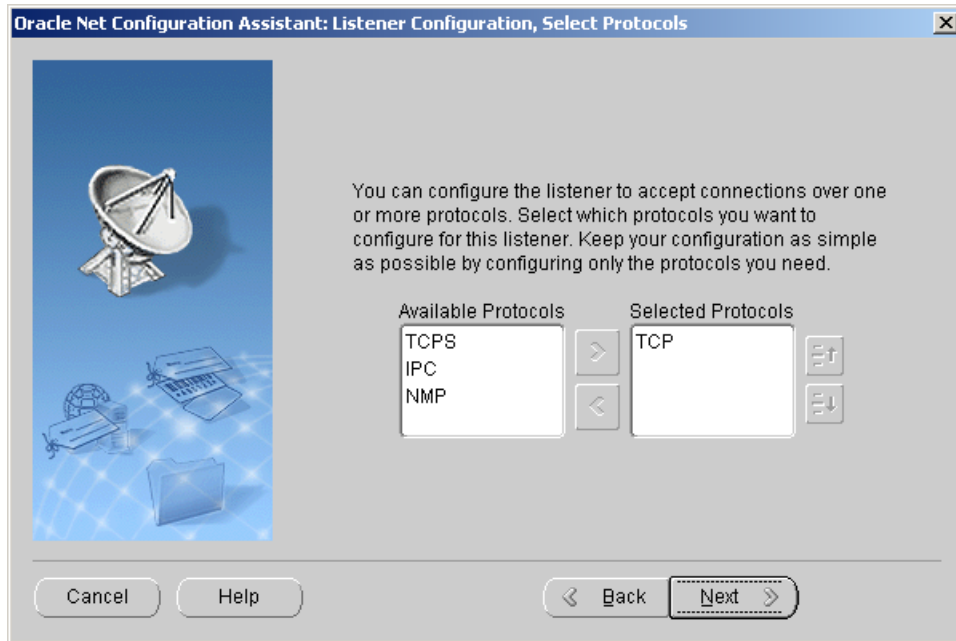
Figure A.56: Listener configuration, select protocols

Step 5:

- o The default setting for port 1521 is appropriate default for the TCP/IP network protocol
- o Click "Next"
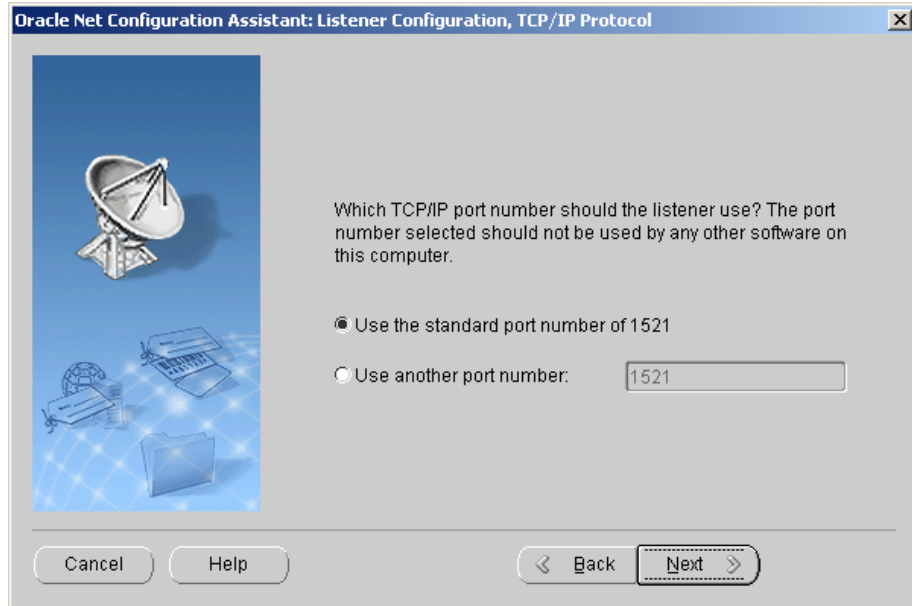
Figure A.57: Listener configuration, TCP/IP protocol

Step 6:
- o Select "No" to configuring another listener
- o Click "Next"
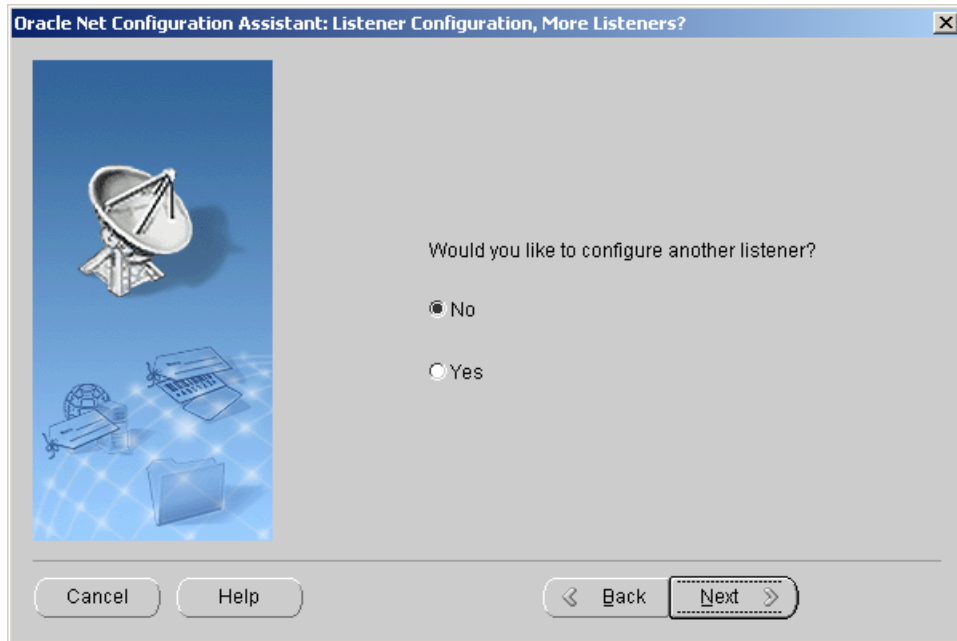
Figure A.58: Listener configuration, more listeners

Step 7:

- o A screen verifies that the listener has been configured
- o Click "Next"
- o Click "Finish
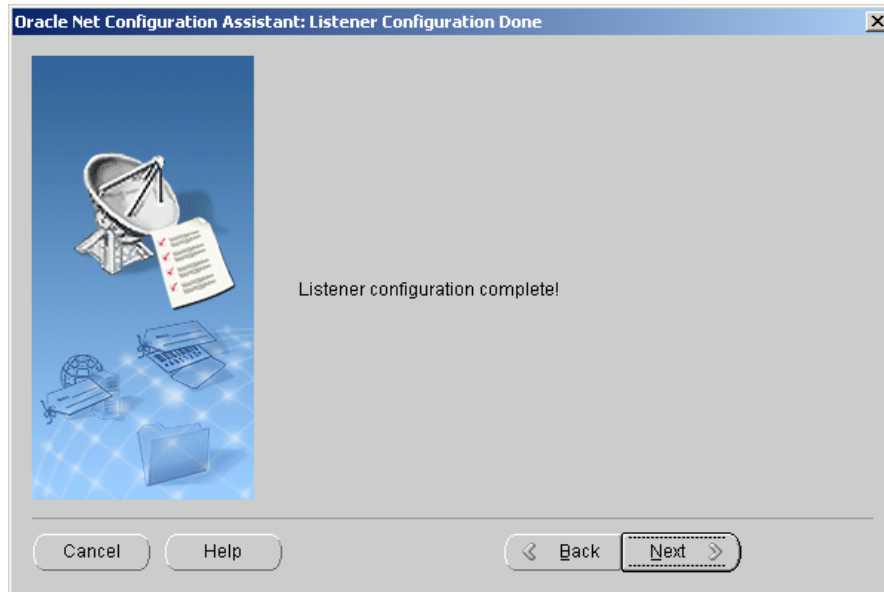
Figure A.59: Listener configuration done

Step 8:

- o To ensure the listener has been configured and running, navigate to the following: Start->Settings->Control Panel->Administrative Tools->Services
- o Scroll the menu and see if the an Oracle listener is displayed as "Started"

Create Naming Methods:

Step 1:
- o After a listener has been verified or created, naming methods for Oracle must be configured
- o Go to Start->Programs->Oracle-OraHome92->Configuration and Migration Tools->Net Configuration Assistant
- o The "Oracle Net Configuration Assistant: Welcome" screen opens
- o Select "Naming Methods configuration"
- o Click "Next"

Figure A.60: Select naming methods configuration

Step 2:
- o For HYDRA+ at the University of Alabama, the selected naming methods necessary were "Local" and "Oracle Names"
- o Click "Next"
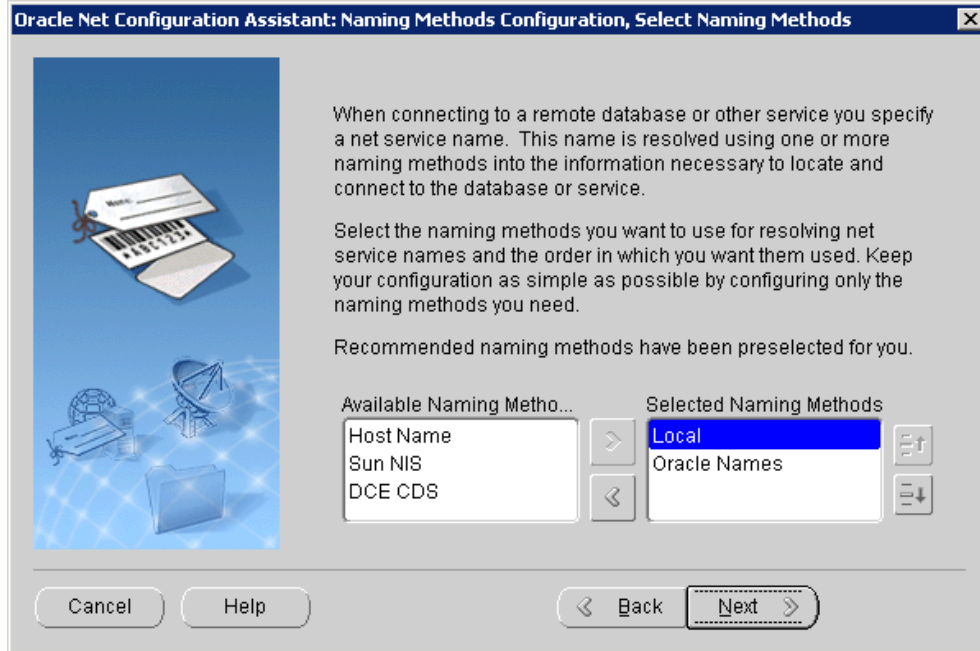
Figure A.61: Naming methods configuration, select naming methods

Step 3:
- o The next screen confirms that the naming methods have been properly configured

Create Local Net Service Name:

Step 1:

- o To create a Local Net Service Name, go to Start->Programs->Oracle-OraHome92->Configuration and Migration Tools->Net Configuration Assistant
- o Choose "Local Net Service Name configuration"
- o Click "Next"
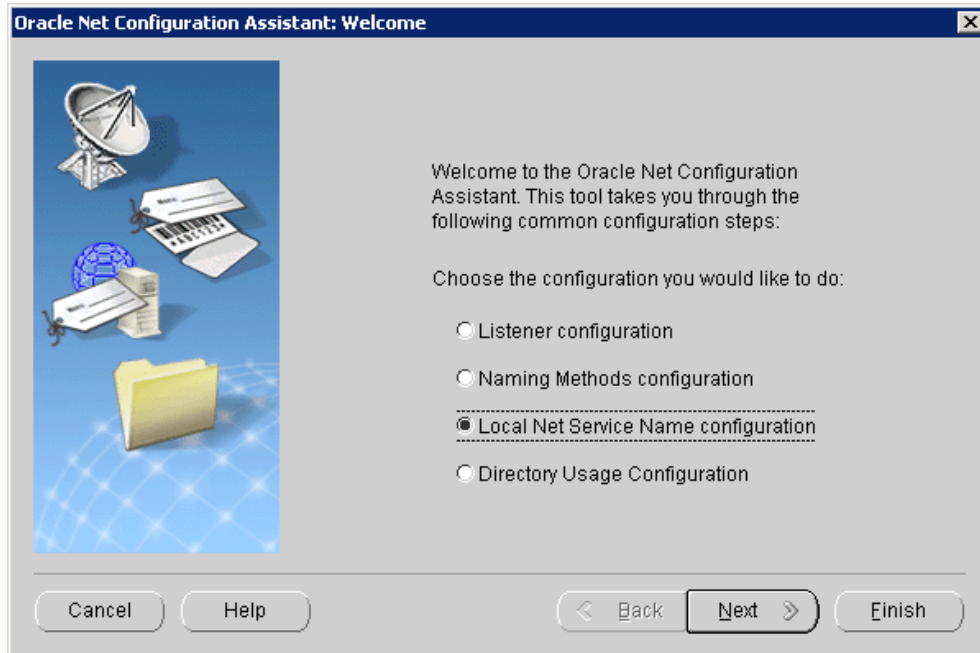
Figure A.62: Add net service name

Step 2:

- o Select "Add" (NOTE: If the "Delete" option is available and the full installation began with deleting an old database, choose "Delete" and remove any previous Net Service Name in the same manner as adding)
- o Click "Next"

Figure A.63: Net service name configuration

Step 3:
- o Choose the Oracle Database version ("Oracle 8i or later database or service")
- o Click "Next"
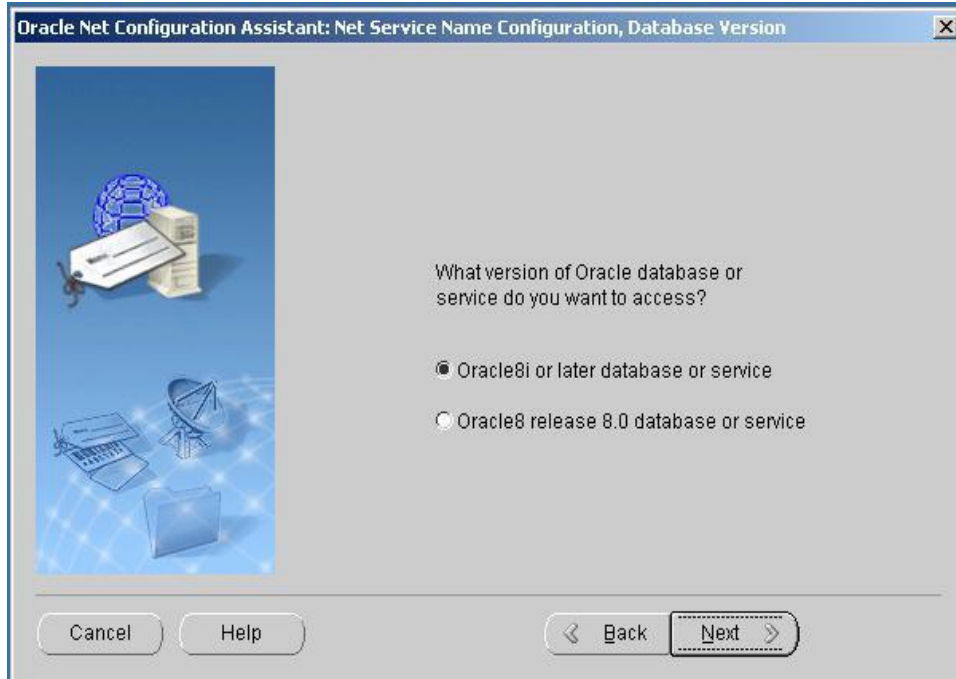
Figure A.64: Choose database version

Step 4:

- o Enter the service name that was entered when creating the database
- o Click "Next"

Figure A.65: Enter service name

Step 5:

- o Select the network communication protocol. (University of Alabama uses TCP)
- o Click "Next"
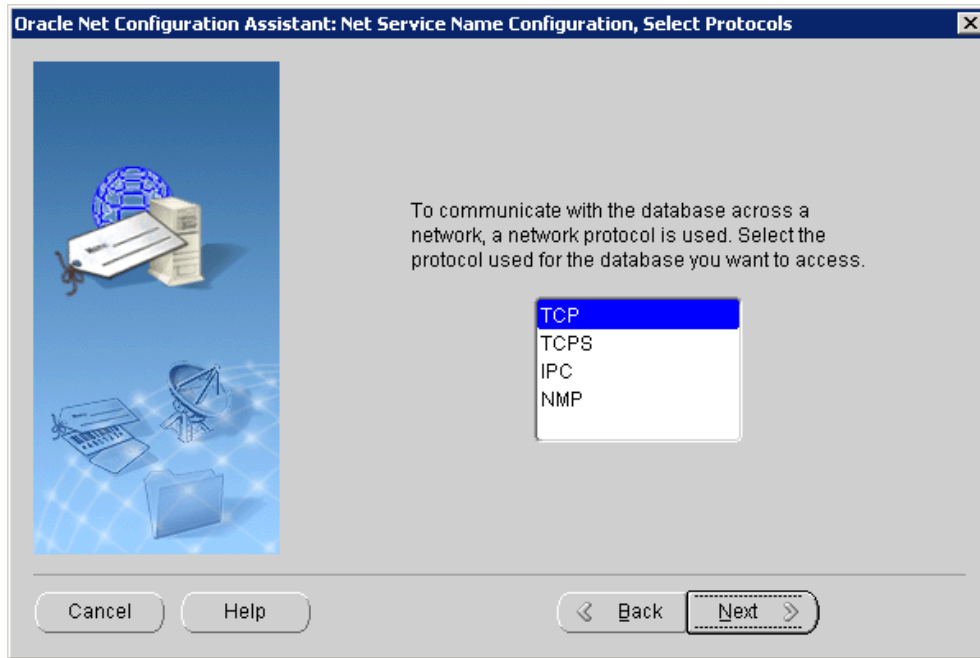
Figure A.66: Select communication protocol

Step 6:

- o Enter the host name of the host server (e.g. MITCSTATSVR)
- o Use the default standard port number (1521)
- o Click "Next"
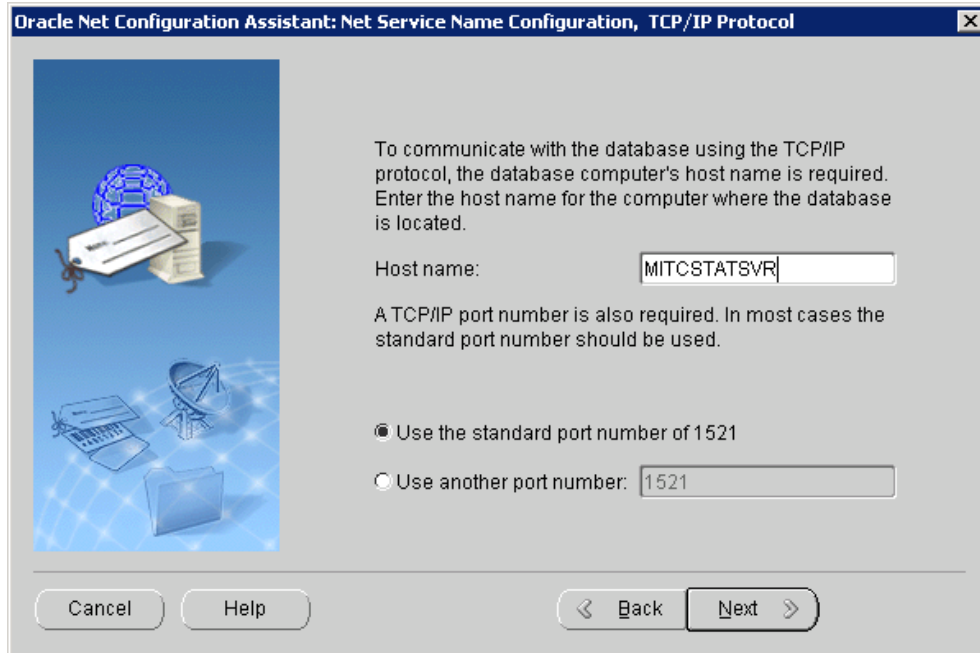
Figure A.67: Enter server/computer host name

Step 7:
- o Select "Yes, perform a test" to confirm that the client is able to communicate with the server entered above
- o Click "Next"
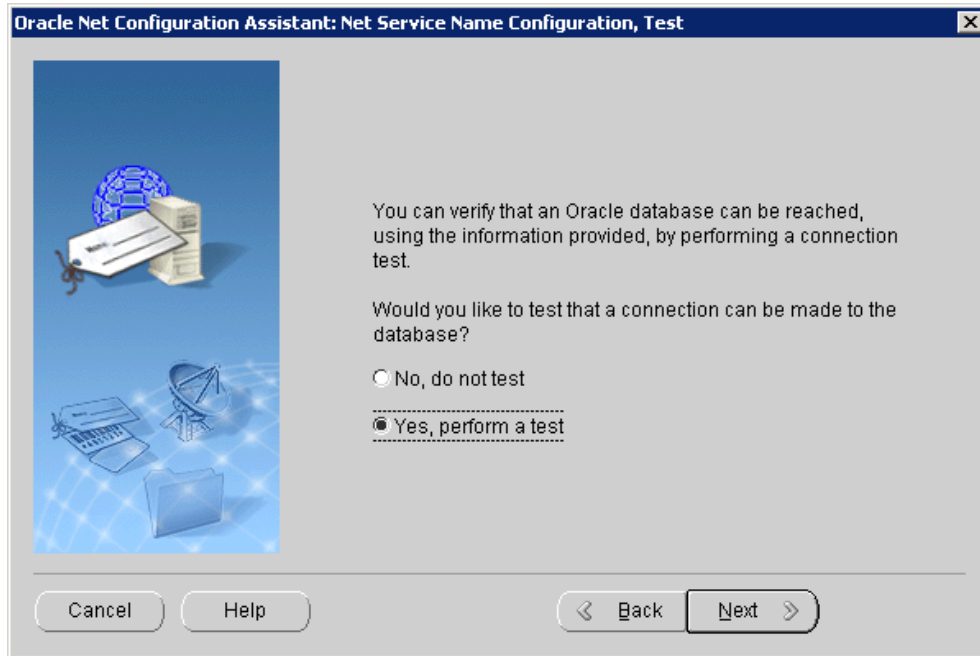
Figure A.68: Test database availability

Step 8:

- o The first test will always fail, because the system does not have the correct password
- o Click "Change Login" located just below the detailed information
- o Enter the correct database username (SYSTEM) and the password created during the "Create Database" procedure.
- o Click "Ok"
- o If the test is successful, click "Next"
- o If the test was unsuccessful, check password created in the "Create Database" procedure and try again
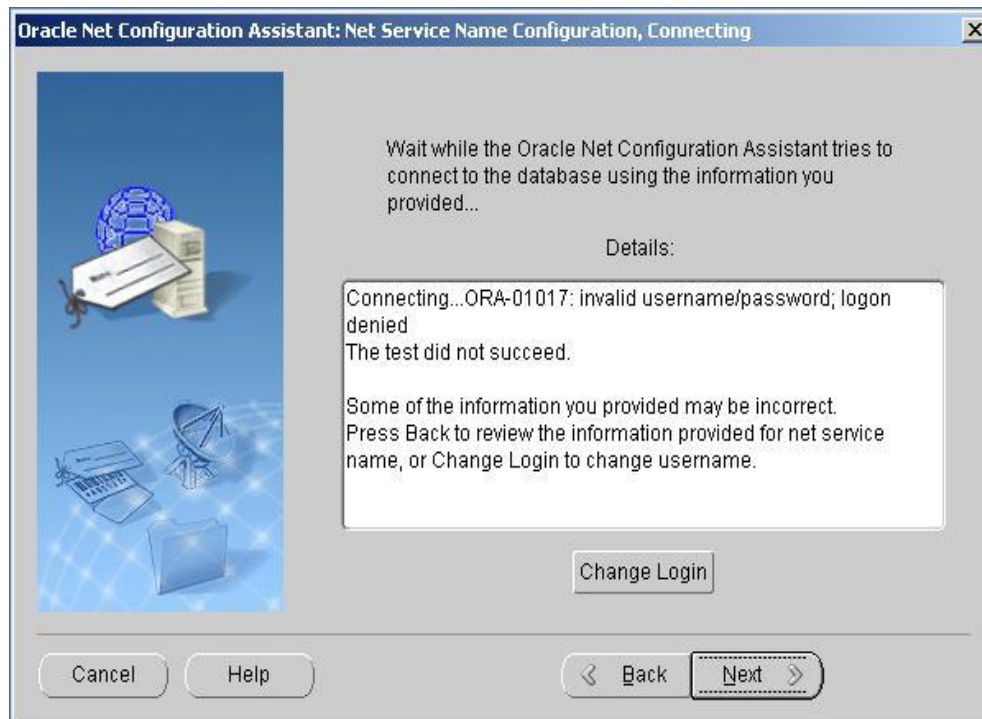
Figure A.69: Database availability test outcome (failure)
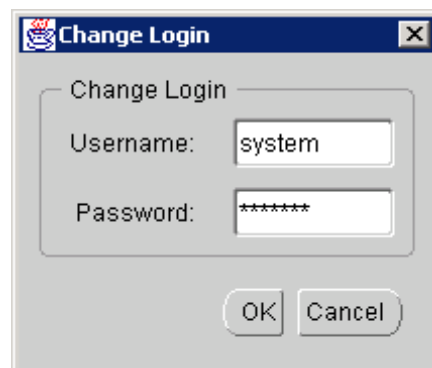
Figure A.70: Enter correct database password
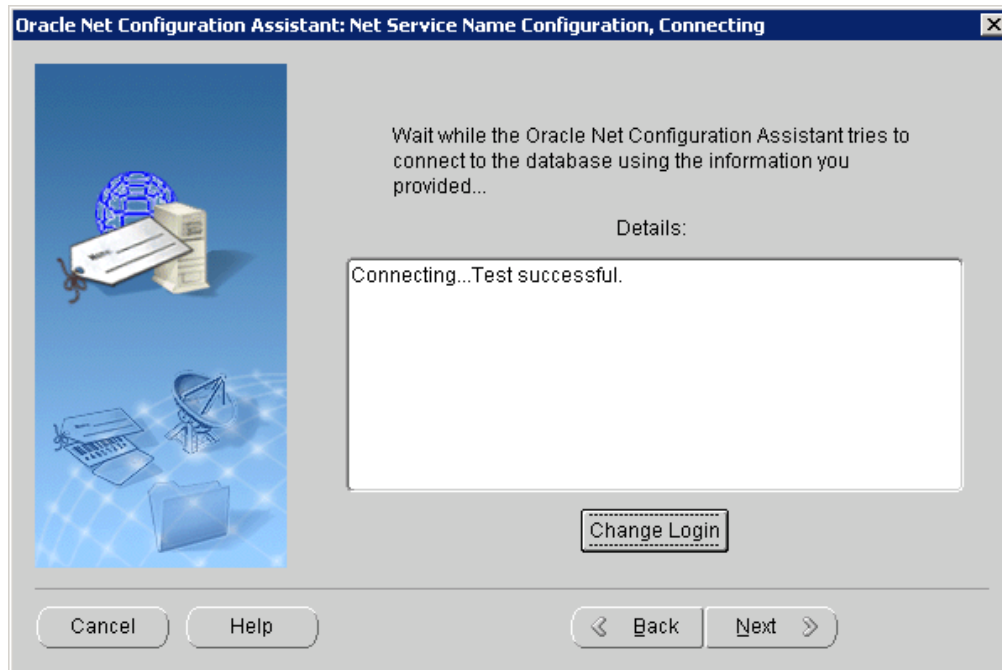
Figure A.71: Database availability test outcome (success)

Step 9:
- o Enter a service name for the client being created. This example uses the same name as the database
- o Click "Next"
- o If no access is needed for another database, select "No" to configuring another net service name
- o Click "Next"
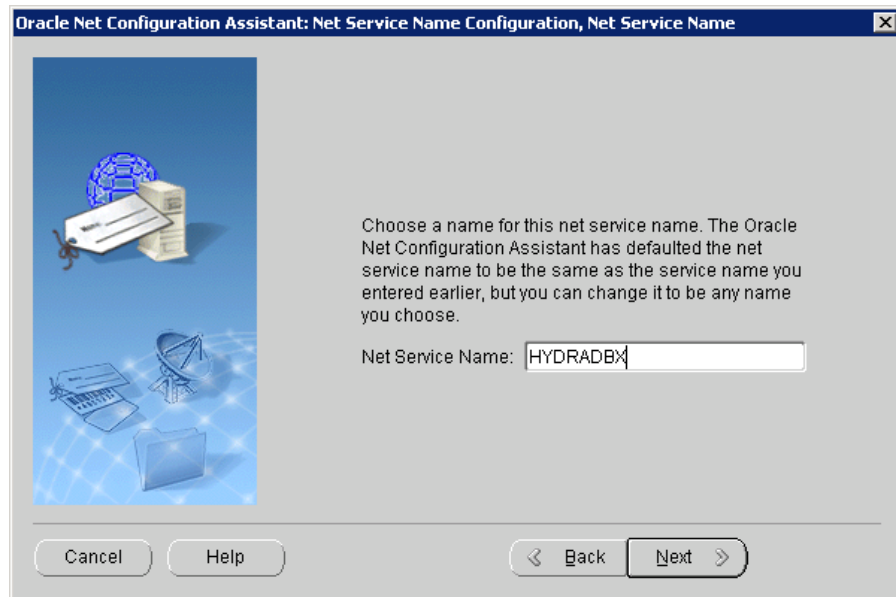
Figure A.72: Enter net service name
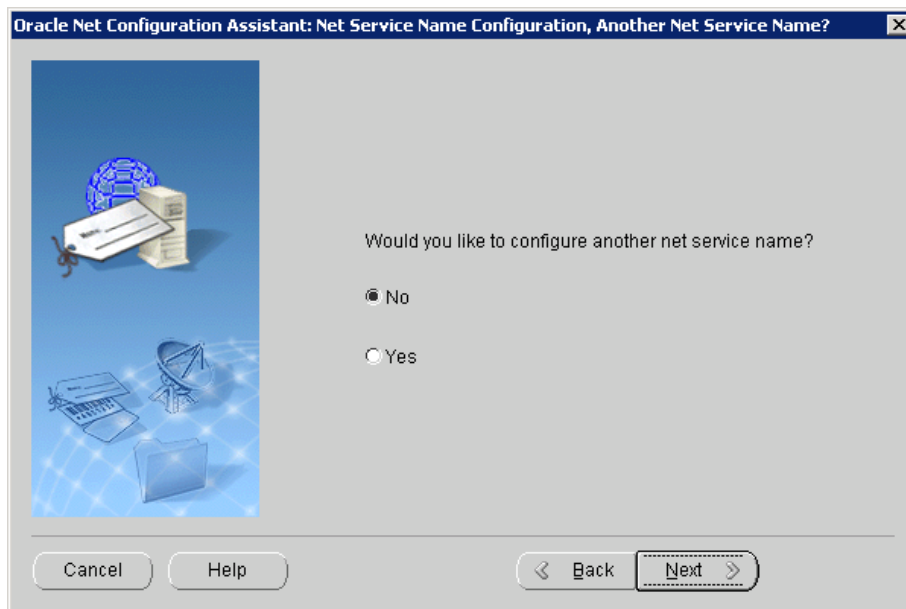
Figure A.73: Configure another net service name

<u>Step 10:</u>

  o Now open the file "tnsnames.ora" from the {root}\Oracle\ora92\network\admin folder
  o Change the name of the database from "HYDRA+DB.eil-server.cba.ua.edu = " (or similar) to simply "HYDRA+DB = "

Delete an Oracle Database:

This example shows how to remove an Oracle Database from a server. This example will disable the services and remove all Oracle folders from the server.

Uninstall the Oracle Database Products:

Step 1:
- o Go to Start->Programs->Oracle Installation Products->Universal Installer
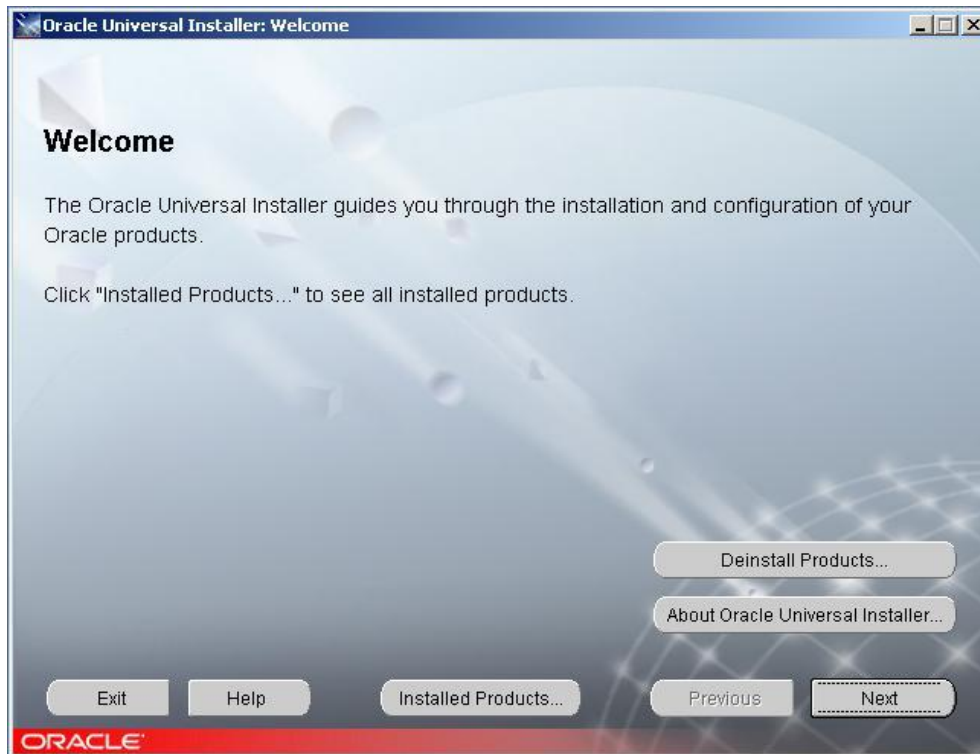
Figure A.74: Universal installer

- o Click Deinstall Products

Step 2:
- o Next select the "+" on OraHome92.
- o Place a check in the box next to Oracle9i Database 9.2.0.1.0 to remove all of the Oracle Database products.
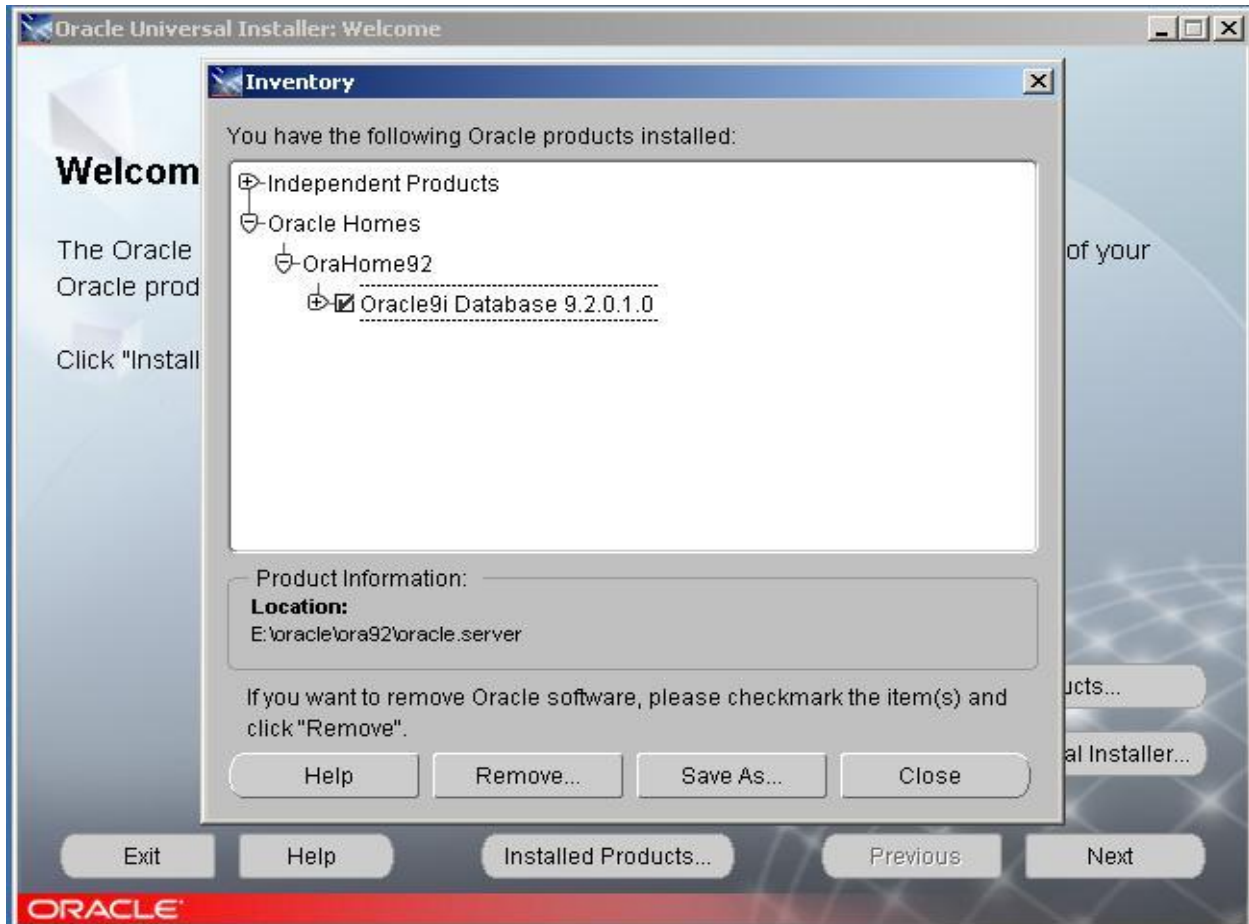
Figure A.75: Oracle product selection screen

- o Click Remove

Step 3:
- o Review and confirm the removal of Oracle products selected to remove.
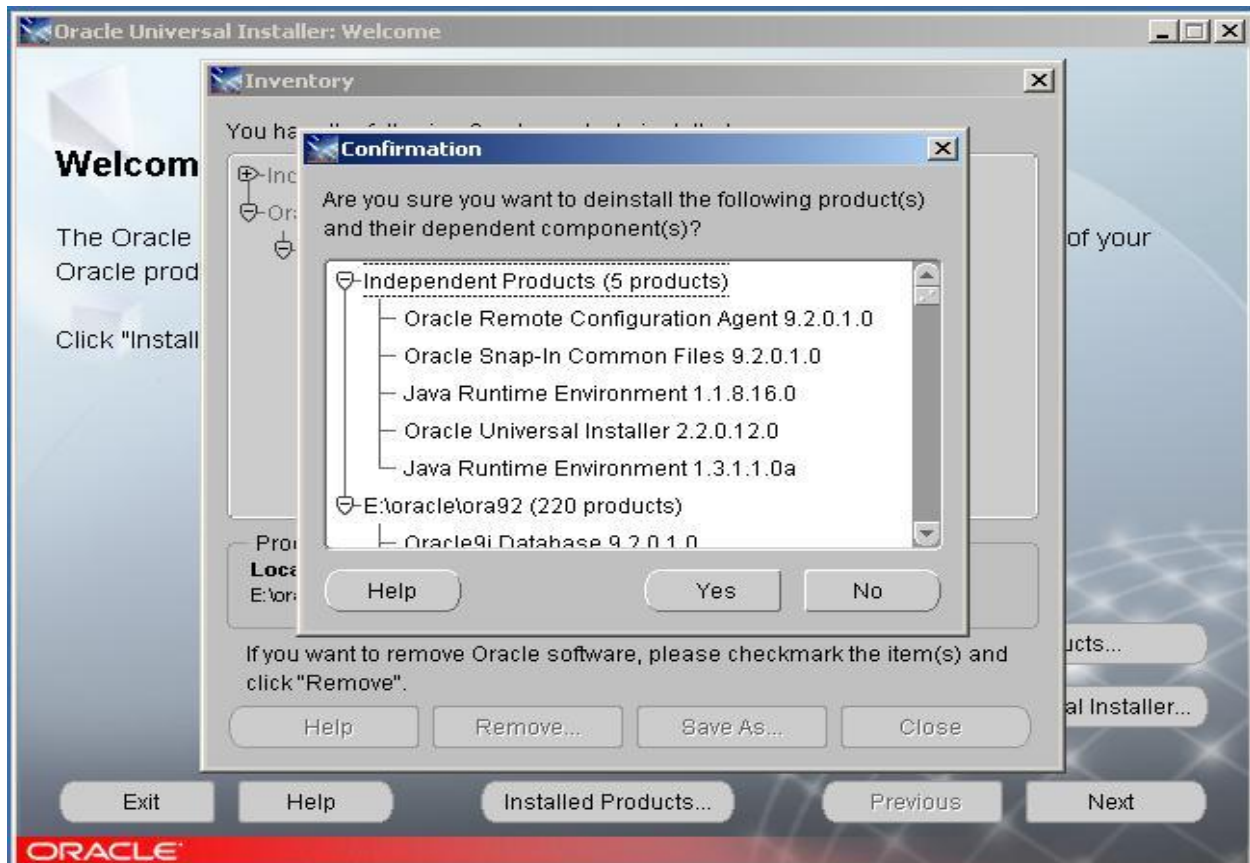
Figure A.76: Uninstall confirmation screen

- o Click yes to remove products. Click no to return to previous Oracle product selection screen (Figure 2).

Step 4:
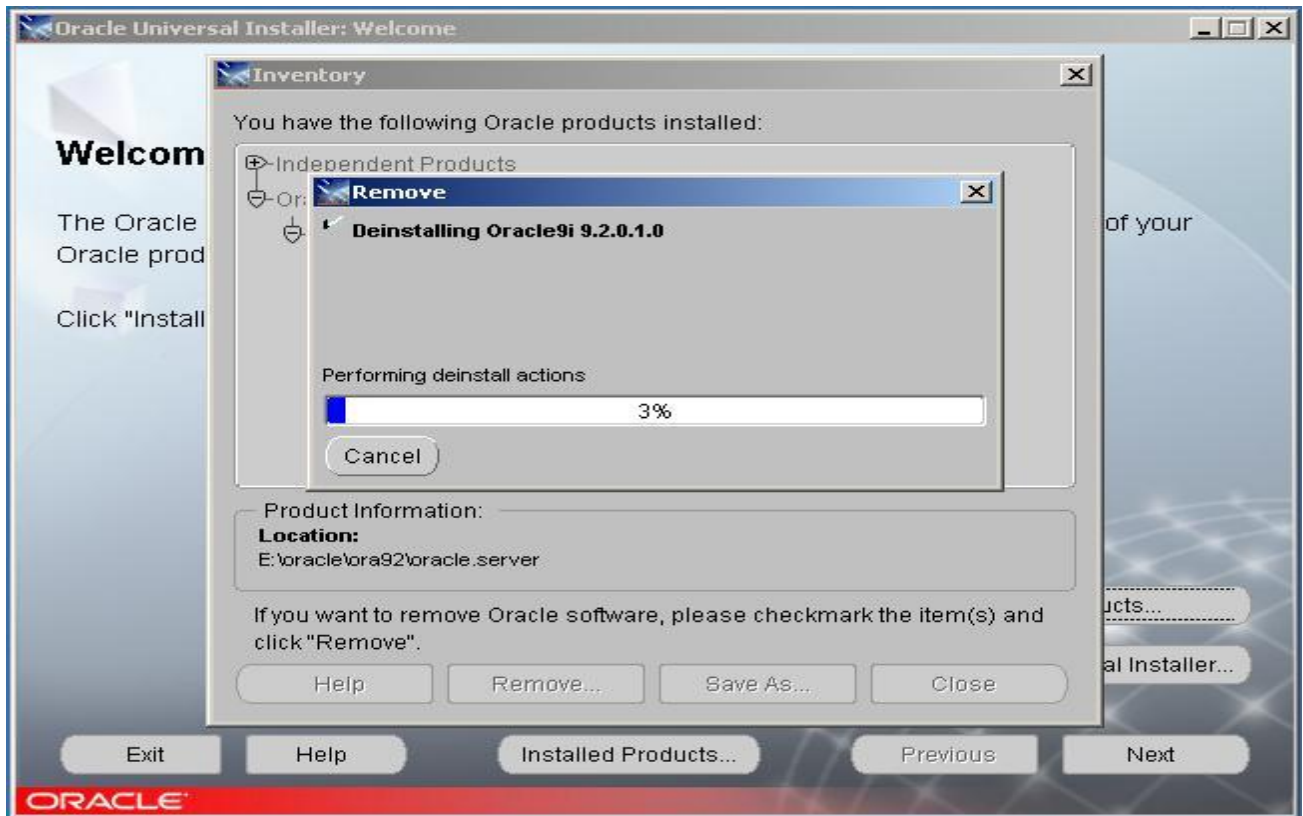
Figure A.77: Removal of oracle products progress screen

Step 5:
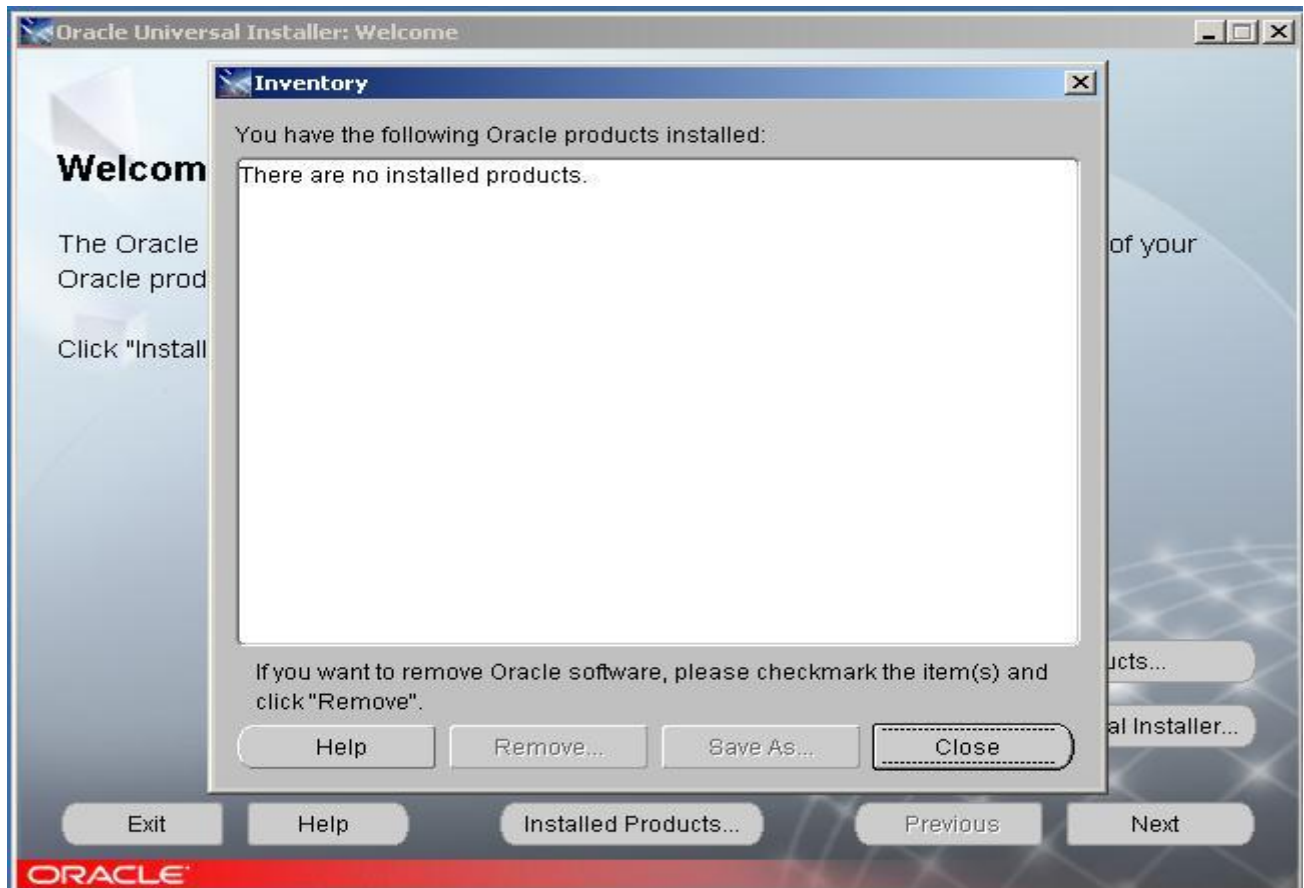
Figure A.78: Installed products viewer

o   Click Close

__Step 6:__
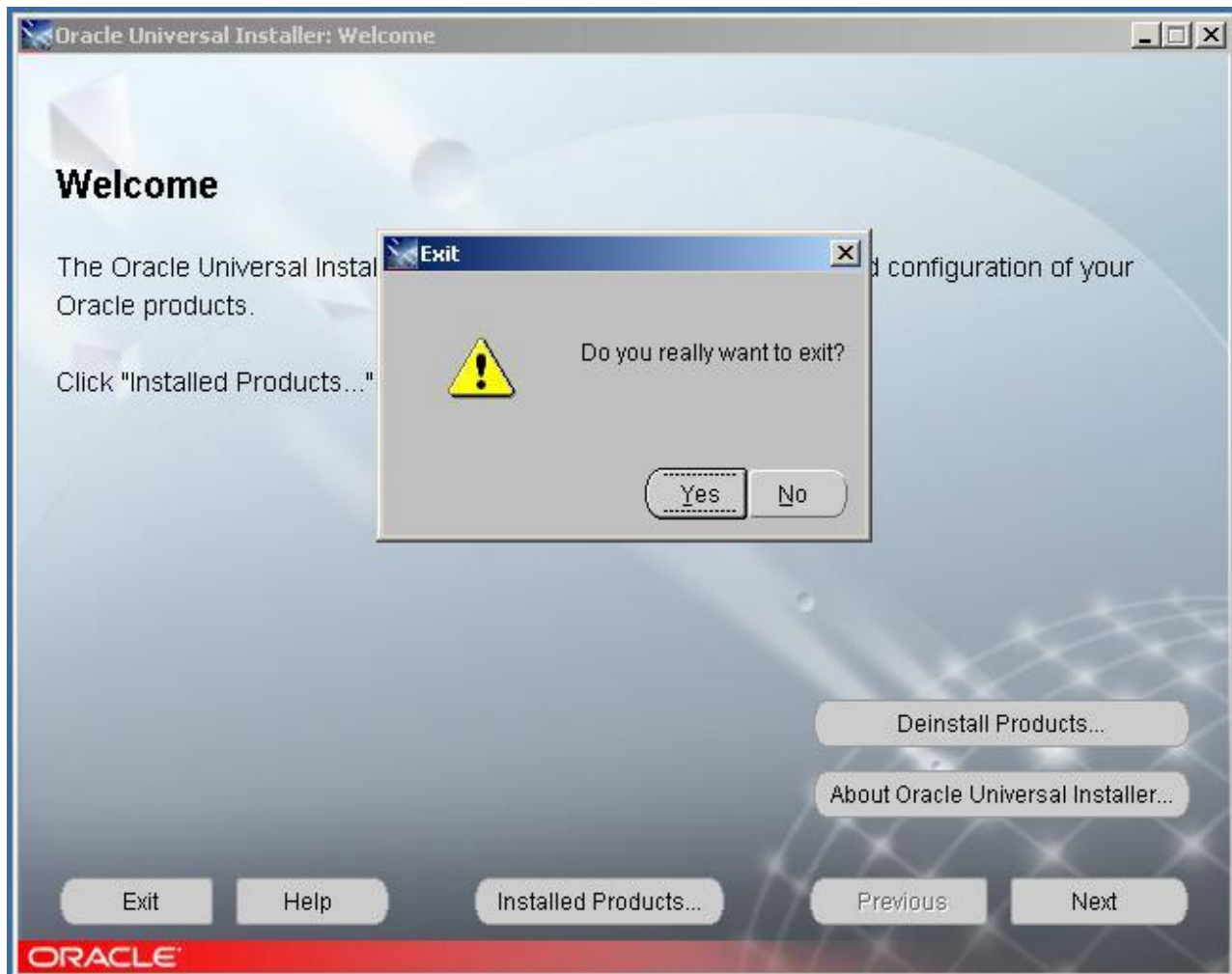
Figure A.79: Exit universal installer

o   Click Exit
o   Click Yes to exit

Step 7:
- o **Disable Installed Services for the Oracle Database**: Oracle has installed services for this database, so:
  - Reboot server
  - Turn off services and listeners (OracleService[DatabaseName] and OracleOraHome92TNSListener)
    - How to turn off services and listeners:
      - Go to Start->Settings->Control Panel->Administrative Tools->Services
      - Go to service you want to turn off and right click on it
        - o Go to "Properties"
        - o From the "Startup type" dropdown box, select "Manual" or "Disabled"
        - o Then click "Stop"
        - o Click "Apply" to finish turning off the service
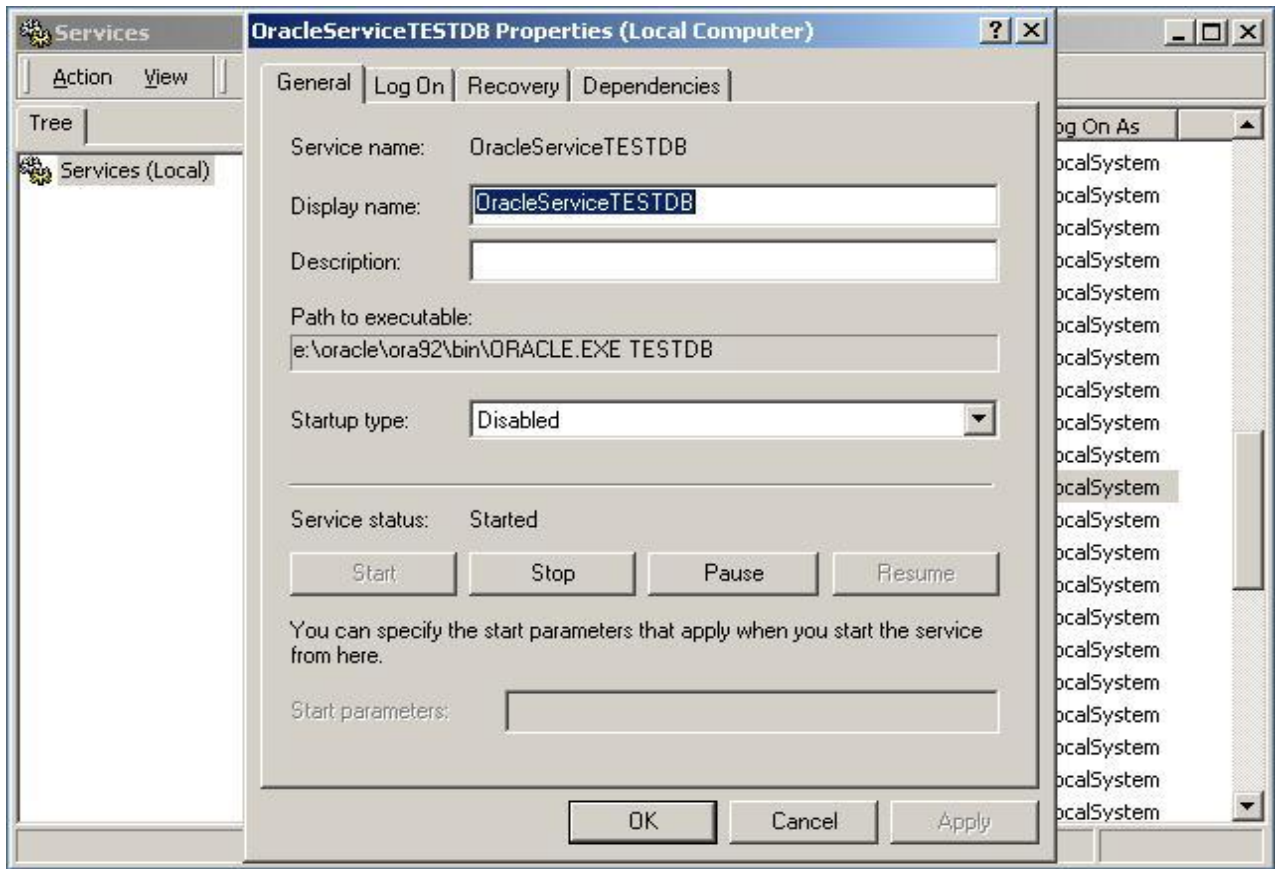
Figure A.80: Disable database service
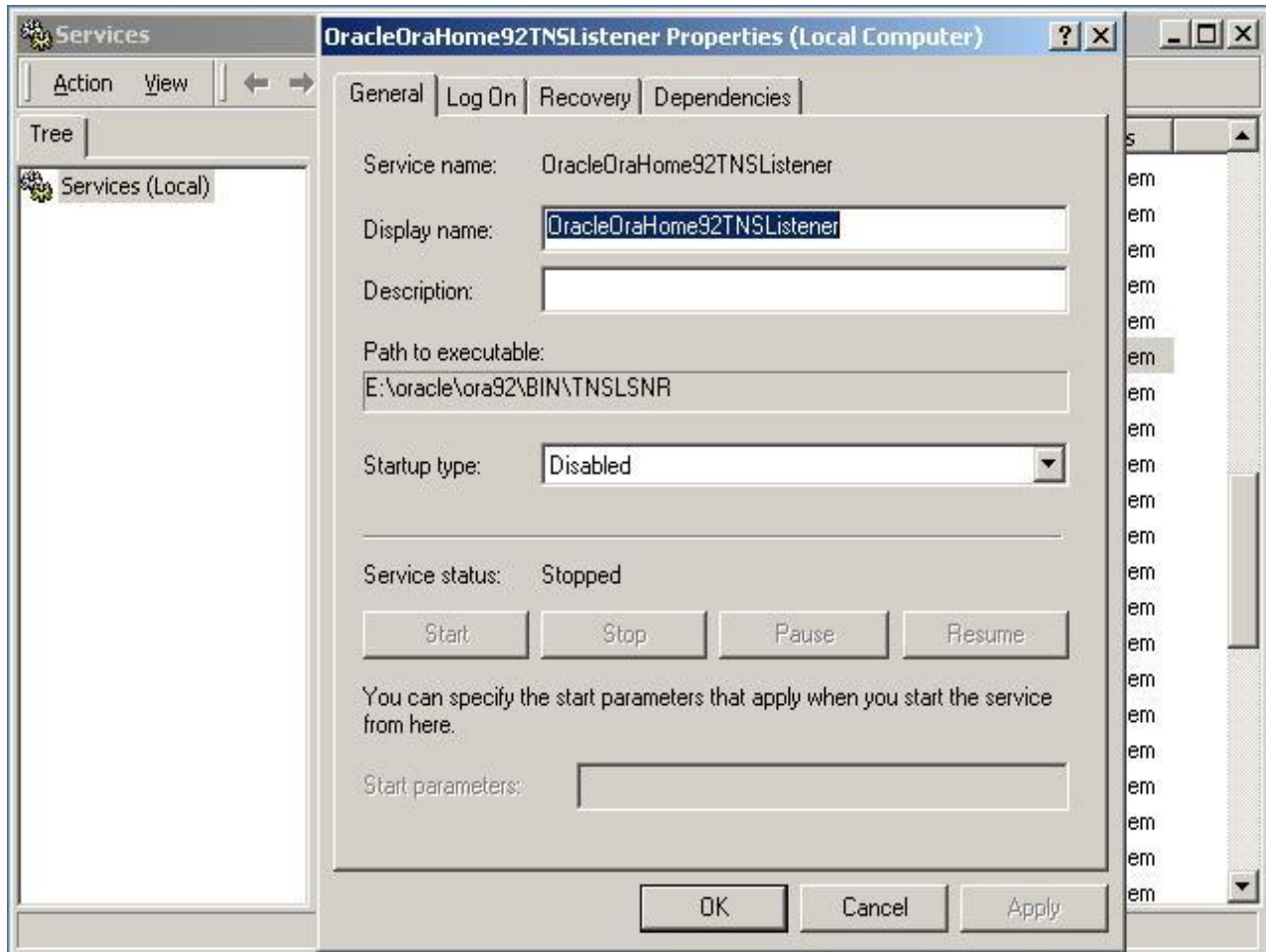
Figure A.81: Disable database listener

Step 8:

- o **Remove Folders containing Oracle Information**
    - o Find where the Oracle folder was placed during the installation process, open the folder and delete the items within.
        - ▪ Reason: Can cause trouble when trying to reinstall.
    - o Exit out of folder and delete the Oracle Folder.

Example to create a HYDRA+ LARGE TableSpace (HYDRA+_LARGE_TS):

Step 1:

- o Open the Oracle Enterprise Manager Console (Standalone) by navigating to "Start -> Programs -> Oracle - OraHome92 -> Enterprise Manager Console"
- o Expand the "Network", "Databases", "HYDRA+", and "Storage" folders
- o Under the "Storage" folder for HYDRA+, right click the "Tablespaces" folder and click "Create…"
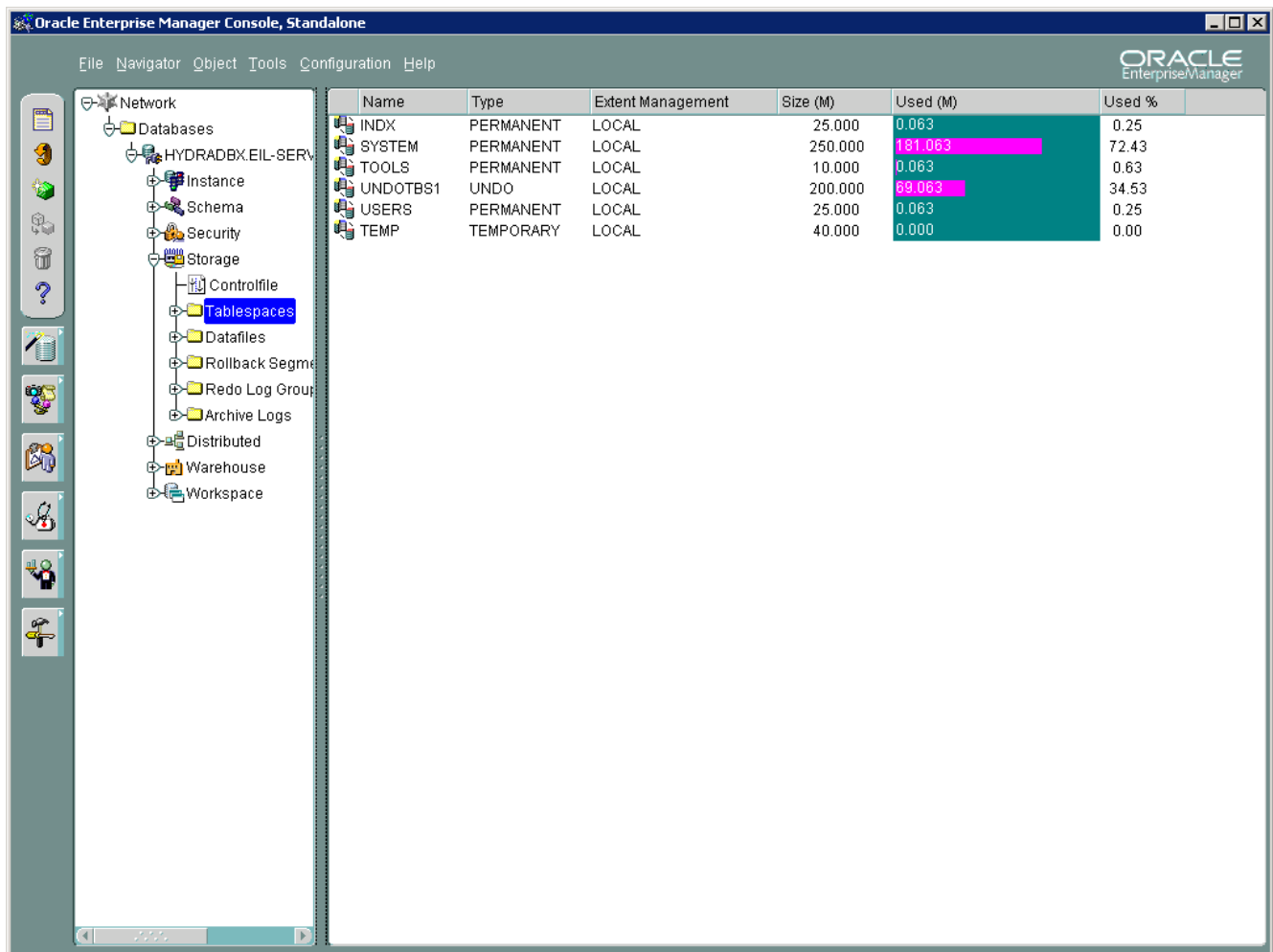
Figure A.82: Tablespaces folder

Step 2:
- o The "Create Tablespace" screen should appear, with the "General" tab selected
- o For the name, enter "HYDRA+_LARGE_TS"
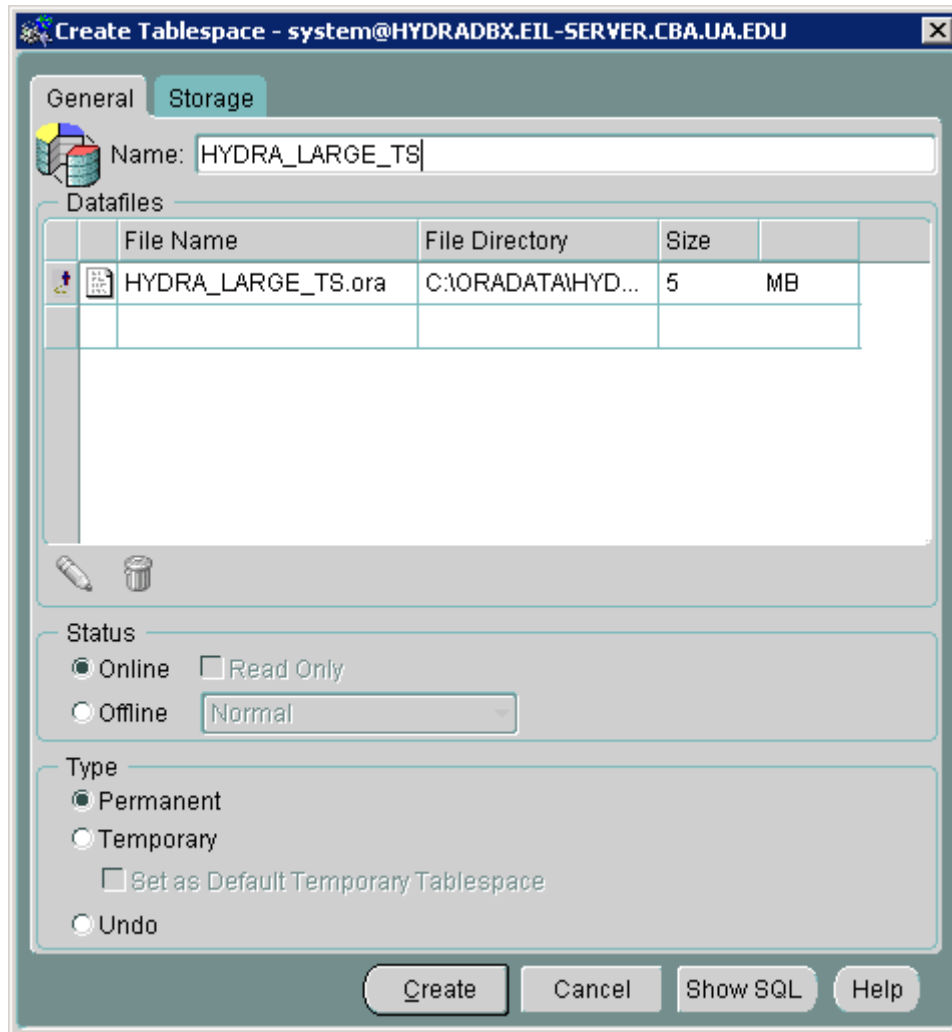
Figure A.83: Create tablespace screen (general tab)

Step 3:
- o Click the "Storage" tab
- o Check to make sure the defaults are as follows:
    - ▪ Extent Management:
        - • Select "Locally managed"
        - • "Automatic Allocation"
    - ▪ Segment Space Management:
        - • "Automatic"
    - ▪ Enable Logging:
        - • "Yes"
    - ▪ Verify the block size is set to 8192 Bytes
- o Click "Create"
- o A window will appear confirming the creation of the tablespace

Figure A.84: Create tablespace (storage tab)

Step 4:

- o Return to the "Tablespaces" folder and click on "HYDRA+_LARGE_TS"
- o In the "General" tab, verify that the size is set to 200 MB
    - ▪ If necessary, change to 200 MB
- o Click "Apply"
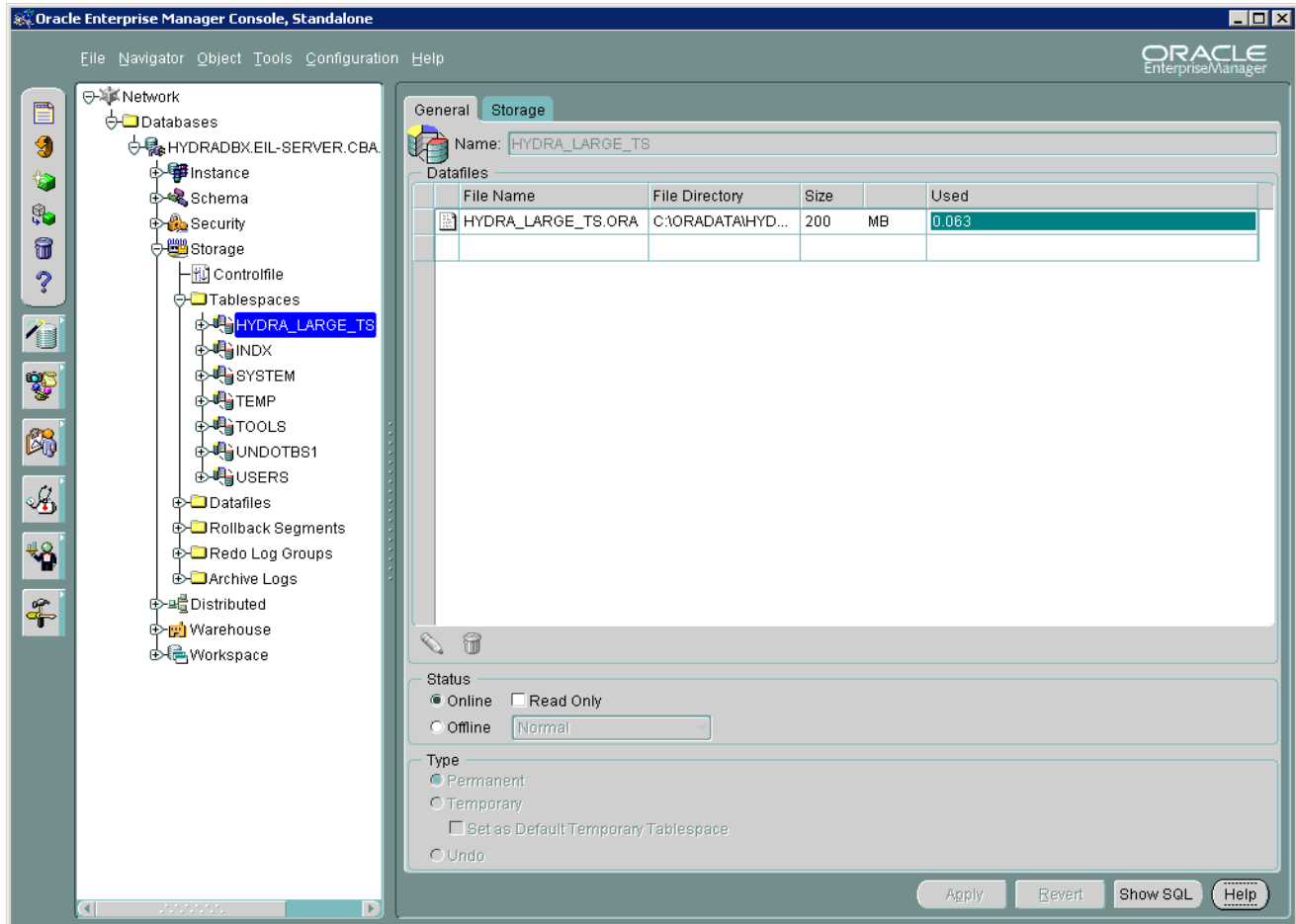
Figure A.85: HYDRA+_LARGE_TS (general tab)

Step 5:
- o Expand the "HYDRA+_LARGE_TS" folder, and then expand the "Datafiles" folder
- o Click the "Storage" tab
- o Select "AUTOEXTEND"
  - ▪ Enter the Increment size as 5120 K Bytes
  - ▪ Enter the Maximum Size Value as 32767 M Bytes
- o Click "Apply"
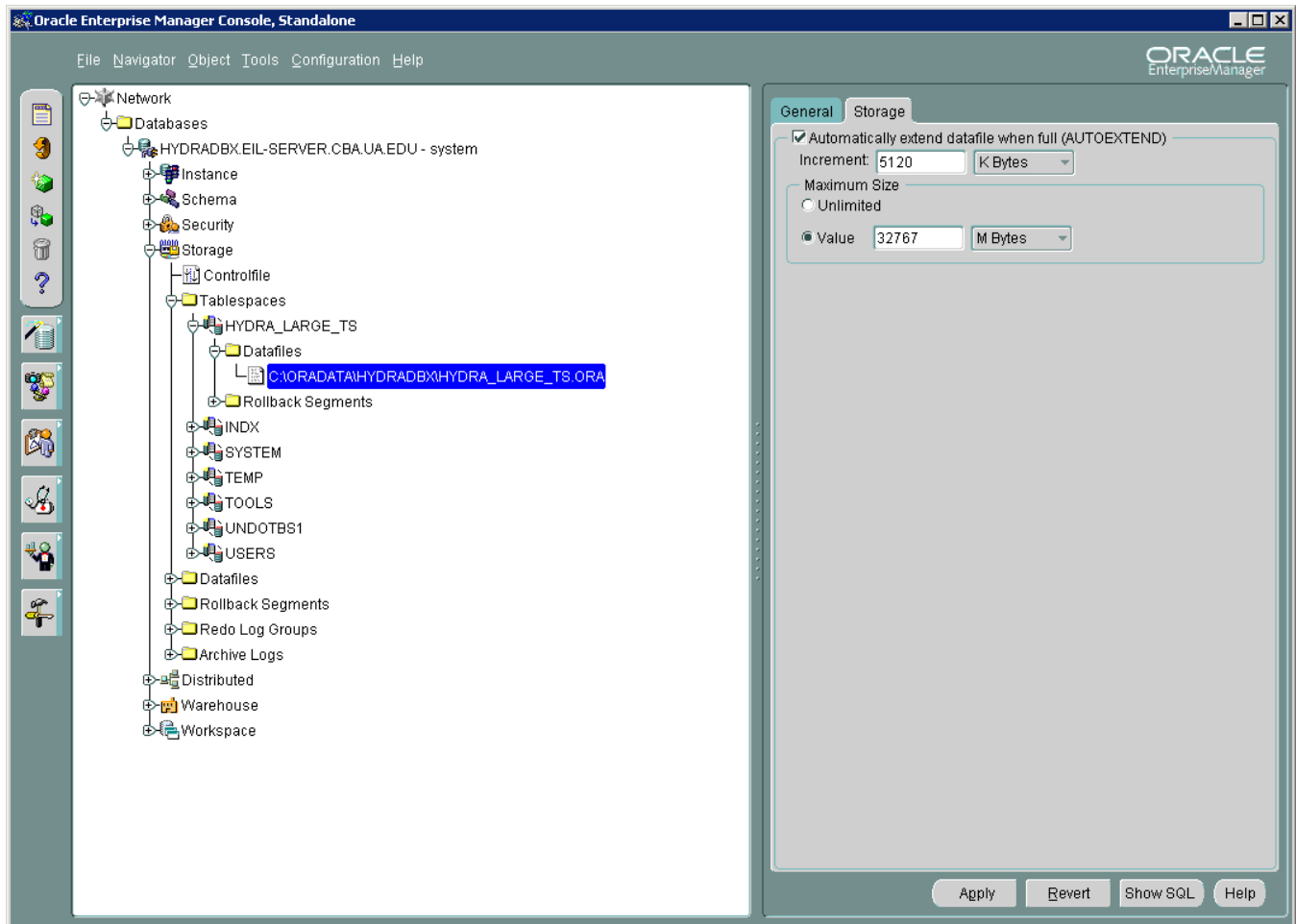
Figure A.86: HYDRA+_LARGE_TS (storage tab)

Create a HYDRA+ User:

Step 1:

- o Open the Oracle Enterprise Manager Console (Standalone) by navigating to "Start -> Programs -> Oracle - OraHome92 -> Enterprise Manager Console"
- o Expand the "Network", "Databases", and "HYDRA+" folders
- o Now expand the "Security" folder, right click on "Users" and select "Create…"
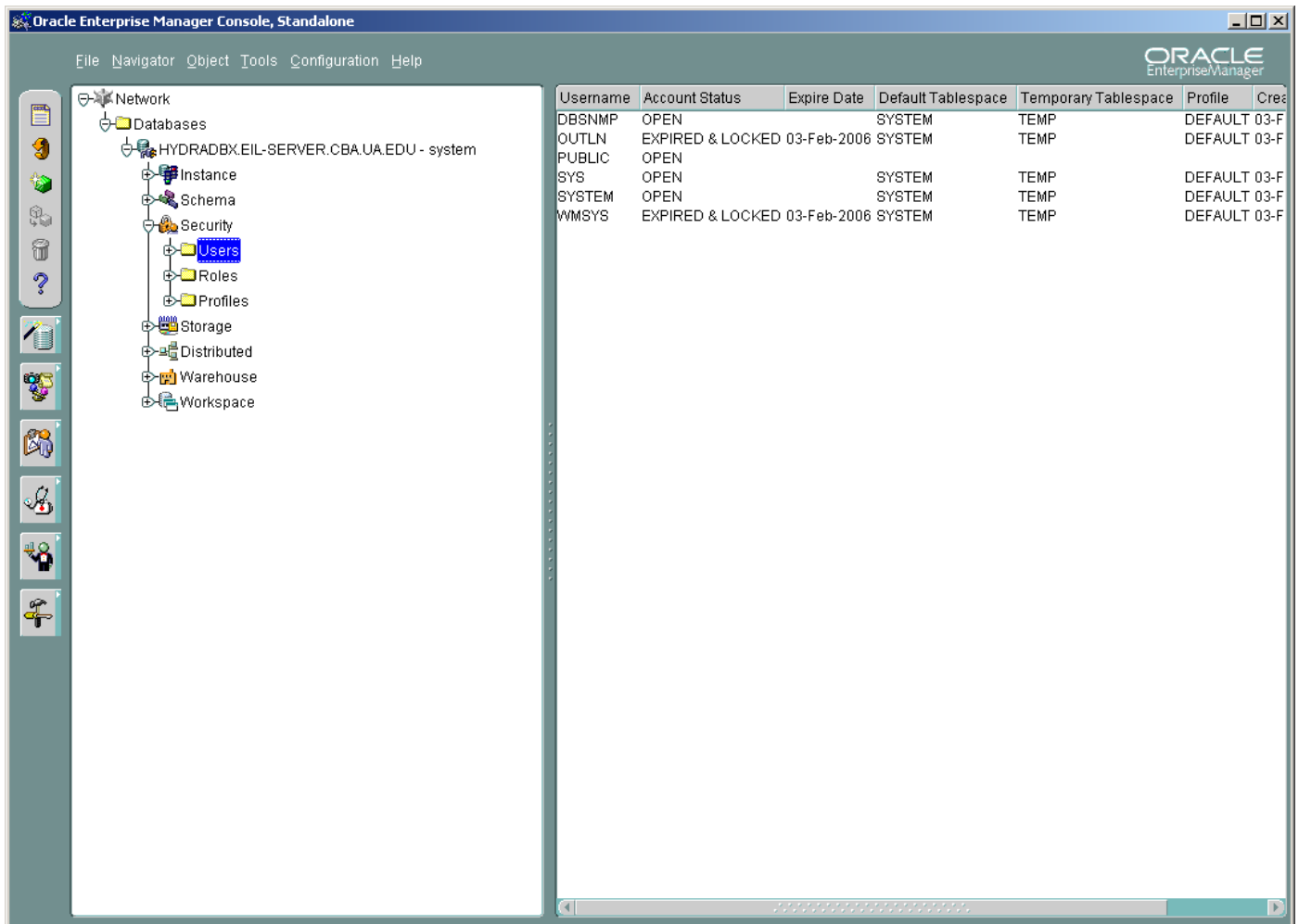
Figure A.87: Users folder

Step 2:
- o The "Create User" screen appears
- o Under the "General" tab, use the following information:
  - ▪ Name: HYDRA+
  - ▪ Default Tablespace: HYDRA+_LARGE_TS
  - ▪ Temporary Tablespace: TEMP
  - ▪ Enter Password

Figure A.88: Create HYDRA+ User (general tab)

Step 3:

- o Now click the "Role" tab

- o Under "Available", select "DBA" and click the down arrow button ⌄
- o Set the "Admin Option" for "CONNECT" and "DBA" to checked
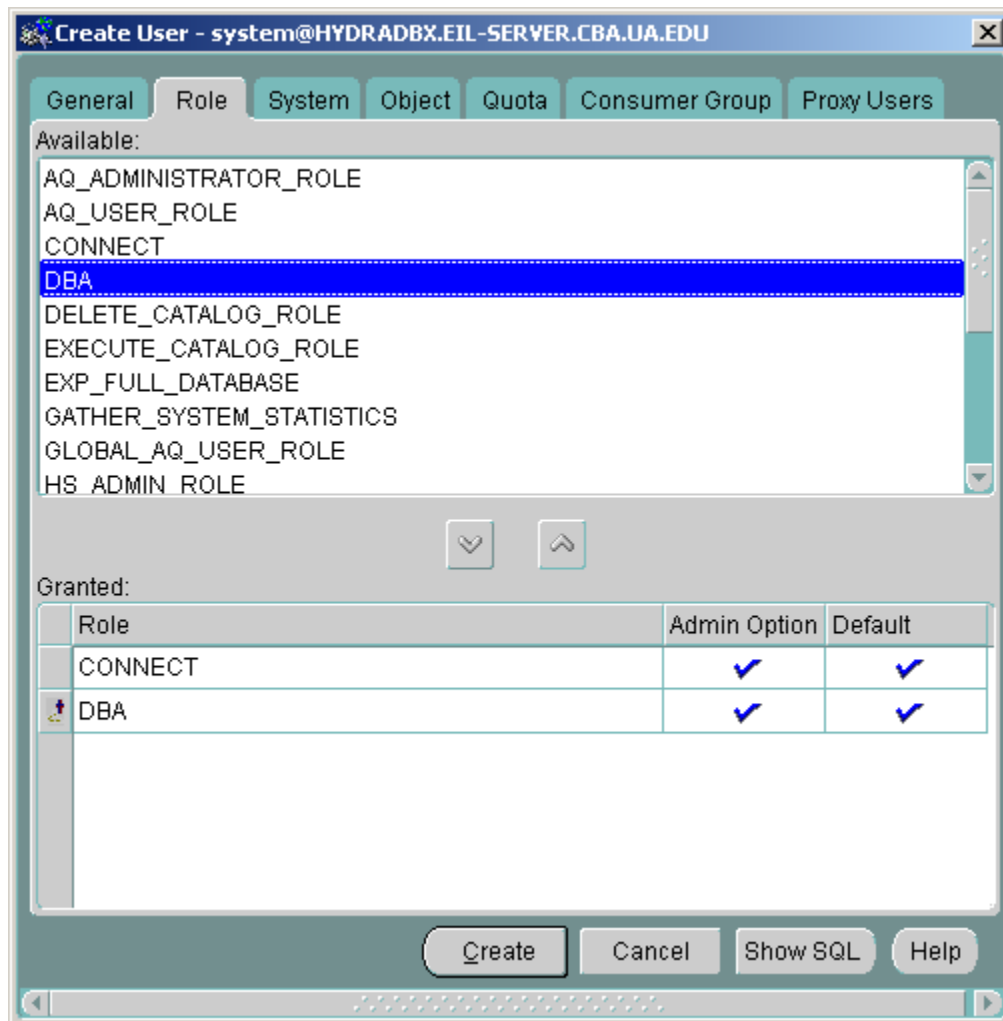
Figure A.89: Create HYDRA+ user (role tab)

Step 4:
- o Click the "System" tab
- o Move the following privileges from "Available" to "Granted":
  - ▪ "ALTER ANY SEQUENCE"
  - ▪ "CREATE ANY SEQUENCE"
  - ▪ "CREATE ANY SYNONYM"
  - ▪ "CREATE ANY TABLE"
  - ▪ "CREATE ANY TRIGGER"
  - ▪ "CREATE ANY VIEW"
  - ▪ "UNLIMITED TABLESPACE"
- o Set the "Admin Option" for all of these to checked
- o Click "Create" to finish
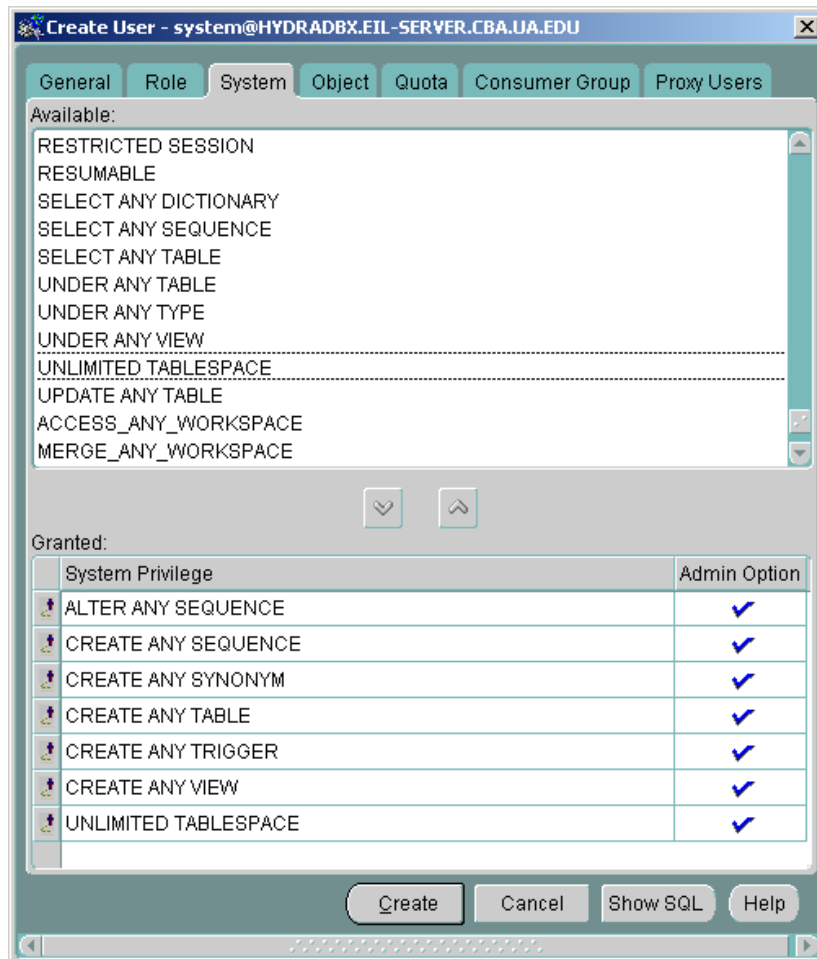
Figure A.90: Create HYDRA+ user (system option)

Import a HYDRA+ Database:

Step 1:
- Open the Enterprise Manager Console by navigating to "Start->Programs->Oracle – OraHome92->Enterprise Manager Console"

Step 2:
- Connect to HYDRA+DB with username "SYS" and change "connect as" to "SYSDBA"

Step 3:
- Navigate to "Security->Users->HYDRA+"
- Right click on "HYDRA+" and click "Remove"

Step 4:
- See "Creating a HYDRA+ user"

Step 5:
- Open the command prompt
- Type "imp"
- Enter "HYDRA+@HYDRA+dbx" as the Username
- Enter the system password as the Password
- Specify the .DMP file to import
- Accept the default "No" for "List contents of import file only"
- Accept the default "No" for "Ignore create error due to object existence"
- Accept the default "Yes" for "Import grants"
- Accept the default "Yes" for "Import table data"
- Type "Yes" for "Import entire export file"

Step 6:
- Wait for import process to finish…

Exporting the HYDRA+ Database:

Step 1:

- o Navigate to the DOS command prompt (Start -> Run -> cmd)

Step 2:

- o Type "exp" to enter the Oracle export utility

Step 3:

- o The system will prompt for username
    - a. Enter "HYDRA+@HYDRA+DB"
- o The system will then prompt for password
    - a. Enter the HYDRA+ password

Step 4:

- o Define the path and meaningful filename for the backup file (Example: D:\backups\HYDRA+users_01_30_2005.dmp)

Step 5:

- o Type in "2" to specify export users (default)
- o Type "yes" for "Export grants" (default)
- o Type "yes" for "Export table data" (default)
- o Type "yes" for "Compress extents" (default)
- o Type "HYDRA+" for "User to be exported"
- o Hit return to quit

Step 6:

- o Verify the file was created by navigating to the location specified in Step 4

Section 3: System's Hierarchical Functional Decomposition and ERDs

Visual Basic Client

Screen Flow of VB Code: figures A.91 through A.98 graphically depict the flow within HYDRA+.

Oracle Server

System ERD: Figure A.99 shows the major tables within HYDRA+ and the relationships between them. The relationships are broken down into 6 different sections to make viewing easier. These sections are numbered on the System ERD (figure A. 99) and are broken down in the detailed ERD's (figures A.100 through A.105). The following Detailed ERD's show every data field in each table and their relationships.

> Input/User ERD
> Condition ERD
> Friction ERD
> Traffic ERD
> Overlay ERD
> Routes/Base Section ERD

Data Dictionary: The Data Dictionary describes all of the major tables used by the HYDRA+ system and their associated fields.

Packages with Procedures: Every Oracle package, its purpose, procedures and the function of each procedure is described. The procedures are indexed by package.

Link between Visual Basic Client and Oracle Side

Packages with Procedures called in VB: Lists all forms within HYDRA+. For each form, form sub-procedures are listed with called Oracle procedures (in the format: Package.Procedure). The indexes with their corresponding names and descriptions are in the "Packages with Procedures and descriptions (numbered)" document.

HYDRA+ 1.0

Figure A.91: HYDRA+ 1.0

1

At Program Initiation

•Define Database Connection (.udl file) at Location

"c:\Program Files\Common Files\System\ OLE DB\Data Links\HYDRA.udl"

•Checks That All Year Dependant Tables Exist. If Not, the System Creates Them.

Interface Selection

Admin / Data Entry   Reporting

At Form Load

•Load DB Connections (calls refer to .udl file)

•Manipulate Table button and Update Table button are located on top of each other on the form and one or the other is set to visible depending on the table selected. The Manipulate Table button is shown for temp tables, whereas the Update Table button is shown for static tables.

NOTE: User data can not be altered once it is entered. If you want to edit user information you have to delete the user and recreate it.

•Inserts user information into table HYDRA_USERS table

•Gets all usernames from HYDRA_USERS table

•Deletes selected username from HYDRA_USERS table

•Populates data grid and shows/hides buttons

•Uses either OVERLAY_PROJ_ TRANS_LOG table or STATE_ STATIC_TRANS_LOG table

•Both options decided according to whether the user has selected a temp table or a static table

•Calls Functions CommitStaticTable and CommitProjectTable from frmUpdateTables Module (these functions create the appropriate tables and import data to those tables from the temp tables)

•Populate Data Grid with all Appropriate Data

•Save Changes Made to Tables

Administration Tab

Data Input Tab

Data Validation Tab

Update Data Tab

User Maintenance

Add User

Delete User

Table Maintenance

Select Table

Update Table

Manipulate Table

Change Status

Add Record

Delete Record

Friction Insert

Overlay Insert

Add Condition

Add Traffic

Validate   Correct

Correct Condition

Correct Traffic

NOTE: Table maintenance refers to the maintenance of the static tables.

NOTE: These all load the same form frmUpdateTables

Figure A.92: HYDRA+ 1.1

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Figure A.93: HYDRA+ 1.2

At Form Load

• Load DB Connections (calls refer to .udl file)

Interface Selection

Admin / Data Entry   Reporting

• Creates Error File in "Errors" folder

• Pulls all Routes and Division Data to Validate the Routes Associated with the Traffic Data

• Calls the following stored procedures in validating condition:

CONDITION_SETUP_PKG.CHECK _CONDITION_TABLES

CONDITION_PKG.COND_ VALIDATE

Administration Tab

Data Input Tab

Data Validation Tab

Update Data Tab

Validate   Correct

Friction Insert

Overlay Insert

Add Condition

Add Traffic

User Maintenance

Add User

Delete User

Table Maintenance

Select Table

Update Table

Manipulate Table

Change Status

Add Record

Delete Record

Correct Condition

Correct Traffic

• Pulls all data from table TEMPTRAFFIC or TEMPCONDITION and fills the data grid in frmErrorLog
• User can either change the data or print all items containing errors
• Upon saving the system calls stored procedure TRAFFIC_PKG.TRAFFIC_ RESUBMIT or CONDITION_PKG.CONDITION _RESUBMIT depending on the data you are currently looking at.
• User can delete all rows from tables TEMPTRAFFICEXCEPTION and TEMPCONDITIONEXCEPTION in this form

Figure A.94: HYDRA+ 1.3

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HYDRA+ 1.4

At Form Load

•Load DB Connections (calls refer to .udl file)

Interface
Selection

Admin / Data Entry ◇ Reporting

Administration Tab

Data Input Tab

Data Validation Tab

Validate ◇ Correct

User Maintenance

Add User

Delete User

Table Maintenance

Select Table

Update Table

Manipulate Table

Change Status

Add Record

Delete Record

Friction Insert

Overlay Insert

Add Condition

Add Traffic

Correct Condition

Correct Traffic

Update Data Tab

•Calls the following stored procedures according to choice of table to update.

COND_COMMIT_CALC_RATINGS _PKG.CALL_GENERATE_ PROCEDURES

TRAF_COMMIT_CALC_RATINGS_ PKG.CALL_GENERATE_ PROCEDURES

•Drops all temp tables associated with condition and traffic data after update has completed

Figure A.95: HYDRA+ 1.4

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At Form Load

•Load DB Connections (calls refer to .udl file)

Interface Selection

Admin / Data Entry   Reporting

Reporting

•Calls the procedure PROJECTION_CALC.SET_OVERLAY_YEAR to determine the as-of date for the PPR

•Calls the procedure PPR_PKG.MOVE_ASOFINS to set the PPR year synonyms in Oracle

Internal

External

•Calls the procedure PPR_PKG.BUILD_ASOF to create a collection of data fitting within the dates specified by the user. These record are kept in the table OVERLAY_BREAKUP_PPR

•Updates OVERLAY_PRJ with the appropriate year increments

•Outputs the PPR data to the file designate by the user

PPR   Friction   GASB   Other

Internal

External

PPR (Excel Or Adobe)

Friction Report (Excel Or Adobe)

GASB (Excel Or Adobe)

Access — Launches MS Access

Crystal Reports — Launches Crystal Reports

Launch GeoMedia — Launches GeoMedia

GeoMedia — Creates and exports tables using GeoMedia

Figure A.96: PPR reporting

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Figure A.97: Friction reporting

Figure A.98: GASB reporting

Figure A.99: High level ERD

Figure A.100: Input/user ERD

CONDITION_TRANSACTION_LOG
- FIELDNAME
- RECORD_NUM
- DATE_TIME
- SESSION_ID
- OLD_VALUE
- NEW_VALUE

TEMPCONDITIONLOADYEAR
- pk COND_ID
- pk COND_ROUTE
- pk COND_ROUTE_TYPE
- pk COND_LANE
- pk COND_MILEPOST
- pk COND_DATE_RATED
- pk COND_DIRECTION
- pk COND_FLAG
- COND_DIV
- COND_IRI1
- COND_IRI2
- COND_TEX_RMS
- COND_TEX_MPD
- COND_RRUT
- COND_LRUT
- COND_GRADE
- COND_LATDEG
- COND_LATMIN
- COND_LATSEC
- COND_LONGDEG
- COND_LONGMIN
- COND_LONGSEC
- COND_RATER
- COND_ARAN
- COND_PATCHING_(G,F,P)
- COND_SHLDR_COND
- COND_SHLDR_TYPE
- COND_RAVEL_(L,W,E)
- COND_BLEED_(L,W,E)
- COND_ALLIGAT1.3
- COND_BLOCK1.3
- COND_LONGIT1.3
- COND_TRANS1.3
- COND_CRKSEAL
- COND_POTHOLE
- COND_PUMP
- COND_LJSPAL_(L,M,S)
- COND_TJOINT
- COND_TJSPAL_(L,M,S)
- COND_POPOUTS
- COND_LANE_SEP
- COND_JOINT_SEAL
- COND_CORNER_BRK
- COND_LANE_WIDTH
- COND_PVMT_TYPE
- COND_BRIDGE
- COND_CONST
- COND_XFALL
- COND_ELEVATION
- COND_PFAULT_CNT
- COND_PFAULT_AVG
- COND_NFAULT_CNT
- COND_NFAULT_AVG
- COND_SAMPLE_SIZE
- COND_RATING
- COND_PSI
- COND_BASE_SECTION_ID

CONDITION_YEAR
- pk COND_ID
- pk COND_MILEPOST
- pk COND_DIRECTION
- pk COND_LANE_NUM
- pk COND_ROUTE_NUMBER
- pk COND_ROUTE_TYPE
- COND_LANE_WIDTH
- COND_RATER
- COND_DATE_RATED
- COND_IRI1
- COND_IRI2
- COND_TEX_MPD
- COND_TEX_RMS
- COND_GRADE
- COND_PATCHING_(F,G,P)
- COND_SHLDR_COND
- COND_SHLDR_TYPE
- COND_RAVEL_(E,L,W)
- COND_BLEED_(E,L,W)
- COND_ALLIGAT1.3
- COND_BLOCK1.3
- COND_LONGIT1.3
- COND_TRANS1.3
- COND_RRUT
- COND_LRUT
- COND_CRKSEAL
- COND_POTHOLE
- COND_PUMP
- COND_ARAN
- COND_BRIDGE
- COND_CONST
- COND_ELEVATION
- COND_XFALL
- COND_PVMT_TYPE
- COND_RATING
- COND_LJSPAL_(L,M,S)
- COND_TJOINT
- COND_TJSPAL_(L,M,S)
- COND_POPOUTS
- COND_LANE_SEP
- COND_JOINT_SEAL
- COND_CORNER_BRK
- COND_PFAULT_CNT
- COND_PFAULT_AVG
- COND_NFAULT_CNT
- COND_NFAULT_AVG
- COND_FSECTION
- COND_GENERATION
- COND_SAMPLE_SIZE
- COND_LAT_DEC
- COND_LNG_DEC
- COND_PSI

TEMPCONDITIONYEAR
- pk COND_ID
- pk COND_ROUTE
- pk COND_ROUTE_TYPE
- pk COND_LANE
- pk COND_MILEPOST
- pk COND_DATE_RATED
- pk COND_DIRECTION
- pk COND_FLAG
- COND_DIV
- COND_IRI1
- COND_IRI2
- COND_TEX_RMS
- COND_TEX_MPD
- COND_RRUT
- COND_LRUT
- COND_GRADE
- COND_LATDEG
- COND_LATMIN
- COND_LATSEC
- COND_LONGDEG
- COND_LONGMIN
- COND_LONGSEC
- COND_RATER
- COND_ARAN
- COND_PATCHING_(G,F,P)
- COND_SHLDR_COND
- COND_SHLDR_TYPE
- COND_RAVEL_(L,W,E)
- COND_BLEED_(L,W,E)
- COND_ALLIGAT1.3
- COND_BLOCK1.3
- COND_LONGIT1.3
- COND_TRANS1.3
- COND_CRKSEAL
- COND_POTHOLE
- COND_PUMP
- COND_LJSPAL_(L,M,S)
- COND_TJOINT
- COND_TJSPAL_(L,M,S)
- COND_POPOUTS
- COND_LANE_SEP
- COND_JOINT_SEAL
- COND_CORNER_BRK
- COND_LANE_WIDTH
- COND_PVMT_TYPE
- COND_BRIDGE
- COND_CONST
- COND_XFALL
- COND_ELEVATION
- COND_PFAULT_CNT
- COND_PFAULT_AVG
- COND_NFAULT_CNT
- COND_NFAULT_AVG
- COND_SAMPLE_SIZE
- COND_RATING
- COND_PSI
- COND_BASE_SECTION_ID

HYDRA_USERS
- pk USERNAME

ERROR_LOG
- fk USERNAME
- fk ERROR_CODE

ERROR
- pk ERROR_CODE

INPUT_LOG
- fk USERNAME

BASE_SECTION
- pk BASE_SECTION_ID
- fk BASE_ROUTE_TYPE
- fk BASE_ROUTE_NUM
- fk BASE_BEGIN_MILE_MARKER
- fk BASE_END_MILE_MARKER
- fk BASE_COUNTY

BASE_COND_DETAIL_YEAR
- pk BASE_COND_DET_BASE_ID
- pk BASE_COND_DET_COND_ID
- BASE_COND_DET_DIR
- BASE_COND_DET_LANE
- BASE_COND_DET_ACTUAL

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Figure A.101: Condition ERD

Figure A.102: Friction ERD

Figure A.103: Traffic ERD

Figure A.104: Overlay ERD

Figure A.105: Route/base section ERD

Data Dictionary

The following tables detail each of the attributes, primary and foreign keys, data type, size, mandatory values, range of acceptable values, and a description of each attribute contained in the table. These accompany the previous graphical ERDs.

AGGREGATE_DETAIL — Table associating the AGGTYPE and SOURCES tables to the OVERLAY_YEAR tables.

Column Name	Keys	Data Type	Size	Accepts Nulls	Range	Description
OVERLAYAGG_ID	PK	NUMBER	10			Unique Identifier of a Material Used in an Overlay
OVERLAYAGG_COARSE_FINE		CHAR	1			Identifies the Texture of a Material
OVERLAYAGG_TYPE	PK	VARCHAR2	150			Identifies the AGGTYPE Referenced
OVERLAYAGG_PERCENT		NUMBER	3		0 - 100	Material Percentage of the Mix
OVERLAYAGG_SOURCE_NAME	PK	VARCHAR2	200			Identifies the Source of the Material

AGGTYPE — Table hold all information about pavement makeup such as the various types of material used in those pavement types.

Column Name	Keys	Data Type	Size	Accepts Nulls	Range	Description
AGG_ID		NUMBER	10			Unique Identifier of a Material Used in an Overlay
AGG_AGGTYPE	PK	VARCHAR2	255			Identifies the AGGTYPE
AGG_STATUS		VARCHAR2	10		VALID / INVALID	Status of a Aggregate Material (Valid / Invalid)

BASE_COND_DETAIL_YEAR — Table associating BASE_SECTION and CONDITION_YEAR.

Column Name	Keys	Data Type	Size	Accepts Nulls	Range	Description
BASE_COND_DET_BASE_ID	PK	NUMBER	12			Identifies Base Record Referenced by this Record
BASE_COND_DET_COND_ID	PK	NUMBER	10	x		Identifies the Condition Record Referenced by this Record
BASE_COND_DET_DIR		VARCHAR2	10	x	N / E / S / W	Identifies the Side of the Road Being Tested (North / South / East / West)
BASE_COND_DET_LANE		VARCHAR2	10	x		Identifies the Lane Being Tested
BASE_COND_DET_ACTUAL		NUMBER	1			

BASE_FRIC_DETAIL_YEAR — Table associating the BASE_SECTION and FRICTION_YEAR tables.

Column Name	Keys	Data Type	Size	Accepts Nulls	Range	Description
BASE_FRICT_DET_BASE_ID	PK	NUMBER	9			Unique Identifier of a Base Section
BASE_FRICT_DET_FRIC_ID	PK	NUMBER	9			Unique Primary Key for a Friction Rating
BASE_FRICT_DET_DIRECTION		CHAR	1		N / E / S / W	Identifies the Side of the Road Being Tested (North / South / East / West)
BASE_FRICT_DET_ACTUAL		NUMBER	1			

BASE_SECTION — Table holds data on every highway in Alabama in increments of 52.8 feet.

Column Name	Keys	Data Type	Size	Accepts Nulls	Range	Description
BASE_SECTION_ID	PK	NUMBER	10			Unique Identifier of a Base Section
BASE_ROUTE_TYPE	FK	VARCHAR2	2		IN / AL	Defines Type of Route
BASE_ROUTE_NUM	FK	VARCHAR2	5			Route Number Where the Base Section is Located
BASE_BEGIN_MILE_MARKER	FK	FLOAT	20			Begin Mile Marker for Base Section
BASE_END_MILE_MARKER	FK	FLOAT	20			End Mile Marker for Base Section
BASE_LAT_GPS_DEC		FLOAT	20	x		GPS Position for Begin of Base Section
BASE_LNG_GPS_DEC		FLOAT	20	x		GPS Position for End of Base Section
BASE_COUNTY	FK	VARCHAR2	3			County containing the base section.
BASE_NHS		NUMBER	1	x	0 / 1	National or non-national (1 = National, 0 = Non-National)
BASE_AL_SENATE		VARCHAR2	3	x		Identifies the Alabama Senate District Associated with a Particular Stretch of Road
BASE_US_HOUSE		VARCHAR2	3	x		
BASE_AL_HOUSE		VARCHAR2	3	x		

BASE_TRAF_DETAIL_YEAR — Table associating the TRAFFIC_YEAR and BASE_SECTION tables.

Column Name	Keys	Data Type	Size	Accepts Nulls	Range	Description
BASE_TRAF_DET_BASE_ID	PK	NUMBER	9			Unique Identifier of a Base Section
BASE_TRAF_DET_TRAF_ID	PK	NUMBER	9			Unique Identifier of a Traffic Record
BASE_TRAF_DET_ACTUAL		NUMBER	1			

CONCURRENT_ROUTES_YEAR — Table holds data identifying all routes that overlap each other (i.e. I-20 and I-59 are concurrent routes from Birmingham, AL all the way to Mississippi).

Column Name	Keys	Data Type	Size	Accepts Nulls	Range	Description
C_ROUTE_TYPE	PK	CHAR	2			Identifies the Type of Route
C_ROUTE_NUM	PK	VARCHAR2	6			Identifies the Number of the Route
C_BEG_MP	PK	FLOAT	126			Beginning Mile Post of the Route Within a Given County
C_END_MP	PK	FLOAT	126			Ending Mile Post of the Route Within a Given County
C_CON_ROUTE_TYPE		CHAR	2			Identifies the Type of Concurrent Route
C_CON_ROUTE_NUM		VARCHAR2	5			Identifies the Number of the Concurrent Route
C_CON_BEG_MP		FLOAT				Beginning Mile Post of the Concurrent Route Within a Given County
C_CON_END_MP		FLOAT	10			Ending Milepost of the Concurrent Route Within a Given County

CONDITION_TRANSACTION_LOG — Table holds a record of all conditional rating transactions in the system.

Column Name	Keys	Data Type	Size	Accepts Nulls	Range	Description
FIELDNAME		VARCHAR2	25	x		Identifies the action that was taken for the particular entry
RECORD_NUM		NUMBER	10	x		
DATE_TIME		DATE		x		
SESSION_ID		VARCHAR2	50	x		
OLD_VALUE		VARCHAR2	25	x		
NEW_VALUE		VARCHAR2	25	x		

CONDITION_YEAR — Table holds all data related to the condition of a given overlay.

Column Name	Keys	Data Type	Size	Accepts Nulls	Range	Description
COND_LANE_WIDTH		FLOAT	126	x		1=Outside/right; 2=Inside/left
COND_DIRECTION	PK	VARCHAR2	1	x		P=Primary (N, E) S=Secondary (S, W)
COND_RATER		VARCHAR2	2			Number identifying the one assigning the codition rating to the particular overlay.
COND_DATE_RATED		DATE	7	x		Date the Rating was done
COND_IRI1		FLOAT	8			International Roughness Index for outside wheel path. The IRI is a standardized Number involving road quality vs. user cost.
COND_IRI2		FLOAT	8	x		International Roughness Index for inside wheel path.
COND_TEX_MPD		FLOAT	8	x		Average mean profile depth
COND_TEX_RMS		FLOAT	8	x		Average root mean square of VARCHAR2ure
COND_GRADE		FLOAT	8	x		Average Grade
COND_PATCHING_F		FLOAT	8	x		Fair Patching.
COND_PATCHING_G		FLOAT	8	x		Patching is replacement/repair of pavement with new material. Good Patching
COND_PATCHING_P		FLOAT	8	x		Marginal Patching
COND_SHLDR_COND		VARCHAR2	1	x		Shoulder condition (G=Good, F=Fair, P=Poor)…change poor to marginal.
COND_SHLDR_TYPE		VARCHAR2	3	x		(ASP=Asphalt, CON=Concrete, C&G=Curb and Gutter, D&G=dirt/gravel, GRA=Grass).
COND_RAVEL_E		FLOAT	8	x		Entire Lane Raveling
COND_RAVEL_L		FLOAT	8	x		Localized Raveling (1=Low severity, 2=medium severity, 3=high severity)
COND_RAVEL_W		FLOAT	8	x		Wheel Path Raveling
COND_BLEED_E		FLOAT	8	x		Entire Lane Bleeding
COND_BLEED_L		FLOAT	8	x		Localized Bleeding…Basically Boolean
COND_BLEED_W		FLOAT	8	x		Wheel Path Bleeding…Basically Boolean
COND_ALLIGAT1		FLOAT	8	x		Alligator Cracking Level 1 (slight)
COND_ALLIGAT2		FLOAT	8	x		Alligator Cracking Level 2 (moderate)
COND_ALLIGAT3		FLOAT	8	x		Alligator Cracking Level 3 (severe)
COND_BLOCK1		FLOAT	8	x		Block Cracking Level 1 (slight)
COND_BLOCK2		FLOAT	8	x		Block Cracking Level 2 (moderate)
COND_BLOCK3		FLOAT	8	x		Block Cracking Level 3 (severe)
COND_LONGIT1		FLOAT	8	x		Longitudinal cracking severity 1
COND_LONGIT2		FLOAT	8	x		Longitudinal cracking severity 2
COND_LONGIT3		FLOAT	8	x		Longitudinal cracking severity 3
COND_TRANS1		FLOAT	8	x		Transverse Cracking Level 1
COND_TRANS2		FLOAT	8	x		Transverse Cracking Level 2
COND_TRANS3		FLOAT	8	x		Transverse Cracking Level 3
COND_RRUT		FLOAT	8	x		Average outside wheel path rutting for this section
COND_LRUT		FLOAT	8	x		Average inside wheel path rutting for this section
COND_CRKSEAL		FLOAT	8	x		Crack Sealant condition (0=None, 1=Good, 2=Marginal)
COND_POTHOLE		FLOAT	8	x		Count of potholes in this section
COND_PUMP		FLOAT	8	x		Presence of pumping
COND_ARAN		VARCHAR2	4	x		ARAN (Automatic Road Analyzer) collection Number. This may be the vehicle Number.
COND_BRIDGE		VARCHAR2	1	x		1=Present
COND_CONST		VARCHAR2	1	x		Construction and Lane deviations. 1=Present
COND_ELEVATION		FLOAT	8	x		Avg. Elevation
COND_XFALL		FLOAT	8	x		Cross-fall. How much drop in elevation from centerline to edge of the road
COND_LANE_NUM	PK	NUMBER	1			Lane Number
COND_PVMT_TYPE		VARCHAR2	1	x		Type of pavement, F = Asphalt, R = Concrete
COND_ID	PK	NUMBER	9			unique id for condition records
COND_RATING		FLOAT	9	x	0 - 96	Calculated Rating of Condition Point
COND_LJSPAL_L		NUMBER	9	x		Count of Longitudinal Joints that have a Low Level of Spalling
COND_LJSPAL_M		NUMBER	9	x		Count of Moderately Spalled Longitudinal Joints
COND_LJSPAL_S		NUMBER	9	x		Count of Severely Spalled Longitudinal Joints
COND_TJOINT		NUMBER	9	x		Count of Unspalled Transverse Joints
COND_TJSPAL_L		NUMBER	9	x		Count of Transverse Joints that have a Low Level of Spalling
COND_TJSPAL_M		NUMBER	9	x		Count of Moderately Spalled Transverse Joints
COND_TJSPAL_S		NUMBER	9	x		Count of Severely Spalled Transverse Joints
COND_POPOUTS		NUMBER	9	x		Count of all Popouts
COND_LANE_SEP		NUMBER	9	x		Lane Separation (1 = Present)
COND_JOINT_SEAL		NUMBER	9	x		Joint Sealant Condition (1 = good, 2 = fair, 3 = poor)
COND_CORNER_BRK		NUMBER	9	x		Count of all Corner Breaks in this Section
COND_PFAULT_CNT		NUMBER	9	x		Number of Positive Faults
COND_PFAULT_AVG		NUMBER	9	x		Average Depth of Positive Faults
COND_NFAULT_CNT		NUMBER	9	x		Number of Negative Faults
COND_NFAULT_AVG		NUMBER	9	x		Average depth of Negative Faults
COND_FSECTION		VARCHAR2	50	x		
COND_GENERATION		NUMBER	9	x		
COND_ROUTE_NUMBER	PK	VARCHAR2	6	x		Identifies the Number of the Route
COND_ROUTE_TYPE	PK	VARCHAR2	10	x		Identifies the Type of Route
COND_SAMPLE_SIZE		NUMBER	9	x		Length of Road that was Sampled
COND_LAT_DEG		FLOAT	30	x		Latitude Decimal Degrees
COND_LNG_DEG		FLOAT	30	x		Longitude Decimal Degrees
COND_MILEPOST	PK	FLOAT	126			Route Milepost Associated with a Rating
COND_PSI		FLOAT	10	x		

COUNTY_YEAR — Table holds all county data. This table identifies a county's name division, district, and county number according to the state as well as the system.

Column Name	Keys	Data Type	Size	Accepts Nulls	Range	Description
COUNTY_FIPS_NUM		NUMBER	5			Federal County Number
COUNTY_ST_COUNTY_NUM		NUMBER	8			State County Designation
COUNTY_NAME		VARCHAR2	20			Name of County
COUNTY_DIST		NUMBER	2	x		County
COUNTY_DIV	FK	NUMBER	2	x		Division which County Belongs in
RECORDNUM		NUMBER	10			Auto-Number (Unique Identifier of a Record)

DIVISION_YEAR — Table holds all information related to division boundaries, counties within that division, and the location of a given division.

Column Name	Keys	Data Type	Size	Accepts Nulls	Range	Description
DIV_NUM	PK	NUMBER	2			Division Number (1-9)
DIV_LOCATION		CHAR	40	x		Address of Division Office.
DIV_GPS_LAT		FLOAT	8	x		GPS Position of Latitude of Division Office.
DIV_GPS_LONG		FLOAT	8	x		GPS position of Longitude of Division Office.
DIV_NUM_DISTRICTS		NUMBER	2	x		Number of Districts in the Division.
DIV_NUM_COUNTY		NUMBER	2	x		Number of Counties in the Division
RECORDNUM		NUMBER	10			Auto-Number (Unique Identifier of a Record)

ERROR — Table contains possible errors that the system can generate. The system pulls the appropriate errors out of this table whenever a problem is encountered.

Column Name	Keys	Data Type	Size	Accepts Nulls	Range	Description
ERROR_CODE	PK	NUMBER	3			Code Associated with a Given Error
ERROR_DESCRIPTION		VARCHAR2	100			Description of the Error

ERROR_LOG — Table holds a log of all errors that occur from the use of the system.

Column Name	Keys	Data Type	Size	Accepts Nulls	Range	Description
ERROR_CODE	FK	NUMBER	6	x		References ERROR_CODE from the Table ERROR
ERROR_TEXT		VARCHAR2	500	x		Description of the Error that Occurred
USER_NAME	FK	VARCHAR2	50	x		Name of the User Who Encountered the Error
ERROR_TIME		DATE	30	x		Time Stamp of the Time and Date when the Error Occurred
DATA_TYPE		VARCHAR2	30	x		Identifies the Type of Data that the User was Trying to Input
RECORD_NUM		NUMBER	10	x		Unique Identifier of an Error
SESSION_ID		VARCHAR2	100	x		Unique Identifier of the Session that was Running when the Error Occurred
ERR_STATUS		NUMBER	10	x		Flag Noting Whether the Error has Been Corrected

FRICTION_TRANSACTION_LOG — Table holds a record of all friction rating transactions in the system.

Column Name	Keys	Data Type	Size	Accepts Nulls	Range	Description
FIELDNAME		VARCHAR2	25			Identifies the action that was taken for the particular entry
RECORD_NUM		NUMBER	6			
DATE_TIME		DATE				
SESSION_ID		VARCHAR2	50	x		
OLD_VALUE		VARCHAR2	25	x		
NEW_VALUE		VARCHAR2	25	x		

FRICTION_YEAR — Table contains all data related to the friction ratings of a given overlay.

Column Name	Keys	Data Type	Size	Accepts Nulls	Range	Description
FRIC_ID	PK	NUMBER	10	x		Unique Primary Key for a Friction Rating
FRIC_DIV		NUMBER	2			Division Where the Friction Rating was Taken
FRIC_ROUTE_TYPE		VARCHAR2	2			Identifies the Type of Route
FRIC_ROUTE_NUM		VARCHAR2	5			Identifies the Number of the Route
FRIC_MILE_POST		NUMBER	10			Mile Along the Highway Where the Friction Rating was Taken
FRIC_DIR		VARCHAR2	1			P=Primary (N, E) S=Secondary (S, W)
FRIC_DATE		DATE	7			Date the Rating was Taken
FRIC_RESULT		NUMBER	3			Friction Number.
FRIC_MODIFIER		VARCHAR2	2	x		Any Condition that May Affect the Result. There is a List of Modifiers.
FRIC_AIR_TEMP		NUMBER	4			Air Temperature When the Rating was Taken
FRIC_ROLE		VARCHAR2	10			Role of the User Who Entered the Rating
FRIC_USER		VARCHAR2	25			User Who Entered the Rating
FRIC_FLAG		VARCHAR2	10			Flag Identifying a Friction Rating as New / Valid / Invalid

HYDRA_USERS — Table holds all HYDRA user related information. Any time a user is added or deleted, or a user logs in, HYDRA adds, removes, or validates against data in this table.

Column Name		Data Type	Size	Accepts Nulls	Range	Description
USERNAME	PK	VARCHAR2	25			Unique Identifier of a User
ROLE		VARCHAR2	10			Role that the User Plays in the System
MAX_SESSIONS		NUMBER	10			Maximum Number of Concurrent Sessions the User can Have
CURRENT_SESSIONS		NUMBER	10			Number of Sessions that a Given User has Running at the Current Moment

INPUT_LOG — Table keeps a record of all traffic and condition data input transactions.

Column Name		Data Type	Size	Accepts Nulls	Range	Description
DATATYPE		VARCHAR2	25	x		Identifies the Type of Data that the User was Trying to Input
USERNAME	FK	VARCHAR2	5	x		Name of the User Who Input the Record
SESSIONID		VARCHAR2	50	x		Unique Identifier of the Session that was Running when the Record was Input
ATTEMPTED		NUMBER	10	x		Number of Records the User Tried to Input
VALID		NUMBER	10	x		Number of Records that were Valid for Input
INVALID		NUMBER	10	x		Number of Records that were Invalid for Input

MIX_TYPE — Table holds data about the various types of mixture combinations used for the aggregate material.

Column Name		Data Type	Size	Accepts Nulls	Range	Description
MIX_ID		NUMBER	10			Unique Identifier of a MIX_TYPE Record
MIX_MIXTYPE	PK	VARCHAR2	10			Name of the Type of Mix
MIX_STATUS		VARCHAR2	10		VALID / INVALID	Status of a Mix (Valid / Invalid)

OVERLAY_DETAIL_YEAR — Associative table linking OVERLAY_YEAR and BASE_SECTION tables.

Column Name		Data Type	Size	Accepts Nulls	Range	Description
OVERLAY_DT_BASE_SECTION	PK	NUMBER	10			Unique Identifier of a Base Section
OVERLAY_DT_ID	PK	NUMBER	10			Unique Identifier of an Overlay

OVERLAY_ERROR — Table holds a log of the errors that occur when the user makes a mistake entering overlay data.

Column Name		Data Type	Size	Accepts Nulls	Range	Description
OVERLAY_ID	FK	NUMBER	10	x		Unique Identifier of an Overlay Record
OVERLAY_COUNTY		VARCHAR2	100	x		Division the Overlay is in
OVERLAY_RATING		FLOAT	10	x	0 - 96	Avg. of the Ratings of the Base Sections Contained in an Overlay (Calculated on Condition Commit)
OVERLAY_DATE_RATED		DATE		x		Avg. of the Rating Dates of the Base Sections Contained in an Overlay.
OVERLAY_ROUTE_TYPE		VARCHAR2	3	x		Identifies the Type of Route that is Referenced by this Record
OVERLAY_ROUTE_NUMBER		VARCHAR2	6	x		Identifies the Number of the Route Referenced by this Record
OVERLAY_DESCRIPTION		VARCHAR2	250	x		Description of the Overlay
OVERLAY_PROJECTION_YEAR1		FLOAT	10	x	0 - 96	Projected Rating One Year Out.
OVERLAY_PROJECTION_YEAR2		FLOAT	10	x	0 - 96	Projected Rating Two Years Out.
OVERLAY_PROJECTION_YEAR3		FLOAT	10	x	0 - 96	Projected Rating Three Years Out.
OVERLAY_FRIC_RATING		FLOAT	10	x	20 - 65	Weighted Average of Friction Rating (Calculated on Friction Commit)
OVERLAY_AADT		NUMBER	10	x		Weighted Average of AADT Rating (Calculated on Traffic Commit)
OVERLAY_DATE_PLACED		DATE		x		Date the Overlay was Placed.
OVERLAY_MAINTENANCE_SECTION		VARCHAR2	20	x		Maintenance ID
OVERLAY_BEGIN_MILEPOST		FLOAT	10	x		Identifies the First Mile Post Along the Stretch of Road that is Represented by this Record
OVERLAY_END_MILEPOST		FLOAT	10	x		Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record
OVERLAY_MIX_TYPE		VARCHAR2	15	x		Identifies the Type of Mix that was Used in an Overlay
OVERLAY_PRODUCER		VARCHAR2	150	x		Identifies the Company that Produced that Made the Asphalt or Concrete that was Used in an Overlay
OVERLAY_PLACER		VARCHAR2	150	x		Identifies the Company that Laid the Overlay
OVERLAY_PROJECT_NUM		VARCHAR2	150	x		Number Assigned to the Project of Laying the Overlay ?
OVERLAY_BEGIN_LAT		FLOAT	40	x		Latitude of the Beginning Milepost of the Overlay
OVERLAY_BEGIN_LNG		FLOAT	40	x		Longitude of the Beginning Milepost of the Overlay
OVERLAY_END_LAT		FLOAT	40	x		Latitude of the Ending Milepost of the Overlay
OVERLAY_END_LNG		FLOAT	40	x		Longitude of the Ending Milepost of the Overlay

OVERLAY_TRANSACTION_LOG — Table holds a log of all the iterations with the OVERLAY_YEAR tables.

Column Name		Data Type	Size	Accepts Nulls	Range	Description
FIELDNAME		VARCHAR2	25	x		Identifies the Field from Overlay Table the that was Altered
RECORD_NUM		NUMBER	6	x		Unique Identifier of a Overlay Record that was Altered
DATE_TIME		DATE		x		Timestamp Identifying the Date and Time that the Transaction Occurred
SESSION_ID		VARCHAR2	50	x		Unique Identifier of the Session that was Running when the Record was Altered
OLD_VALUE		VARCHAR2	250	x		Identifies the Original Data that was Held in the Referenced Field
NEW_VALUE		VARCHAR2	250	x		Identifies the that Replaced the Original Data in the Referenced Field

OVERLAY_YEAR — Table contains all overlay data after it has been entered and validated.

Column Name		Data Type	Size	Accepts Nulls	Range	Description
OVERLAY_ID	PK	NUMBER	10	x		Unique Identifier of an Overlay Record
OVERLAY_COUNTY	FK	VARCHAR2	100	x		County in which the Overlay is in.
OVERLAY_RATING		FLOAT	10	x	0 - 96	Avg. of the Ratings of the Base Sections Contained in an Overlay (Calculated on Condition Commit)
OVERLAY_DATE_RATED		DATE		x		Avg. of the Rating Dates of the Base Sections Contained in an Overlay.
OVERLAY_ROUTE_TYPE	PK	VARCHAR2	3		IN / AL	Identifies the Type of Route that is Referenced by this Record
OVERLAY_ROUTE_NUMBER	PK	VARCHAR2	6			Identifies the Number of the Route Referenced by this Record
OVERLAY_DESCRIPTION		VARCHAR2	250	x		Description of the Overlay
OVERLAY_PROJECTION_YEAR1		FLOAT	10	x	0 - 96	Projected Rating One Year Out.
OVERLAY_PROJECTION_YEAR2		FLOAT	10	x	0 - 96	Projected Rating Two Years Out.
OVERLAY_PROJECTION_YEAR3		FLOAT	10	x	0 - 96	Projected Rating Three Years Out.
OVERLAY_FRIC_RATING		FLOAT	10	x		Weighted Average of Friction Rating (Calculated on Friction Commit)
OVERLAY_AADT		NUMBER	10	x		Weighted Average of AADT Rating (Calculated on Traffic Commit)
OVERLAY_DATE_PLACED		DATE		x		Date the Overlay was Placed.
OVERLAY_MAINTENANCE_SECTION		VARCHAR2	20	x		Maintenance ID
OVERLAY_BEGIN_MILEPOST	PK	NUMBER	10			Identifies the First Mile Post Along the Stretch of Road that is Represented by this Record
OVERLAY_END_MILEPOST	PK	NUMBER	10			Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record
OVERLAY_MIX_TYPE	FK	VARCHAR2	15	x		Identifies the Type of Mix that was Used in an Overlay
OVERLAY_PRODUCER	FK	VARCHAR2	150	x		Identifies the Company that Produced that Made the Asphalt or Concrete that was Used in an Overlay
OVERLAY_PLACER	FK	VARCHAR2	150	x		Identifies the Company that Laid the Overlay
OVERLAY_PROJECT_NUM		VARCHAR2	150	x		Number Assigned to the Project of Laying the Overlay ?
OVERLAY_BEGIN_LAT		FLOAT	40	x		Latitude of the Beginning Milepost of the Overlay
OVERLAY_BEGIN_LNG		FLOAT	40	x		Longitude of the Beginning Milepost of the Overlay
OVERLAY_END_LAT		FLOAT	40	x		Latitude of the Ending Milepost of the Overlay
OVERLAY_END_LNG		FLOAT	40	x		Longitude of the Ending Milepost of the Overlay

PLACERS — Table contains data about the individual organizations that place overlays for ALDOT.

Column Name		Data Type	Size	Accepts Nulls	Range	Description
PLA_ID		NUMBER	10			Unique Identifier of a Company that Places Overlays
PLA_PLACERNAME	PK	VARCHAR2	255			Company Name of the Placer
PLA_STATUS		VARCHAR2	10		VALID / INVALID	Status of a Placer (Valid / Invalid)

PRODUCER — Table contains information related to the different producers of the aggregate types.

Column Name		Data Type	Size	Accepts Nulls	Range	Description
PRO_ID		NUMBER	10			Unique Identifier of a Company that Produces Asphalt or Concrete
PRO_PRODUCERNAME	PK	VARCHAR2	255			Company Name of the Producer
PRO_STATUS		VARCHAR2	10		VALID / INVALID	Status of a Producer (Valid / Invalid)

ROUTES_YEAR — Table holds all route related data. This table identifies all route ranges and what county and division those routes are located in.

Column Name		Data Type	Size	Accepts Nulls	Range	Description
ROUTE_TYPE	PK	CHAR	2			Identifies the Type of Route
ROUTE_NUM	PK	CHAR	5			Identifies the Number of the Route
ROUTE_BEGIN_MILE	PK	FLOAT	126			Beginning Mile Post of the Route Within a Given County
ROUTE_END_MILE	PK	FLOAT	126			Ending Milepost of the Route Within a Given County
ROUTE_COUNTY		NUMBER	3			County that a Route is Running Through
ROUTE_DIVISION		CHAR	2			Division that a Route is Running Through
ROUTE_NHS_FLAG		NUMBER	1			Flag Identifying Non-National Highway
RECORDNUM		NUMBER	10			Unique Identifier of a Route

SOURCES — Table contains data about the source of the material used in a given overlay.

Column Name		Data Type	Size	Accepts Nulls	Range	Description
SOU_PITNUMBER	PK	VARCHAR2	50			ID Number of the Pit that the Material what Taken From
SOU_PITOWNERCODE	PK	VARCHAR2	50			ID Number of the Owner of a Pit
SOU_PCA__		VARCHAR2	50	x		Percentage of Primary Coarse Aggregate
SOU_FCA__		VARCHAR2	50	x		Percentage of Primary Fine Aggregate
SOU_PITNAME_LOC	FK	VARCHAR2	200	x		Name of the Pit
SOU_STATUS		VARCHAR2	10	x	VALID / INVALID	Status of a Source (Valid / Invalid)

TEMP_TRAFFIC_LOAD_YEAR

Column Name		Data Type	Size	Accepts Nulls	Range	Description
TRAF_ID	PK	NUMBER	10	x		Unique Identifier of a Traffic Record
TRAF_COUNTY		VARCHAR2	10	x		Identifies the County Referenced by this Record
TRAF_DIV		NUMBER	10	x		Identifies the Division Referenced by this Record
TRAF_ROUTE_NUM		VARCHAR2	10			Identifies the Number of the Route Referenced by this Record
TRAF_ROUTE_TYPE		VARCHAR2	3	x		Identifies the Type of Route that is Referenced by this Record
TRAF_US		VARCHAR2	10	x		US Route Number Associated with that Route
TRAF_ALT		VARCHAR2	10	x		Identifies Alternate Routes and Type of Route (eg. ALT / BUS)
TRAF_BEGMP		FLOAT	126			Identifies the First Mile Post Along the Stretch of Road that is Represented by this Record
TRAF_ENDMP		FLOAT	126			Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record
TRAF_DISTML		FLOAT	126	x		Distance in Miles Between TRAF_BEGMP and TRAF_ENDMP ?
TRAF_DISTKM		FLOAT	126	x		Distance in Kilometers Between TRAF_BEGMP and TRAF_ENDMP ?
TRAF_AADT		NUMBER	10	x		Weighted Average of AADT Rating (Calculated on Traffic Commit)
TRAF_K		NUMBER	10	x		
TRAF_D		NUMBER	10	x		
TRAF_TDHV		NUMBER	10	x		
TRAF_TADT		NUMBER	10	x		
TRAF_MED		NUMBER	10	x	0 - 100	Percentage Value of Traffic Vehicle Type (Medium vs. Heavy)
TRAF_HVY		NUMBER	10	x	0 - 100	Percentage Value of Traffic Vehicle Type (Medium vs. Heavy)
TRAF_GROWTH		FLOAT	126	x		
TRAF_STGROWTH		FLOAT	126	x		
TRAF_DVMTGROWTH		FLOAT	126	x		
TRAF_FLAG	PK	VARCHAR2	10	x		Flag Identifying Rating as Valid / Invalid / New

TEMPCONDITIONLOADYEAR	Table contains all condition data after it has been entered and validated.					
	Column Name		**Data Type**	**Size**	**Accepts Nulls**	**Range**	**Description**

Column Name		Data Type	Size	Accepts Nulls	Range	Description
COND_ID	PK	NUMBER	10			Unique Identifier for a Conditional Rating
COND_DIV		NUMBER	10	x		Division the Rating was Taking Within
COND_ROUTE_TYPE	PK	VARCHAR2	10			Identifies the Type of Route
COND_ROUTE	PK	NUMBER	10			Identifies the Number of the Route
COND_DIRECTION	PK	VARCHAR2	10			P=Primary (N, E) S=Secondary (S, W)
COND_LANE	PK	VARCHAR2	10			Identifies the Lane Used to Take the Conditional Rating
COND_MILEPOST	PK	FLOAT	126			Identifies the Mile from which the Rating was Taken
COND_DATE_RATED	PK	DATE	7			Date the Rating was done
COND_IRI1		NUMBER		x		International Roughness Index for outside wheel path. The IRI is a standardized Number involving road quality vs. user cost.
COND_IRI2		NUMBER		x		International Roughness Index for inside wheel path.
COND_TEX_RMS		NUMBER		x		Average root mean square of VARCHAR2ure
COND_TEX_MPD		NUMBER		x		Average mean profile depth
COND_RRUT		NUMBER		x		Average outside wheel path rutting for this section
COND_LRUT		NUMBER		x		Average inside wheel path rutting for this section
COND_GRADE		NUMBER		x		Average Grade
COND_LATDEG		NUMBER		x		Latitude Decimal Degrees
COND_LATMIN		NUMBER		x		Latitude Decimal Minutes
COND_LATSEC		NUMBER		x		Latitude Decimal Seconds
COND_LONGDEG		NUMBER		x		Longitude Decimal Degrees
COND_LONGMIN		NUMBER		x		Longitude Decimal Minutes
COND_LONGSEC		NUMBER		x		Longitude Decimal Seconds
COND_RATER		VARCHAR2	50	x		Number identifying the one assigning the codition rating to the particular overlay.
COND_ARAN		VARCHAR2	10	x		ARAN (Automatic Road Analyzer) collection Number. This may be the vehicle Number.
COND_PATCHING_G		NUMBER		x		Patching is replacement/repair of pavement with new material. Good Patching
COND_PATCHING_F		NUMBER		x		Fair Patching.
COND_PATCHING_P		NUMBER		x		Marginal Patching
COND_SHLDR_COND		VARCHAR2	50	x		Shoulder condition (G=Good, F=Fair, P=Poor)…change poor to marginal.
COND_SHLDR_TYPE		VARCHAR2	50	x		(ASP=Asphalt, CON=Concrete, C&G=Curb and Gutter, D&G=dirt/gravel, GRA=Grass).
COND_RAVEL_L		VARCHAR2	10	x		Localized Raveling (1=Low severity, 2=medium severity, 3=high severity)
COND_RAVEL_W		VARCHAR2	10	x		Wheel Path Raveling
COND_RAVEL_E		VARCHAR2	10	x		Entire Lane Raveling
COND_BLEED_L		VARCHAR2	10	x		Localized Bleeding…Basically Boolean
COND_BLEED_W		VARCHAR2	10	x		Wheel Path Bleeding…Basically Boolean
COND_BLEED_E		VARCHAR2	10	x		Entire Lane Bleeding
COND_ALLIGAT1		NUMBER		x		Alligator Cracking Level 1 (slight)
COND_ALLIGAT2		NUMBER		x		Alligator Cracking Level 2 (moderate)
COND_ALLIGAT3		NUMBER		x		Alligator Cracking Level 3 (severe)
COND_BLOCK1		NUMBER		x		Block Cracking Level 1 (slight)
COND_BLOCK2		NUMBER		x		Block Cracking Level 2 (moderate)
COND_BLOCK3		NUMBER		x		Block Cracking Level 3 (severe)
COND_LONGIT1		NUMBER		x		Longitudinal cracking severity 1
COND_LONGIT2		NUMBER		x		Longitudinal cracking severity 2
COND_LONGIT3		NUMBER		x		Longitudinal cracking severity 3
COND_TRANS1		NUMBER		x		Transverse Cracking Level 1
COND_TRANS2		NUMBER		x		Transverse Cracking Level 2
COND_TRANS3		NUMBER		x		Transverse Cracking Level 3
COND_CRKSEAL		NUMBER		x		Crack Sealant condition (0=None, 1=Good, 2=Marginal)
COND_POTHOLE		NUMBER		x		Count of potholes in this section
COND_PUMP		NUMBER		x		Presence of pumping
COND_LJSPAL_L		NUMBER		x		Count of Longitudinal Joints that have a Low Level of Spalling
COND_LJSPAL_M		NUMBER		x		Count of Moderately Spalled Longitudinal Joints
COND_LJSPAL_S		NUMBER		x		Count of Severely Spalled Longitudinal Joints
COND_TJOINT		NUMBER		x		Count of Unspalled Transverse Joints
COND_TJSPAL_L		NUMBER		x		Count of Transverse Joints that have a Low Level of Spalling
COND_TJSPAL_M		NUMBER		x		Count of Moderately Spalled Transverse Joints
COND_TJSPAL_S		NUMBER		x		Count of Severely Spalled Transverse Joints
COND_POPOUTS		NUMBER		x		Count of all Popouts
COND_LANE_SEP		NUMBER		x		Lane Separation (1 = Present)
COND_JOINT_SEAL		NUMBER		x		Joint Sealant Condition (1 = good, 2 = fair, 3 = poor)
COND_CORNER_BRK		NUMBER		x		Count of all Corner Breaks in this Section
COND_LANE_WIDTH		NUMBER		x		1=Outside/right; 2=Inside/left
COND_PVMT_TYPE		VARCHAR2	50	x		Type of pavement, F = Asphalt, R = Concrete
COND_BRIDGE		VARCHAR2	10	x		1=Present
COND_CONST		VARCHAR2	10	x		Construction and Lane deviations. 1=Present
COND_XFALL		NUMBER		x		Cross-fall. How much drop in elevation from centerline to edge of the road
COND_ELEVATION		NUMBER		x		Avg. Elevation
COND_PFAULT_CNT		NUMBER		x		Number of Positive Faults
COND_PFAULT_AVG		NUMBER		x		Average Depth of Positive Faults
COND_NFAULT_CNT		NUMBER		x		Number of Negative Faults
COND_NFAULT_AVG		NUMBER		x		Average depth of Negative Faults
COND_SAMPLE_SIZE		NUMBER	9	x		Length of Road that was Sampled
COND_FLAG	PK	VARCHAR2	10			Flag Identifying a Condition Rating as New / Valid / Invalid
COND_RATING		FLOAT	10	x	0 - 96	Calculated Rating of Condition Point
COND_PSI		FLOAT	10	x		
COND_BASE_SECTION_ID		NUMBER	8	x		References an Associated Base Section

TEMPCONDITIONYEAR — Table contains all condition data after it has been entered and before it was validated.

Column Name		Data Type	Size	Accepts Nulls	Range	Description
COND_ID	PK	NUMBER	10	x		Unique Identifier for a Conditional Rating
COND_DIV		NUMBER	10			Division the Rating was Taking Within
COND_ROUTE_TYPE	PK	VARCHAR2	10	x		Identifies the Type of Route
COND_ROUTE	PK	NUMBER	10			Identifies the Number of the Route
COND_DIRECTION	PK	VARCHAR2	10			P=Primary (N, E) S=Secondary (S, W)
COND_LANE	PK	VARCHAR2	10			Identifies the Lane Used to Take the Conditional Rating
COND_MILEPOST	PK	FLOAT	126			Identifies the Mile from which the Rating was Taken
COND_DATE_RATED	PK	DATE	7			Date the Rating was done
COND_IRI1		NUMBER				International Roughness Index for outside wheel path. The IRI is a standardized Number involving road quality vs. user cost.
COND_IRI2		NUMBER		x		International Roughness Index for inside wheel path.
COND_TEX_RMS		NUMBER		x		Average root mean square of VARCHAR2ure
COND_TEX_MPD		NUMBER		x		Average mean profile depth
COND_RRUT		NUMBER		x		Average outside wheel path rutting for this section
COND_LRUT		NUMBER		x		Average inside wheel path rutting for this section
COND_GRADE		NUMBER		x		Average Grade
COND_LATDEG		NUMBER		x		Latitude Decimal Degrees
COND_LATMIN		NUMBER		x		Latitude Decimal Minutes
COND_LATSEC		NUMBER		x		Latitude Decimal Seconds
COND_LONGDEG		NUMBER		x		Longitude Decimal Degrees
COND_LONGMIN		NUMBER		x		Longitude Decimal Minutes
COND_LONGSEC		NUMBER		x		Longitude Decimal Seconds
COND_RATER		VARCHAR2	50	x		Number identifying the one assigning the codition rating to the particular overlay.
COND_ARAN		VARCHAR2	10	x		ARAN (Automatic Road Analyzer) collection Number. This may be the vehicle Number.
COND_PATCHING_G		NUMBER		x		Patching is replacement/repair of pavement with new material. Good Patching
COND_PATCHING_F		NUMBER		x		Fair Patching.
COND_PATCHING_P		NUMBER		x		Marginal Patching
COND_SHLDR_COND		VARCHAR2	50	x		Shoulder condition (G=Good, F=Fair, P=Poor)…change poor to marginal.
COND_SHLDR_TYPE		VARCHAR2	50	x		(ASP=Asphalt, CON=Concrete, C&G=Curb and Gutter, D&G=dirt/gravel, GRA=Grass).
COND_RAVEL_L		VARCHAR2	10	x		Localized Raveling (1=Low severity, 2=medium severity, 3=high severity)
COND_RAVEL_W		VARCHAR2	10	x		Wheel Path Raveling
COND_RAVEL_E		VARCHAR2	10	x		Entire Lane Raveling
COND_BLEED_L		VARCHAR2	10	x		Localized Bleeding…Basically Boolean
COND_BLEED_W		VARCHAR2	10	x		Wheel Path Bleeding…Basically Boolean
COND_BLEED_E		VARCHAR2	10	x		Entire Lane Bleeding
COND_ALLIGAT1		NUMBER		x		Alligator Cracking Level 1 (slight)
COND_ALLIGAT2		NUMBER		x		Alligator Cracking Level 2 (moderate)
COND_ALLIGAT3		NUMBER		x		Alligator Cracking Level 3 (severe)
COND_BLOCK1		NUMBER		x		Block Cracking Level 1 (slight)
COND_BLOCK2		NUMBER		x		Block Cracking Level 2 (moderate)
COND_BLOCK3		NUMBER		x		Block Cracking Level 3 (severe)
COND_LONGIT1		NUMBER		x		Longitudinal cracking severity 1
COND_LONGIT2		NUMBER		x		Longitudinal cracking severity 2
COND_LONGIT3		NUMBER		x		Longitudinal cracking severity 3
COND_TRANS1		NUMBER		x		Transverse Cracking Level 1
COND_TRANS2		NUMBER		x		Transverse Cracking Level 2
COND_TRANS3		NUMBER		x		Transverse Cracking Level 3
COND_CRKSEAL		NUMBER		x		Crack Sealant condition (0=None, 1=Good, 2=Marginal)
COND_POTHOLE		NUMBER		x		Count of potholes in this section
COND_PUMP		NUMBER		x		Presence of pumping
COND_LJSPAL_L		NUMBER		x		Count of Longitudinal Joints that have a Low Level of Spalling
COND_LJSPAL_M		NUMBER		x		Count of Moderately Spalled Longitudinal Joints
COND_LJSPAL_S		NUMBER		x		Count of Severely Spalled Longitudinal Joints
COND_TJOINT		NUMBER		x		Count of Unspalled Transverse Joints
COND_TJSPAL_L		NUMBER		x		Count of Transverse Joints that have a Low Level of Spalling
COND_TJSPAL_M		NUMBER		x		Count of Moderately Spalled Transverse Joints
COND_TJSPAL_S		NUMBER		x		Count of Severely Spalled Transverse Joints
COND_POPOUTS		NUMBER		x		Count of all Popouts
COND_LANE_SEP		NUMBER		x		Lane Separation (1 = Present)
COND_JOINT_SEAL		NUMBER		x		Joint Sealant Condition (1 = good, 2 = fair, 3 = poor)
COND_CORNER_BRK		NUMBER		x		Count of all Corner Breaks in this Section
COND_LANE_WIDTH		NUMBER		x		1=Outside/right; 2=Inside/left
COND_PVMT_TYPE		VARCHAR2	50	x		Type of pavement, F = Asphalt, R = Concrete
COND_BRIDGE		VARCHAR2	10	x		1=Present
COND_CONST		VARCHAR2	10	x		Construction and Lane deviations. 1=Present
COND_XFALL		NUMBER		x		Cross-fall. How much drop in elevation from centerline to edge of the road
COND_ELEVATION		NUMBER		x		Avg. Elevation
COND_PFAULT_CNT		NUMBER		x		Number of Positive Faults
COND_PFAULT_AVG		NUMBER		x		Average Depth of Positive Faults
COND_NFAULT_CNT		NUMBER		x		Number of Negative Faults
COND_NFAULT_AVG		NUMBER		x		Average depth of Negative Faults
COND_SAMPLE_SIZE		NUMBER	9	x		Length of Road that was Sampled
COND_FLAG	PK	VARCHAR2	10	x		Flag Identifying a Condition Rating as New / Valid / Invalid
COND_RATING		FLOAT	10	x	0 - 96	Calculated Rating of Condition Point
COND_PSI		FLOAT	10	x		
COND_BASE_SECTION_ID		NUMBER	8	x		References an Associated Base Section

TEMPFRICTIONLOADYEAR — Table contains all friction data after it has been entered and validated.

Column Name		Data Type	Size	Accepts Nulls	Range	Description
FRIC_ID	FK	NUMBER	10			Unique Primary Key for a Friction Rating
FRIC_DIV		NUMBER	10	x		Division Where the Friction Rating was Taken
FRIC_ROUTE_TYPE		VARCHAR2	3	x		Identifies the Type of Route
FRIC_ROUTE_NUM		VARCHAR2	6	x		Identifies the Number of the Route
FRIC_MILE_POST		FLOAT	10	x		Mile Along the Highway Where the Friction Rating was Taken
FRIC_DIR		VARCHAR2	3	x		P=Primary (N, E) S=Secondary (S, W)
FRIC_DATE		DATE	7	x		Date the Rating was Taken
FRIC_RESULT		NUMBER	5	x		Friction Number.
FRIC_MODIFIER		VARCHAR2	25	x		Any Condition that May Affect the Result. There is a List of Modifiers.
FRIC_AIR_TEMP		FLOAT	10	x		Air Temperature When the Rating was Taken
FRIC_ROLE		VARCHAR2	20	x		Role of the User Who Entered the Rating
FRIC_USER		VARCHAR2	25	x		User Who Entered the Rating
FRIC_FLAG		VARCHAR2	25	x		Flag Identifying a Friction Rating as New / Valid / Invalid

TEMPFRICTIONYEAR — Table contains all friction data after it has been entered and before it was validated.

Column Name		Data Type	Size	Accepts Nulls	Range	Description
FRIC_ID	FK	NUMBER	10			Unique Primary Key for a Friction Rating
FRIC_DIV		NUMBER	10	x		Division Where the Friction Rating was Taken
FRIC_ROUTE_TYPE		VARCHAR2	3	x		Identifies the Type of Route
FRIC_ROUTE_NUM		VARCHAR2	6	x		Identifies the Number of the Route
FRIC_MILE_POST		FLOAT	10	x		Mile Along the Highway Where the Friction Rating was Taken
FRIC_DIR		VARCHAR2	3	x		P=Primary (N, E) S=Secondary (S, W)
FRIC_DATE		DATE	7	x		Date the Rating was Taken
FRIC_RESULT		NUMBER	5	x		Friction Number.
FRIC_MODIFIER		VARCHAR2	25	x		Any Condition that May Affect the Result. There is a List of Modifiers.
FRIC_AIR_TEMP		FLOAT	10	x		Air Temperature When the Rating was Taken
FRIC_ROLE		VARCHAR2	20	x		Role of the User Who Entered the Rating
FRIC_USER		VARCHAR2	25	x		User Who Entered the Rating
FRIC_FLAG		VARCHAR2	25	x		Flag Identifying a Friction Rating as New / Valid / Invalid

TEMPOVERLAYLOADYEAR
Table holds overlay data after the user has validated it and is ready to commit it to the appropriate OVERLAY_YEAR table.

Column Name		Data Type	Size	Accepts Nulls	Range	Description
OVERLAY_AUTO_NUM	PK	NUMBER	10			Unique Identifier of an Overlay
OVERLAY_ROUTE_TYPE		CHAR	2			Identifies the Type of Route that is Referenced by this Record
OVERLAY_ROUTE_NUM		VARCHAR2	5			Identifies the Number of the Route Referenced by this Record
OVERLAY_DESCRIPTION		VARCHAR2	250	x		Description of the Overlay
OVERLAY_COUNTY		VARCHAR2	100	x		County the Overlay is in
OVERLAY_DIVISION		NUMBER	2			Division the Overlay is in
OVERLAY_MAINTENANCE		VARCHAR2	13	x		Maintenance ID
OVERLAY_BEGIN_MILEPOST		NUMBER	10			Identifies the First Mile Post Along the Stretch of Road that is Represented by this Record
OVERLAY_END_MILEPOST		NUMBER	10			Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record
OVERLAY_BEGIN_KILOMETER		VARCHAR2	8	x		Identifies the First Kilometer Along the Stretch of Road that is Represented by this Record
OVERLAY_END_KILOMETER		VARCHAR2	8	x		Identifies the Last Kilometer Along the Stretch of Road that is Represented by this Record
OVERLAY_BEGIN_GPS		VARCHAR2	30	x		GPS Location of the Beginning Location of the Overlay
OVERLAY_END_GPS		VARCHAR2	30	x		GPS Location of the Ending Location of the Overlay
OVERLAY_MIX_TYPE		VARCHAR2	15	x		Identifies the Type of Mix that was Used in an Overlay
OVERLAY_PRODUCER		VARCHAR2	150	x		Identifies the Company that Produced that Made the Asphalt or Concrete that was Used in an Overlay
OVERLAY_PLACER		VARCHAR2	150	x		Identifies the Company that Laid the Overlay
OVERLAY_DATE_PLACED		DATE		x		Date the Overlay was Placed.
OVERLAY_PROJECT_NUM		VARCHAR2	150	x		Number Assigned to the Project of Laying the Overlay ?
OVERLAY_NVI		VARCHAR2	7	x		
OVERLAY_ROLE		VARCHAR2	40	x		Role that the User Plays in the System
OVERLAY_USER		VARCHAR2	50	x		Unique Identifier of a User

TEMPOVERLAYYEAR
Table holds overlay data until the user has validated it.

Column Name		Data Type	Size	Accepts Nulls	Range	Description
OVERLAY_AUTO_NUM	FK	NUMBER	10			Identifies the Type of Route that is Referenced by this Record
OVERLAY_ROUTE_TYPE	PK	CHAR	2			Identifies the Number of the Route Referenced by this Record
OVERLAY_ROUTE_NUM	PK	VARCHAR2	5			Description of the Overlay
OVERLAY_DESCRIPTION		VARCHAR2	250	x		County the Overlay is in
OVERLAY_COUNTY		VARCHAR2	100	x		Division the Overlay is in
OVERLAY_DIVISION		NUMBER	2	x		Maintenance ID
OVERLAY_MAINTENANCE		VARCHAR2	13	x		Identifies the First Mile Post Along the Stretch of Road that is Represented by this Record
OVERLAY_BEGIN_MILEPOST	PK	NUMBER	10			Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record
OVERLAY_END_MILEPOST	PK	NUMBER	10			Identifies the First Kilometer Along the Stretch of Road that is Represented by this Record
OVERLAY_BEGIN_KILOMETER		VARCHAR2	8	x		Identifies the Last Kilometer Along the Stretch of Road that is Represented by this Record
OVERLAY_END_KILOMETER		VARCHAR2	8	x		GPS Location of the Beginning Location of the Overlay
OVERLAY_BEGIN_GPS		VARCHAR2	30	x		GPS Location of the Ending Location of the Overlay
OVERLAY_END_GPS		VARCHAR2	30	x		Identifies the Type of Mix that was Used in an Overlay
OVERLAY_MIX_TYPE		VARCHAR2	15	x		Identifies the Company that Produced that Made the Asphalt or Concrete that was Used in an Overlay
OVERLAY_PRODUCER		VARCHAR2	150	x		Identifies the Company that Laid the Overlay
OVERLAY_PLACER		VARCHAR2	150	x		Date the Overlay was Placed.
OVERLAY_DATE_PLACED		DATE		x		Number Assigned to the Project of Laying the Overlay ?
OVERLAY_PROJECT_NUM		VARCHAR2	150	x		Unique Identifier of a Project that is Associated with an Overlay
OVERLAY_NVI		VARCHAR2	7	x		
OVERLAY_ROLE		VARCHAR2	40	x		Role that the User Plays in the System
OVERLAY_USER		VARCHAR2	50	x		Unique Identifier of a User

TEMPTRAFFICYEAR
Table holds traffic data until the user has validated it and is ready to commit it to the appropriate OVERLAY_YEAR table.

Column Name		Data Type	Size	Accepts Nulls	Range	Description
TRAF_ID	PK	NUMBER	10	x		Unique Identifier of a Traffic Record
TRAF_COUNTY		VARCHAR2	10	x		Identifies the County Referenced by this Record
TRAF_DIV		NUMBER	10	x		Identifies the Division Referenced by this Record
TRAF_ROUTE_NUM	PK	VARCHAR2	10			Identifies the Number of the Route Referenced by this Record
TRAF_ROUTE_TYPE		VARCHAR2	3	x		Identifies the Type of Route that is Referenced by this Record
TRAF_US		VARCHAR2	10	x		US Route Number Associated with that Route
TRAF_ALT		VARCHAR2	10	x		Identifies Alternate Routes and Type of Route (eg. ALT / BUS)
TRAF_BEGMP	PK	FLOAT	126			Identifies the First Mile Post Along the Stretch of Road that is Represented by this Record
TRAF_ENDMP	PK	FLOAT	126			Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record
TRAF_DISTML		FLOAT	126	x		Distance in Miles Between TRAF_BEGMP and TRAF_ENDMP ?
TRAF_DISTKM		FLOAT	126	x		Distance in Kilometers Between TRAF_BEGMP and TRAF_ENDMP ?
TRAF_AADT		NUMBER	10	x		Weighted Average of AADT Rating (Calculated on Traffic Commit)
TRAF_K		NUMBER	10	x		
TRAF_D		NUMBER	10	x		
TRAF_TDHV		NUMBER	10	x		
TRAF_TADT		NUMBER	10	x		
TRAF_MED		NUMBER	10	x	0 - 100	Percentage Value of Traffic Vehicle Type (Medium vs. Heavy)
TRAF_HVY		NUMBER	10	x	0 - 100	Percentage Value of Traffic Vehicle Type (Medium vs. Heavy)
TRAF_GROWTH		FLOAT	126	x		
TRAF_STGROWTH		FLOAT	126	x		
TRAF_DVMTGROWTH		FLOAT	126	x		
TRAF_FLAG		VARCHAR2	10	x		Flag Identifying Rating as Valid / Invalid / New

TRAFFIC_TRANSACTION_LOG
Table holds a log of all changes made to the traffic tables.

Column Name		Data Type	Size	Accepts Nulls	Range	Description
FIELDNAME		VARCHAR2	25	x		Identifies the Field from the Traffic Table that was Altered
RECORD_NUM		NUMBER	6	x		Unique Identifier of a Traffic Record that was Altered
DATE_TIME		DATE		x		Timestamp Identifying the Date and Time that the Transaction Occurred
SESSION_ID		VARCHAR2	50	x		Unique Identifier of the Session that was Running when the Record was Altered
OLD_VALUE		VARCHAR2	25	x		Identifies the Original Data that was Held in the Referenced Field
NEW_VALUE		VARCHAR2	25	x		Identifies the that Replaced the Original Data in the Referenced Field

TRAFFIC_YEAR
Table contains all data related to the traffic ratings of a given overlay.

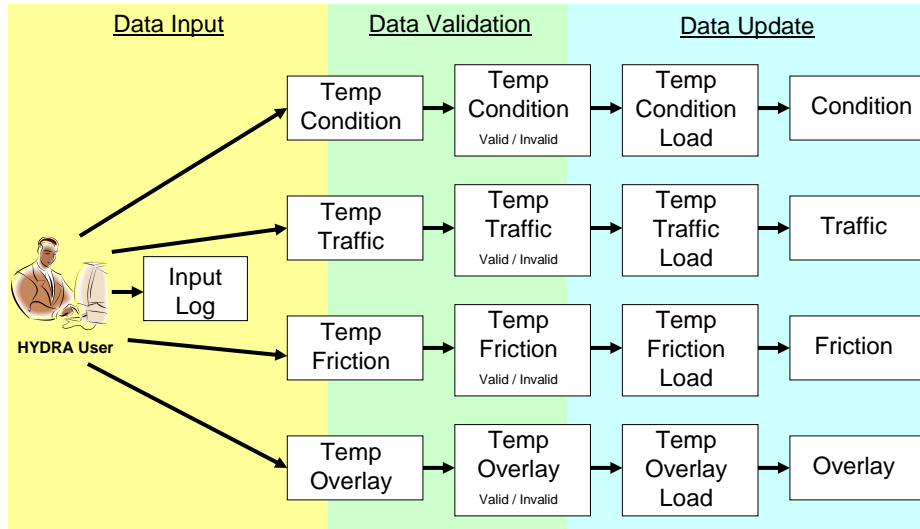| Column Name		Data Type	Size	Accepts Nulls	Range	Description
TRAF_ID	PK	NUMBER	10	x		Unique Identifier of a Traffic Record
TRAF_COUNTY		VARCHAR2	10	x		Identifies the County Referenced by this Record
TRAF_ROUTE_NUM	PK	VARCHAR2	10			Identifies the Number of the Route Referenced by this Record
TRAF_ROUTE_TYPE		VARCHAR2	3	x		Identifies the Type of Route that is Referenced by this Record
TRAF_US		VARCHAR2	10	x		US Route Number Associated with that Route
TRAF_ALT		VARCHAR2	10	x		Identifies Alternate Routes and Type of Route (eg. ALT / BUS)
TRAF_BEGMP	PK	FLOAT	126			Identifies the First Mile Post Along the Stretch of Road that is Represented by this Record
TRAF_ENDMP	PK	FLOAT	126			Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record
TRAF_DISTML		FLOAT	126	x		Distance in Miles Between TRAF_BEGMP and TRAF_ENDMP ?
TRAF_DISTKM		FLOAT	126	x		Distance in Kilometers Between TRAF_BEGMP and TRAF_ENDMP ?
TRAF_AADT		NUMBER	10	x		Weighted Average of AADT Rating (Calculated on Traffic Commit)
TRAF_K		NUMBER	10	x		
TRAF_D		NUMBER	10	x		
TRAF_TDHV		NUMBER	10	x		
TRAF_TADT		NUMBER	10	x		
TRAF_MED		NUMBER	10	x	0 - 100	Percentage Value of Traffic Vehicle Type (Medium vs. Heavy)
TRAF_HVY		NUMBER	10	x	0 - 100	Percentage Value of Traffic Vehicle Type (Medium vs. Heavy)
TRAF_GROWTH		FLOAT	126	x		
TRAF_STGROWTH		FLOAT	126	x		
TRAF_DVMTGROWTH		FLOAT	126	x		

HYDRA Data Flow

Figure A.106: HYDRA+ data flow

HYDRA Data Flow
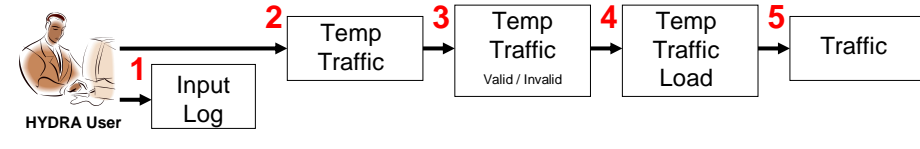
1. The HYDRA User inputs data into the system using the application. A record of the input session and data type are recorded in the Input Log.

2. The data goes into the Temp___ table of its data type and the flag in each record is set to "New".

3. The data in the Temp___ table is then validated. The flag in each record is set to either "Valid" or "Invalid".

4. All Valid records in the Temp table are put into the Temp___Load table of its data type.

5. The records in the Temp___Load table are moved into the final table of its data type. The Temp___Load table is then deleted.

Figure A.107: HYDRA+ data flow

Section 4: Forms, Packages, Procedures and Triggers

Client-side Forms

This section contains a list of client-side (Visual Basic) forms in the HYDRA+ application. All form sub-procedures that make calls to server-side (Oracle) procedures within packages are listed along with the mapping to the client server procedure. The first number denotes the server package and the second denotes the procedure within that package. Note the sub-procedures for each form can call different procedures depending on the data type, e.g. Condition, Friction, Overlay, and/or Traffic.

frmAbout (No external call)

frmAddUser (No external call)

frmAdminWizard
VB-client: cmdDataInInputDate_Click()
      Server Package.Procedure 7.1
VB-client: cmdDatValValidate_Click()
      Server Package.Procedure 2.1, 1.4
VB-client: Validate(...)
      Server Package.Procedure 2.1, 7.1, 13.1, 20.1, 1.4, 19.4, 4.4
      Error Message: ***NO OVERLAY_PKG.VALIDATE_OVERLAY_DATA3***
VB-client: UpdateDataString(...)
      Server Package.Procedure 2.1, 7.1, 13.1, 20.1, 9.1, 11.1, 3.1, 21.1, 22.1, 2.1, 7.1,
                    13.1, 20.1, 2.9, 7.10, 13.12, 20.10

frmAutomatedInput
VB-client: SendTrafficToDB(...)
      Server Package.Procedure 20.1, 19.1, 19.2
VB-client: SendConditionToDB(...)
      Server Package.Procedure 2.1, 1.1, 1.2

frmCommitProcessing (No external call)

frmDeleteUser (No external call)

frmErrorLog
VB-client: cmdSave_Click(...)
      Server Package.Procedure 19.3, 1.3, 4.3
      Error Message: ***NO OVERLAY_PKG.OVERLAY_RESUBMIT***

frmFrictionInput (No external call)

frmGenGASB (No external call)

frmGenGIS (No external call)

frmInterfaceSelection (No external call)

frmMain (No external call)

frmOverlayCheck (No external call)

frmOverlayInput
VB-client: InsertOverlay(...)
      Server Package.Procedure 12.11, 12.1
VB-client: UpdateOverlay(...)
      Error Message: ***NO OVERLAY_PKG.OVERLAY_UPDATE***
VB-client: Form_Load()
      Server Package.Procedure 13.1

frmPPR (No external call)

frmProcSplash (No external call)

frmREPORT
VB-client: cmdPPRsubmit_Click()
      Server Package.Procedure 16.6, 14.3, 14.2, 14.4, 16.1
VB-client: GetDataPPR()
      Server Package.Procedure 15.1, 15.2, 15.3, 14.1
VB-client: cmdFRICsubmit_Click()
      Server Package.Procedure 7.1
VB-client: cmdGASBsubmit_Click()
      Server Package.Procedure 16.1

frmReportProcessing (No external call)

frmSplash (No external call)

frmTableUpdating (No external call)

frmUpdateTables
VB-client: CommitStaticTable()
      Server Package.Procedure 13.11

Server-side Packages and Procedures

This section lists every server-side (Oracle) package and its corresponding procedures. The purpose for each package is stated and the function of each procedure is described. The procedures are indexed by package.

1.0   CONDITION_PKG
- **Purpose:** *Insert condition records into tables and error logs, validation procedure handles validation checks*
- **Procedures:**
    1.1 CONDITION_INSERT
    - *Takes input data and inserts it into TEMPCONDITION_CURRENT*
    1.2 INPUT_LOG_INSERT
    - *Inserts session info into INPUT_LOG*
    1.3 CONDITION_RESUBMIT
    - *This procedure overwrites an incorrect condition with the corrected condition record and deletes its record from the error log*
    1.4 COND_VALIDATE
    - *Validates input data and flags it if it is invalid*
    1.5 COND_REVALIDATE
    - *Validates new input data if there were previous errors and flags it if it is invalid*
    1.6 WRITE_ERROR
    - *Records error with error information in the ERROR_LOG*

2.0   CONDITION_SETUP_PKG
- **Purpose:** *Creates necessary tables, sequences and triggers for automatic import of Condition data*
- **Procedures:**
    2.1 CHECK_CONDITION_TABLES
    - *Checks if tables exist or not and flags them if they do exist*
    2.2 CREATE_TABLE
    - *Creates Condition table and it's fields*
    2.3 CREATE_SEQUENCE
    - *Creates the sequence used for the COND_ID in the condition table*
    2.4 CREATE_TRANSACTION_LOG
    - *Creates the table CONDITION_TRANSACTION_LOG and it's fields*
    2.5 CREATE_ERROR_LOG
    - *Creates the table ERROR_LOG and it's fields*
    2.6 CREATE_INPUT_LOG

- *Creates the table INPUT_LOG and it's fields*

2.7 CREATE_CONDITION_DETAIL_TABLE
- *Creates the table CONDITION_DETAIL_LOG and it's fields*

2.8 CREATE_CONDITION_INDEX
- *Creates or replaces unique primary keys on the CONDITION_YEAR table*

2.9 DROP_TABLES_AFTER_COMMIT
- *Drops the table TEMPCONDITIONLOAD_YEAR after the commit*

2.10 SET_SYNONYMS
- *Creates or replaces specified synonyms for specified tables*

3.0 <u>**COND_COMMIT_CALC_RATINGS_PKG**</u>
- <u>**Purpose:**</u> **Calculates and commits condition rating to DB.**
- <u>**Procedures:**</u>

3.1 CALL_GENERATE_PROCEDURES
- *Calls the other condition commit procedures in the proper order*

3.2 CALCULATE_CONDITION_RATING
- *This procedure calculates the "COND_RATING" field in the TEMPCONDITIONLOAD table according to the year of the table*

3.3 CALCULATE_COND_RATING_PRE_1996
- *This procedure calculates the "COND_RATING" field in the TEMPCONDITIONLOAD table for years before 1996*

3.4 CALCULATE_COND_RATING_96_99
- *This procedure calculates the "COND_RATING" field in the TEMPCONDITIONLOAD table for years between 1996 and 1999*

3.5 CALCULATE_COND_RATING_2002
- *This procedure calculates the "COND_RATING" field in the TEMPCONDITIONLOAD table for the year 2002*

3.6 CONDITION_INIT
- *This procedure calls CONDITION_ROUTE_INIT and passes each route individually*

3.7 CONDITION_ROUTE_INIT
- *This procedure inserts detail condition records for each route and calls CONDITION_FULL_INSERT when needed to insert the condition record*

3.8 CONDITION_FULL_INSERT
- *This procedure is responsible for inserting data into CONDITION_CURRENT and returning the CONDITION_ID that was generated*

3.9 GEN_ALL_OVERLAY_RATINGS
- *This procedure selects individual overlays and passes them to GEN_OVERLAY_RATING*

3.10 GEN_OVERLAY_RATING
- *This procedure uses all the condition records within an overlay's milepost to calculate it a weighted condition rating*

3.11 PROMOTE_OVERLAY_RATINGS

- *This procedure assigns ratings and DATE_RATED to overlays that were not rated in the condition table being committed. If an overlay's begin and end milepost have not changed then it pulls up the rating from the previous year's overlay table. If the mileposts have change then it calculates a rating with the previous condition table.*

3.12 PROMOTE
- *This gets ratings and date rated from the previous year's overlay table for an overlay*

3.13 GEN_DYN_RATING
- *This calculates a weighted condition average for an overlay*

3.14 SET_PROJECTION_YEAR
- *This procedure sets the synonym "CONDITION_PRJ" to reference the condition table for the year P_YEAR*

3.15 SET_OVERLAY_YEAR
- *This procedure sets the synonym "OVERLAY_PRJ" to reference the overlay table for the year P_YEAR*

4.0   FRICTION_PKG
- **Purpose:**   *Insert friction records into tables and error logs, validation procedure handles validation checks*
- **Procedures:**

  4.1 FRICTION_INSERT
  - *Takes input data and inserts it into TEMPFRICTION_CURRENT*

  4.2 INPUT_LOG_INSERT
  - *Inserts session info into INPUT_LOG*

  4.3 FRICTION_RESUBMIT
  - *This procedure overwrites an incorrect friction record with the corrected friction record and deletes its record from the error log*

  4.4 VALIDATE_FRICTION_DATA3
  - *Validates input data and flags it if it is invalid*

  4.5 WRITE_ERROR
  - *Records error with error information in the ERROR_LOG*

5.0   FRICTION_RPT
- **Purpose:**   *Pulls in data for the PPR.*
- **Procedures:**

  5.1 Get_Fric_Record_Set
  - *This procedure pulls PPR data for queries with a 1 or 2 search option*

6.0   FRICTION_RPT_PTS
- **Purpose:**   *Pulls in data for the PPR.*
- **Procedures:**

  6.1 Get_Fric_Record_Set_Pts

- This procedure pulls PPR data for queries with a 1 or 2 search option

7.0 FRICTION_SETUP_PKG
- **Purpose:** *Checks and sets up all tables for friction input*
- **Procedures:**
  - **7.1** CHECK_FRICTION_TABLES
    - *Checks if tables exist or not and flags them if they do exist*
  - **7.2** CREATE_TABLE
    - *Creates Friction table and it's fields*
  - **7.3** CREATE_FINAL_TABLE
    - *Creates Friction table and it's fields without flag, user, role and air_temp*
  - **7.4** CREATE_SEQUENCE
    - *Creates the sequence used for the COND_ID in the condition table*
  - **7.5** CREATE_TRIGGER
    - *This procedure creates the trigger for execution based on the trigger*
  - **7.6** CREATE_TRANSACTION_LOG
    - *Creates the table FRICTION_TRANSACTION_LOG and it's fields*
  - **7.7** CREATE_ERROR_LOG
    - *Creates the table ERROR_LOG and it's fields*
  - **7.8** CREATE_INPUT_LOG
    - *Creates the table INPUT_LOG and it's fields*
  - **7.9** CREATE_BASE_FRIC_DETAIL_TABLE
    - *Creates the table BASE_FRIC_DETAIL and it's fields*
  - **7.10** DROP_TABLES_AFTER_COMMIT
    - *Drops the table TEMPCONDITIONLOAD_YEAR after the commit*

8.0 FRICTION_SYN
- **Purpose:** *This package creates the synonyms for variables received from VB*
- **Procedures:**
  - **8.1** Cre_Cty_Fric_Syn
    - *This retrieves a year variable from the VB application and creates a synonym for the county table name based on the year given*
  - **8.2** Cre_Fric_Syn
    - *This retrieves a year variable from the VB application and creates a synonym for the Friction table name based on the year given*
  - **8.3** Cre_Fric_Base_Fric_Det_Syn
    - *This retrieves a year variable from the VB application and creates a synonym for the Friction Detail table name based on the year given*
  - **8.4** Cre_Fric_Over_Syn
    - *This retrieves a year variable from the VB application and creates a synonym for the Friction table name based on the year given*
  - **8.5** Cre_Fric_Over_Det_Syn

- This retrieves a year variable from the VB application and creates a synonym for the Friction Detail table name based on the year given

8.6 Cre_Fric_Agg_Det_Syn

- *This retrieves a year variable from the VB application and creates a synonym for the Friction Detail table name based on the year given*

9.0   FRIC_COMMIT_CALC_RATINGS_PKG

- **Purpose: Calculates and commits friction rating to DB.**
- **Procedures:**

  9.1 CALL_GENERATE_PROCEDURES
  - *This procedure calls the stored procedures SET_SYNONYM in the OVERLAY_SETUP_PKG package; it also calls procedures in this package*

  9.2 FRICTION_INIT
  - *This procedure calls FRIC_ROUTE_INIT and passes each route individually*

  9.3 FRICTION_ROUTE_INIT
  - *This procedure inserts detail friction records for each route and calls "FRICTION_FULL_INSERT" when needed*

  9.4 FRICTION_FULL_INSERT
  - *This procedure is responsible for inserting data into CONDITION_CURRENT and returning the CONDITION_ID that was generated*

  9.5 CALC_FRIC_OVERLAY_RATINGS
  - *This procedure sets the OVERLAY_FRIC_RATING for each overlay by calculating the OVERLAY_AVERAGE for that overlay*

10.0   OVERLAY_CLEAN_PKG

- **Purpose:**   *This package contains two procedures, call_overlay_clean and overlay_clean*
- **Procedures:**

  10.1 call_overlay_clean
  - *This procedure absorbs all overlays in a given year that are less than 1 mile*

  10.2 overlay_clean
  - *This procedure calls overlay_clean until there are no overlays that are less than 1 mile. The procedure makes new tables for inserting cleaned data into. The name format of the new tables is OVERLAY_1984_NEW0. The 0 at the end is a counter that is incremented after each iteration.*

11.0   OVERLAY_COMMIT_PKG

- **Purpose:**   *This package is in charge of committing the overlay tables.*
- **Procedures:**

  11.1 CALL_OVERLAY_COMMIT

- *This procedure calls the rest of the procedures in the package depending on whether the year is the previous year or if it is the current year.*

11.2 APPEND_CURRENT_OVERLAYS
- *This procedure pulls all overlays from previous year into current year TEMPOVERLAYLOAD table*

11.3 CLEAN_OVERLAYLOAD_TABLE
- *cleans up overlapping overlays by keeping most recent overlay*

11.4 OVERLAY_INSERT
- *Called by the CLEAN_OVERLAYLAOD_TABLE, this procedure inserts the "last_record" into overlay_current*

11.5 OVERLAY_INIT
- *This procedure creates overlay_detail table to relate to a base_section*

12.0 OVERLAY_PKG

- **Purpose:** *This package does calculations for overlays and inserts them into the overlay table.*
- **Procedures:**

12.1 OVERLAY_SUBMIT
- *This procedure inserts the inputted overlay data into the TEMPOVERLAYYEAR table. It also inputs overlay data into the OVERLAY_BREAKUP table.*

12.2 WRITE_ERROR
- *If there are errors, the errors are written to the ERROR_LOG*

12.3 OVERLAY_BREAKUP
- *This procedure breaks up the affected overlays when a new overlay is inserted.*

12.4 SET_SYNONYM
- *This procedure creates or replaces the synonym for a specified table.*

12.5 RECALCULATE_RATINGS
- *This procedure calls CALC_CONDITION and CALC_TRAFFIC for the overlay in the OVERLAY_BREAKUP table.*

12.6 CALC_CONDITION
- *This procedure calculates the condition for the overlay sent by RECALCULATE_RATINGS*

12.7 CALC_TRAFFIC
- *This procedure calculates the traffic for the overlay sent by RECALCULATE_RATINGS*

12.8 OVERLAY_INSERT
- *This procedure adds, deletes, and modifies overlays. It calls OVERLAY_ROUT_INIT and sends it an overlay.*

12.9 UPDATE_AGGREGATE

- *This procedure updates the aggregate detail of the affected old overlay with the new overlay aggregate detail.*

12.10 OVERLAY_ROUTE_INIT
- *This procedure sets the synonyms needed to connect the BASE_SECTION table to the OVERLAY_DETAIL_YEAR table*

12.11 GET_AFFECTED_OVERLAY
- *This procedure gets the affected overlays after a new overlay has been inserted*

12.12 ABSORB_HALF_MILE

13.0   OVERLAY_SETUP_PKG
- **Purpose:**   *This packages checks and sets up all tables for overlay input.*
- **Procedures:**

13.1 CHECK_OVERLAY_TABLES
- *This procedure checks to see if the proper tables already exist and flags them if they do.*

13.2 CREATE_OVERLAYAGGDETAIL_TABLE
- *This procedure creates the OVERLAYAGGDETAIL table and its fields*

13.3 CREATE_TABLE
- *This procedure creates a Temp Overlay table*

13.4 CREATE_TABLE2
- *This procedure creates a Temp Overlay Load table*

13.5 CREATE_FINAL_TABLE
- *This procedure creates an Overlay table*

13.6 CREATE_SEQUENCE
- *This procedure creates the sequence*

13.7 CREATE_TRIGGER
- *This procedure creates the trigger for Overlay inserts*

13.8 CREATE_TRANSACTION_LOG
- *This procedure creates the TRANSACTION_LOG table and its fields*

13.9 CREATE_FINAL_AGG_DETAIL_TABLE
- *This procedure creates the AGGREGATE_DETAIL table and its fields*

13.10 CREATE_OVERLAY_DETAIL_TABLE
- *This procedure creates the OVERLAY_DETAIL_YEAR table and its fields*

13.11 SET_SYNONYM
- *This procedure sets the synonyms for the overlay tables*

13.12 DROP_TABLES_AFTER_COMMIT
- *This procedure drops the TEMPOVERLAYLOADYEAR table after the OVERLAY_YEAR table has been committed.*

14.0   PPR_PKG

- **Purpose:** *This package is responsible for calculating and organizing the data that goes into the PPR.*
- **Procedures:**
  - **14.1** Get_Record_Set12
    - *This procedure pulls PPR data for queries with a 1 or 2 search option*
  - **14.2** move_asofins
    - *This procedure creates or replaces the synonym PPR_ASOF_INSERT for the OVERLAY_YEAR and CONDITION_YEAR tables.*
  - **14.3** move_asofread
    - *This procedure creates or replaces the synonym PPR_ASOF_READ for the OVERLAY_YEAR and CONDITION_YEAR tables.*
  - **14.4** Build_ASOF
    - *This procedure inserts everything from PPR_ASOF_READ into OVERLAY_ASOF and calls the procedure PPR_OVERLAY_SUBMIT.*
  - **14.5** PPR_OVERLAY_SUBMIT
    - *This procedure calculates the projections for the overlays.*
  - **14.6** PPR_OVERLAY_INSERT
    - *This procedure inserts the projections into the overlay table.*
  - **14.7** PPR_OVERLAY_BREAKUP
    - *This procedure breaks up effected overlays.*

15.0   PPR_SYN
- **Purpose:** *This package creates the synonyms for variables received from VB*
- **Procedures:**
  - **15.1** Cre_Cty_PPR_Syn
    - *This retrieves a year variable from the VB application and creates a synonym for the county table name based on the year given*
  - **15.2** Cre_Ovr_PPR_Syn
    - *This retrieves a year variable from the VB application and creates a synonym for the Overlay table name based on the year given*
  - **15.3** Cre_Ovr_Det_PPR_Syn
    - *This retrieves a year variable from the VB application and creates a synonym for the Base Section table name based on the year given*
  - **15.4** Cre_Base_PPR_Syn
    - *This retrieves a year variable from the VB application and creates a synonym for the Overlay_Detail table name based on the year given*

16.0   PROJECTION_CALC

- **Purpose:**   *This package does calculations for projection data for each overlay*
- **Procedures:**
  - **16.1** GEN_OVERLAY_PROJECTION
    - *Generates 3 projections for each overlay " Overlays must have OVERLAY_DATE_PLACED"*
  - **16.2** GEN_DYN_RATING
    - *Calculates weighted condition average for overlay for year CONDITION_PRJ2 references*
  - **16.3** CALCULATE_PRJ_SUMS
    - *Sums regression coefficients needed by CALCULATE_PRJ_FACTORS to get factors*
  - **16.4** CALCULATE_PRJ_FACTORS
    - *Calculates factors needed in the projection equation*
  - **16.5** SET_PROJECTION_YEAR
    - *Sets synonym "CONDITION_PRJ2" to the condition table needed in GEN_DYN_RATING*
  - **16.6** SET_OVERLAY_YEAR
    - *This procedure sets the synonym "OVERLAY_PRJ" for the overlay year being projected*

17.0   ROLLOVER_PKG

- **Purpose:**   *This package rolls over the tables that need to be rolled over.*
- **Procedures:**
  - **17.1** COMPARE_YEAR
    - *This procedure checks if current year is greater than the system date passed to the function from the VB side.*
  - **17.2** CREATE_TABLES
    - *This procedure creates tables that should be rolled over.*
  - **17.3** CREATE_MOVE_SYNONYMS
    - *This procedure moves the current year synonyms to point to the new year and temporary synonyms are created to hold the previous year's value.*
  - **17.4** COPY_DATA
    - *This procedure copies over all the data from the previous year into the new year's table.*
  - **17.5** DROP_SYNONYM
    - *This procedure deletes the synonyms for the previous year.*
  - **17.6** DECAY
    - *This procedure decrements the condition of the overlay by a standard amount each year.*

18.0 TRAFFIC_BREAKUP_PKG

- **Purpose:** *This package breaks the traffic data into a temporary table called traffic_breakup_table.*
- **Procedures:**
  - **18.1** traffic_record_cursor
    - *This procedure passes one traffic record at a time to the traffic_breakup procedure*
  - **18.2** traffic_breakup
    - *This procedure loops through a traffic records beginning and end mileposts. While it is between the two it assigns the data in that record to another record in the traffic_breakup_table and inserts the mp_counter value for the milepost. The mp_counter value is incremented by .1 after each interation.*
  - **18.3** drop_traffic_breakup_table
    - *This procedure drops the TRAFFIC_BREAKUP_TABLE.*

19.0 TRAFFIC_PKG

- **Purpose:** *This package inserts traffic records into tables and error logs, validation procedure handles validation checks.*
- **Procedures:**
  - **19.1** TRAFFIC_INSERT
    - *Takes input data and inserts it into TEMPTRAFFIC_CURRENT*
  - **19.2** INPUT_LOG_INSERT
    - *Inserts session info into INPUT_LOG*
  - **19.3** TRAFFIC_RESUBMIT
    - *This procedure overwrites an incorrect traffic field with the corrected traffic field and deletes its record from the error log*
  - **19.4** VALIDATE_TRAFFIC_DATA3
    - *Validates input data and flags it if it is invalid*
  - **19.5** WRITE_ERROR
    - *Records error with error information in the ERROR_LOG*

20.0 TRAFFIC_SETUP_PKG

- **Purpose:** *This package creates necessary tables, sequences and triggers for automatic import of traffic data.*
- **Procedures:**
  - **20.1** CHECK_TRAFFIC_TABLES
    - *This procedure checks to see if the proper tables already exist and flags them if they do.*
  - **20.2** CREATE_INPUT_TABLE
    - *This procedure creates the TEMPTRAFFICYEAR table and its fields.*
  - **20.3** CREATE_TRANSACTION_LOG
    - *This procedure creates the table TRAFFIC_TRANSACTION_LOG and its fields.*

20.4 CREATE_ERROR_LOG
  - *This procedure creates the table ERROR_LOG and its fields.*

20.5 CREATE_INPUT_LOG
  - *This procedure creates the table INPUT_LOG and its fields.*

20.6 CREATE_LOAD_TABLE
  - *This procedure creates the table TEMPTRAFFICLOADYEAR and its fields.*

20.7 CREATE_TRAFFIC_TABLE
  - *This procedure creates the tables TRAFFIC_YEAR and TEMPTRAFFICCOMMITYEAR and their fields.*

20.8 CREATE_TRAFFIC_DETAIL_TABLE
  - *This procedure creates the tables BASE_TRAF_DETAIL_YEAR and TEMPTRAFFICDETCOMMITYEAR and their fields.*

20.9 CREATE_TRAFFIC_BREAKUP_TABLE
  - *This procedure creates the table TRAFFIC_BREAKUP_TABLE and its fields.*

20.10 DROP_TABLES_AFTER_COMMIT
  - *This procedure drops the table TEMPTRAFFICLOADYEAR and it deletes everything from the TRAFFIC_BREAKUP_TABLE.*

21.0   TRAF_COMMIT_CALC_RATINGS_PKG

- **Purpose:**   *This package creates synonyms for traffic tables and calculates ratings for traffic data.*

- **Procedures:**

  21.1 CALL_GENERATE_PROCEDURES
  - *This procedure calls the stored procedures SET_SYNONYM in the OVERLAY_SETUP_PKG package; it also calls procedures in this package*

  21.2 SET_TRAFFIC_SYN
  - *This procedure creates the synonym TRAFFIC_CURRENT for the TRAFFIC_YEAR table.*

  21.3 SET_LOAD_SYN
  - *This procedure creates the synonym TEMPTRAFFICLOAD_CURRENT for the TEMPTRAFFICLOADYEAR table.*

  21.4 GEN_ALL_OVERLAY_RATINGS
  - *This procedure calls the procedure GEN_OVERLAY_RATING for every overlay.*

  21.5 GEN_OVERLAY_RATING
  - *This procedure gets the average of the traf_aadt and*

  21.6 TRAFFIC_INIT
  - *This procedure calls TRAFFIC_ROUTE_INIT and passes each route individually*

  21.7 TRAFFIC_ROUTE_INIT

- ▪ *This procedure inserts detail traffic records for each route and calls TRAFFIC_FULL_INSERT when needed to insert the traffic record*

21.8 TRAFFIC_FULL_INSERT
- ▪ *This procedure is responsible for inserting data into TRAFFIC_CURRENT and returning the TRAFFIC_ID that was generated.*

22.0   UPDATE_ADMIN_STATE

- **Purpose:**   *This package updates the ADMIN_STATE table and its synonyms.*
- **Procedures:**
  22.1 INSERT_RECORDS
  - ▪ *This procedure inserts records into the ADMIN_STATE table.*
  22.2 SET_COUNT_TABLE
  - ▪ *This procedure creates the synonym ADMIN_STATE_COUNT.*

Trigger List

This section lists every server-side (Oracle) triggers and the corresponding table that it acts upon. Details of the event and location of each event within a table is also noted.

Trigger	Type	Event	Table
AGGTYPE_INSERT	BEFORE EACH ROW	INSERT	AGGTYPE
AGGTYPE_LOG	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	AGGTYPE
AGGTYPE_TEMP_INSERT	BEFORE EACH ROW	INSERT	AGGTYPE_TEMP
ARCHIVE_EVENT_OCCURRENCES	AFTER EACH ROW	UPDATE	SMP_VDE_EVENT_TARGET_DETAILS
CONCURRENT_ROUTES__TEMP_INSERT	BEFORE EACH ROW	INSERT	CONCURRENT_ROUTES__TEMP
CONCURRENT_ROUTES__TEMP_LOG	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	CONCURRENT_ROUTES__TEMP
CONDITION1999_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPCONDITION1999
CONDITION2000_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPCONDITION2000
CONDITION2001_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPCONDITION2001
CONDITION2002_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPCONDITION2002
CONDITION2004_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPCONDITION2004
COUNTY__TEMP_INSERT	BEFORE EACH ROW	INSERT	COUNTY__TEMP
COUNTY__TEMP_LOG	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	COUNTY__TEMP
DIVISION__TEMP_INSERT	BEFORE EACH ROW	INSERT	DIVISION__TEMP
DIVISION__TEMP_LOG	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	DIVISION__TEMP
EVENT_ARCHIVE_AGENT_STATE	AFTER EACH ROW	UPDATE	SMP_VDE_EVENT_TARGET_DETAILS
FRICTION_LOG_1999	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	TEMPFRICTION1999
FRICTION_LOG_2000	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	TEMPFRICTION2000
FRICTION_LOG_2001	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	TEMPFRICTION2001
FRICTION_LOG_2002	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	TEMPFRICTION2002
FRICTION_LOG_2003	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	TEMPFRICTION2003
FRICTION_LOG_2004	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	TEMPFRICTION2004
FRICTION_LOG_2005	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	TEMPFRICTION2005
FRIC_MODIFIER_TEMP_INSERT	BEFORE EACH ROW	INSERT	FRIC_MODIFIER_TEMP
LOG_EVENT_REGISTRATION_STAT	AFTER EACH ROW	INSERT OR UPDATE	SMP_VDE_EVENT_TARGET_INFO
MIXTYPE_INSERT	BEFORE EACH ROW	INSERT	MIX_TYPE
MIXTYPE_TEMP_INSERT	BEFORE EACH ROW	INSERT	MIX_TYPE_TEMP
MIX_TYPE_LOG	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	MIX_TYPE
OVERLAYTRANSACTION2001_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPOVERLAY2001
OVERLAYTRANSACTION2002_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPOVERLAY2002
OVERLAYTRANSACTION2003_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPOVERLAY2003
OVERLAYTRANSACTION2004_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPOVERLAY2004
OVERLAYTRANSACTION2005_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPOVERLAY2005
PERPETUAL_OVERLAY_AUTONUM_1984	BEFORE EACH ROW	INSERT	TEMPOVERLAY1984
PERPETUAL_OVERLAY_AUTONUM_1985	BEFORE EACH ROW	INSERT	TEMPOVERLAY1985
PERPETUAL_OVERLAY_AUTONUM_1986	BEFORE EACH ROW	INSERT	TEMPOVERLAY1986
PERPETUAL_OVERLAY_AUTONUM_1987	BEFORE EACH ROW	INSERT	TEMPOVERLAY1987
PERPETUAL_OVERLAY_AUTONUM_1988	BEFORE EACH ROW	INSERT	TEMPOVERLAY1988
PERPETUAL_OVERLAY_AUTONUM_1989	BEFORE EACH ROW	INSERT	TEMPOVERLAY1989
PERPETUAL_OVERLAY_AUTONUM_1990	BEFORE EACH ROW	INSERT	TEMPOVERLAY1990
PERPETUAL_OVERLAY_AUTONUM_1991	BEFORE EACH ROW	INSERT	TEMPOVERLAY1991
PERPETUAL_OVERLAY_AUTONUM_1992	BEFORE EACH ROW	INSERT	TEMPOVERLAY1992
PERPETUAL_OVERLAY_AUTONUM_1993	BEFORE EACH ROW	INSERT	TEMPOVERLAY1993
PERPETUAL_OVERLAY_AUTONUM_1994	BEFORE EACH ROW	INSERT	TEMPOVERLAY1994
PERPETUAL_OVERLAY_AUTONUM_1995	BEFORE EACH ROW	INSERT	TEMPOVERLAY1995
PERPETUAL_OVERLAY_AUTONUM_1996	BEFORE EACH ROW	INSERT	TEMPOVERLAY1996
PERPETUAL_OVERLAY_AUTONUM_1997	BEFORE EACH ROW	INSERT	TEMPOVERLAY1997
PERPETUAL_OVERLAY_AUTONUM_1998	BEFORE EACH ROW	INSERT	TEMPOVERLAY1998
PERPETUAL_OVERLAY_AUTONUM_1999	BEFORE EACH ROW	INSERT	TEMPOVERLAY1999
PERPETUAL_OVERLAY_AUTONUM_2000	BEFORE EACH ROW	INSERT	TEMPOVERLAY2000
PERPETUAL_OVERLAY_AUTONUM_2001	BEFORE EACH ROW	INSERT	TEMPOVERLAY2001
PERPETUAL_OVERLAY_AUTONUM_2002	BEFORE EACH ROW	INSERT	TEMPOVERLAY2002
PERPETUAL_OVERLAY_AUTONUM_2003	BEFORE EACH ROW	INSERT	TEMPOVERLAY2003
PERPETUAL_OVERLAY_AUTONUM_2004	BEFORE EACH ROW	INSERT	TEMPOVERLAY2004
PLACERS_INSERT	BEFORE EACH ROW	INSERT	PLACERS
PLACERS_LOG	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	PLACERS
PLACERS_TEMP_INSERT	BEFORE EACH ROW	INSERT	PLACERS_TEMP
PRODUCER_INSERT	BEFORE EACH ROW	INSERT	PRODUCER
PRODUCER_LOG	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	PRODUCER
PRODUCER_TEMP_INSERT	BEFORE EACH ROW	INSERT	PRODUCER_TEMP
ROUTES__TEMP_INSERT	BEFORE EACH ROW	INSERT	ROUTES__TEMP
ROUTES__TEMP_LOG	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	ROUTES__TEMP
SMP_UPDATE_LAST_NOTIFICATION	AFTER EACH ROW	INSERT	SMP_VDM_NOTIFICATION
SMP_VDE_ON_OCCURRENCE_DELETE	AFTER EACH ROW	DELETE	SMP_VDE_EVENT_OCCURRENCE
SMP_VDE_ON_REMOVE_EVENT	AFTER EACH ROW	DELETE	SMP_VDE_EVENT
SMP_VDJ_ON_REMOVE_JOB_LOG	BEFORE EACH ROW	DELETE	SMP_VDJ_JOB_LOG
SMP_VDM_ON_DELETE_PAG_SERVER	AFTER EACH ROW	DELETE	SMP_VDM_NOTIFICATION_SERVICES
SMP_VDN_GROUP_LIST_TRIG	BEFORE EACH ROW	DELETE	SMP_VDN_GROUP_LIST
SMP_VDN_GRP_CHECK_CYCLES	BEFORE EACH ROW	INSERT	SMP_VDN_GROUP_GROUP
SMP_VDN_TARGET_DELETE_TRIG	BEFORE EACH ROW	DELETE	SMP_VDN_TARGET_LIST
SMP_VDU_PRIV_OBJECT_TRIG	BEFORE EACH ROW	DELETE	SMP_VDU_OBJECTS_TABLE
SMP_VDU_PRIV_PRINCIPALS_TRIG	BEFORE EACH ROW	DELETE	SMP_VDU_PRINCIPALS_TABLE
SMP_VDV_DELETE_TRIG	AFTER EACH ROW	DELETE	SMP_VDU_PRINCIPALS_TABLE
SMP_VDV_INSERT_TRIG	AFTER EACH ROW	INSERT	SMP_VDU_PRINCIPALS_TABLE
SMP_VDV_ON_DELETE_USER	AFTER EACH ROW	DELETE	SMP_VDV_USER
SMP_VDV_ON_INSERT_USER	AFTER EACH ROW	INSERT	SMP_VDV_USER
SOURCES_LOG	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	SOURCES
SOURCES_TEMP_INSERT	BEFORE EACH ROW	INSERT	SOURCES_TEMP
TEMPOVERLAY_AUTONUM_2002	BEFORE EACH ROW	INSERT	TEMPOVERLAYLOAD2002
TRAFFIC1984_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1984
TRAFFIC1985_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1985
TRAFFIC1986_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1986
TRAFFIC1987_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1987
TRAFFIC1988_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1988
TRAFFIC1989_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1989
TRAFFIC1990_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1990
TRAFFIC1991_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1991
TRAFFIC1992_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1992
TRAFFIC1993_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1993
TRAFFIC1994_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1994
TRAFFIC1995_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1995
TRAFFIC1996_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1996
TRAFFIC1997_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1997
TRAFFIC1998_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1998
TRAFFIC1999_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1999
TRAFFIC2000_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC2000
TRAFFIC2001_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC2001
TRAFFIC2002_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC2002
TRAFFIC2003_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC2003
TRAFFIC2004_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC2004

Traffic Table format:

Field Names / Data types/ Size

CNYF / Double / 8
CITY / Double / 8
DIV / Double / 8
RTE / Double / 8
US / Double / 8
ALT / Text / 3
BEGINML / Double / 8
ENDML / Double / 8
DISTML / Double / 8
DISTKM / Double / 8
AADT / Double / 8
K / Double / 8
D / Double / 8
TDHV / Long Integer / 4
TADT / Double / 8
MED / Double / 8
HVY / Double / 8
GROWTH / Double / 8
STGROWTH / Double / 8
DVMTGWTH / Double / 8
ACTMP / Double / 8
DESCRIPTION / Text / 50

APPENDIX A.2:

Condition Table format:

Field Names / Data types / Size

ROUTE_TYPE / Text / 1
ROUTE / Double / 5
DIR / Text / 1
LANE / Text / 1
KM / Double / 8
DATE_RATED / DateTime / 8
IRI1 / Double / 8
IRI2 / Double / 8
TEX_RMS / Double / 8
TEX_MPD / Double / 8
RRUT / Double / 8
LRUT / Double / 8
GRADE / Double / 8
LATDEG / Double / 8
LATMIN / Double / 8
LATSEC / Double / 8
LONGDEG / Double / 8
LONGMIN / Double / 8
LONGSEC / Double / 8
RATER / Text / 2
ARAN / Text / 4
PATCHING_G / Double / 8
PATCHING_F / Double / 8
PATCHING_P / Double / 8
SHLDR_COND / Text / 1
SHLDR_TYPE / Text / 3
RAVEL_L / Double / 8
RAVEL_W / Double / 8
RAVEL_E / Double / 8
BLEED_L / Double / 8
BLEED_W / Double / 8
BLEED_E / Double / 8
ALLIGAT1 / Double / 8
ALLIGAT2 / Double / 8
ALLIGAT3 / Double / 8
BLOCK1 / Double / 8
BLOCK2 / Double / 8
BLOCK3 / Double / 8
LONGIT1 / Double / 8
LONGIT2 / Double / 8

LONGIT3 / Double / 8
TRANS1 / Double / 8
TRANS2 / Double / 8
TRANS3 / Double / 8
CRKSEAL / Double / 8
POTHOLE / Double / 8
PUMP / Double / 8
LJSPAL_L / Double / 8
LJSPAL_M / Double / 8
LJSPAL_S / Double / 8
TJOINT / Double / 8
TJSPAL_L / Double / 8
TJSPAL_M / Double / 8
TJSPAL_S / Double / 8
POPOUTS / Double / 8
LANE_SEP / Double / 8
JOINT_SEAL / Double / 8
CORNER_BRK / Double / 8
LANE_WIDTH / Double / 8
PVMT_TYPE / Text / 3
BRIDGE / Text / 1
CONST / Text / 1
XFALL / Double / 8
ELEVATION / Double / 8
PFAULT_CNT / Double / 8
PFAULT_AVG / Double / 8
NFAULT_CNT / Double / 8
NFAULT_AVG / Double / 8

System requirements:

1) *Windows XP*
    - Windows XP Professional with Service Pack 1 must be installed on any computer that will run the HYDRA+ program.
2) *Oracle*
    - The Oracle 9i release 2 client must be installed on any computer that will run the HYDRA+ program.
    - Users must have permission to access the Ora92 folder on the local computer.
    - **Note: Oracle must be installed prior to running the HYDRA+ setup package.**
3) *Microsoft Office XP*
    - Access version 10 is required to import Condition and Traffic Data.
    - Excel version 10 is required for reporting purposes.

Optional software:

4) *Adobe Writer*
    - In order to use the PDF reporting function of HYDRA+, the Adobe Writer software must be installed on the computer. Reporting will still be available without the software, but only in Excel form.
5) *Crystal Reports 10*
    - Used for statistical analysis of data, chart creation, and ad hoc queries
6) *GeoMedia*
    - Used to create maps from overlay data

Setting up the Oracle ODBC driver:

The ODBC driver is necessary for any computer that will make a connection to the database server. Only the system administrator can perform this function on a local computer.

Step 1:

Click the **Start** menu, then select **Control Panel.**

Step 2:

Choose **Administrative Tools**, then choose **Data Sources (ODBC).**

Step 3:

Click the **System DSN** tab, and you will see the following box:
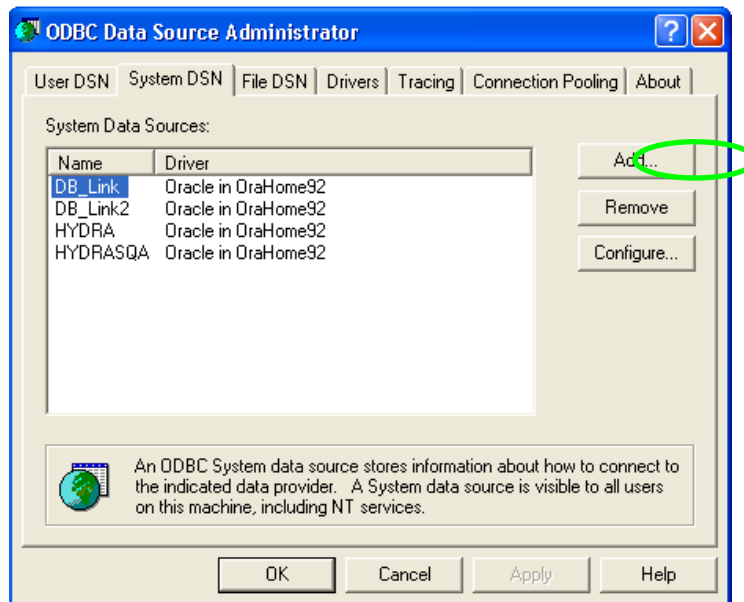
Figure A.4.1: ODBC data source administrator

Step 4:

Click the **Add…** button. The following box will appear:
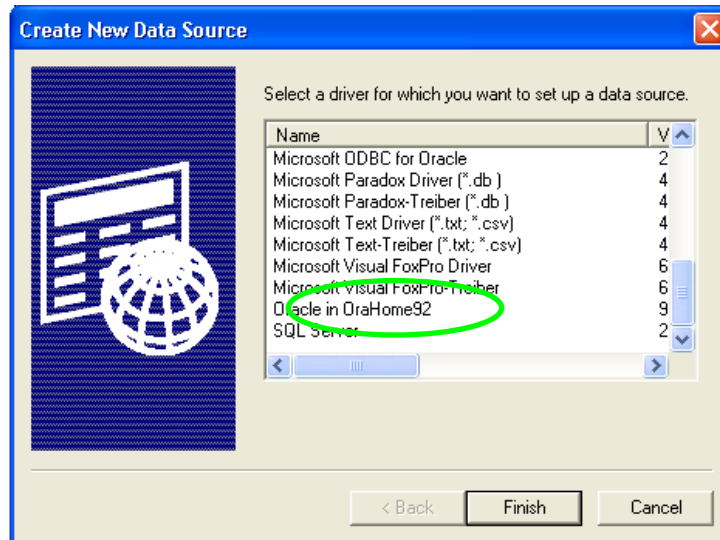
Figure A.4.2: Create new data source

Step 5:

Select the **Oracle in OraHome92** driver and click **Finish.**

- Note: Be sure to choose this driver rather than the Microsoft ODBC for Oracle driver. If the Oracle driver is not available, verify that the Oracle client is installed on the local computer.

The following box will appear:
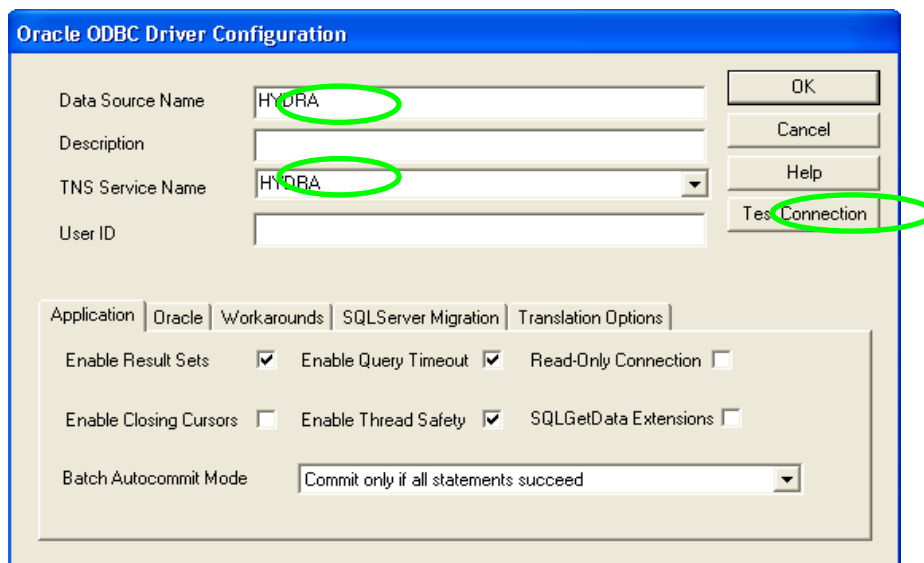
Figure A.4.3: ODBC driver configuration

In the Data Source name box type HYDRA+, and in the TNS Service Name box, also type HYDRA+. The other boxes may be left blank.
You may test the connection to ensure that it is set up correctly by clicking the **Test Connection** button. You will see the following box:
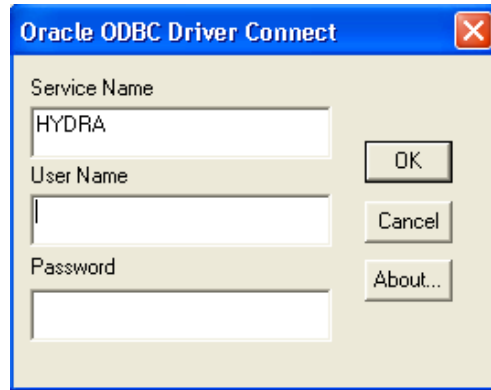
Figure A.4.4: ODBC driver connect

Type your user name and password into the boxes and press OK. You will be informed of the success or failure of the connection.

Complete the driver setup by clicking OK in the Driver Configuration box and the Data Source Administration box.

Appendix B: User's Manual

User's Manual Overview

The User's Manual provides system administration and client (user) operations for the HYDRA+ system. Section 1 and 2 details the administrator's ability to manually update a series of database tables that describe location, payment type, producer information, and traffic loads. Section 3 provides automated input of traffic and condition data.

Section 4 provides manual input by the user of friction and condition data. Section 5 details the process by which a user can manage the automatic validation of condition data. Section 6 provides instructions for the user to update traffic and condition data prior to the data having been committed to the database. Section 7 provides instructions to the user on creating PPRs, friction reports, GASB reports and exports for data usage outside the system

Section 1: Table Administration (Manual Information)

The purpose of this process is to allow users to update the following tables manually:

> *AGGTYPE*
> *CONCURRENT_ROUTES*
> *CONDITION_VALIDATION_RANGES*
> *COUNTY*
> *DISTRICT*
> *DIVISION*
> *FRICTION_VALIDATION_RANGES*
> *FRIC_MODIFIER*
> *MIX_TYPE*
> *PLACER*
> *PRODUCER*
> *OVERLAY_PROJECTION_ERROR*
> *ROUTES*
> *SOURCES*
> *TRAFFIC_VALIDATION_RANGES*

- Note: To begin inputting Table data follow the steps and diagrams below.

Step 1:

Open the HYDRA+ program and select **Data Input** from the interface selection screen.
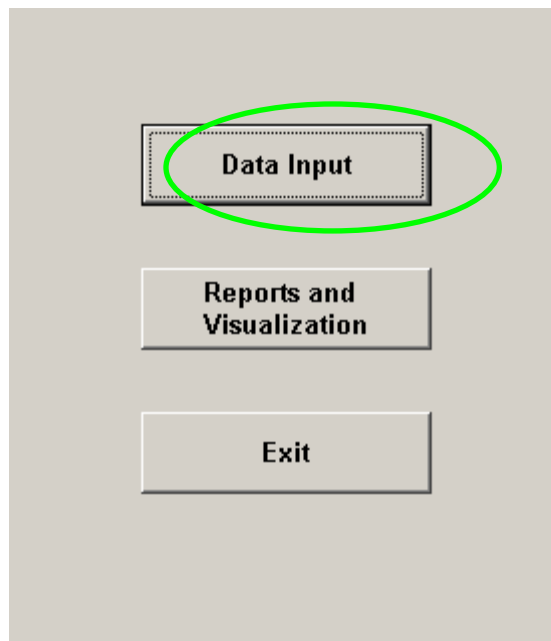
Figure B.1: Interface selection screen

Step 2:

Select the **Administration** tab and select the table that you wish to update from the **Select Table** drop-down menu. After a table is selected, update buttons will appear below the menu box which will allow you to edit the tables.

Selecting *Aggtype*, *Fric_Modifier*, *Mix_Type*, *Placers*, *Producer*, or *Sources* will give the user four options: **Update Table**, **Change Status**, **Add Record**, and **Delete Record**.

Selecting *Concurrent_Routes*, *County, Division*, *Routes*, *Overlay_Projection_Error*, *Friction_Validation_Ranges*, *Condition_Validation_Ranges*, or *Traffic_Validation_Ranges* table names will give the user only one option: **Manipulate Table**. This is detailed in the Manipulate Table Section (I. E).
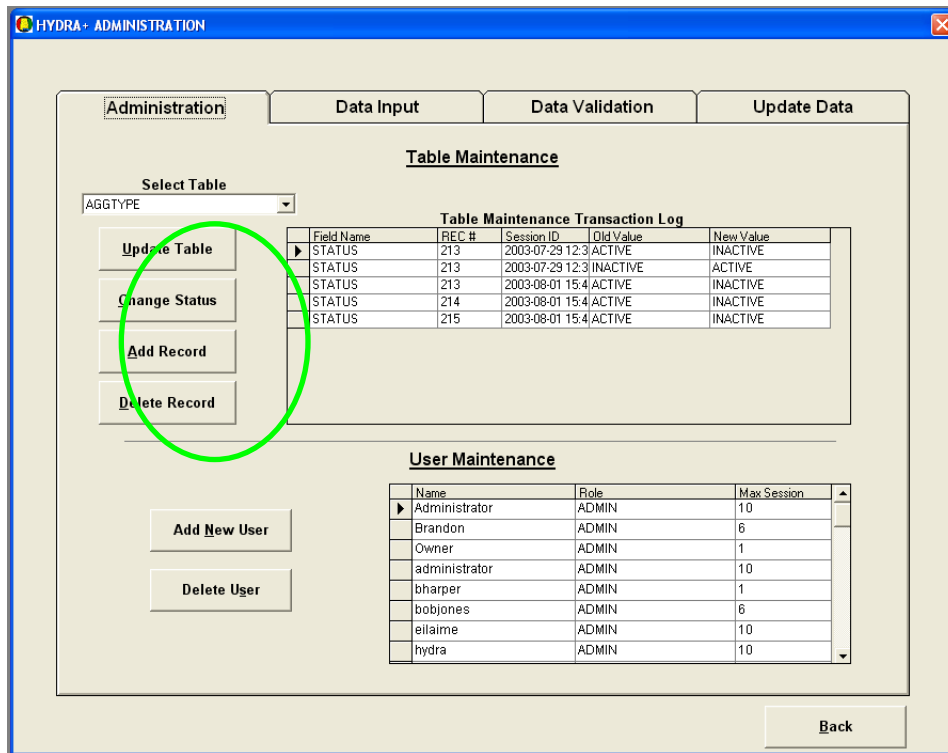
Figure B.2: Administration tab table selection

NOTE: The Table Maintenance Transaction Log shows the records in a selected table the user has changed. After selecting a table you can see the **Field Name, Record #, Session ID, Old Value,** and the **New Value** of the changed records in this table.

Section 2: Description of Administrator Options

A. Update Table:

Selecting this option will update the table that currently appears in the **Select Table** menu box. A message box will appear when this option is selected to confirm that the user wishes to proceed with an update. Clicking *Yes* will cause a second message box to appear. Choose *Yes* again to update the selected table.

- **NOTE:** Once the user selects *Yes* in the second message box, the update cannot be stopped or undone. Choosing *No* will cancel the update. A message box will appear to confirm that no update has taken place.

When the update is complete, a message box will inform the user of the update's success.
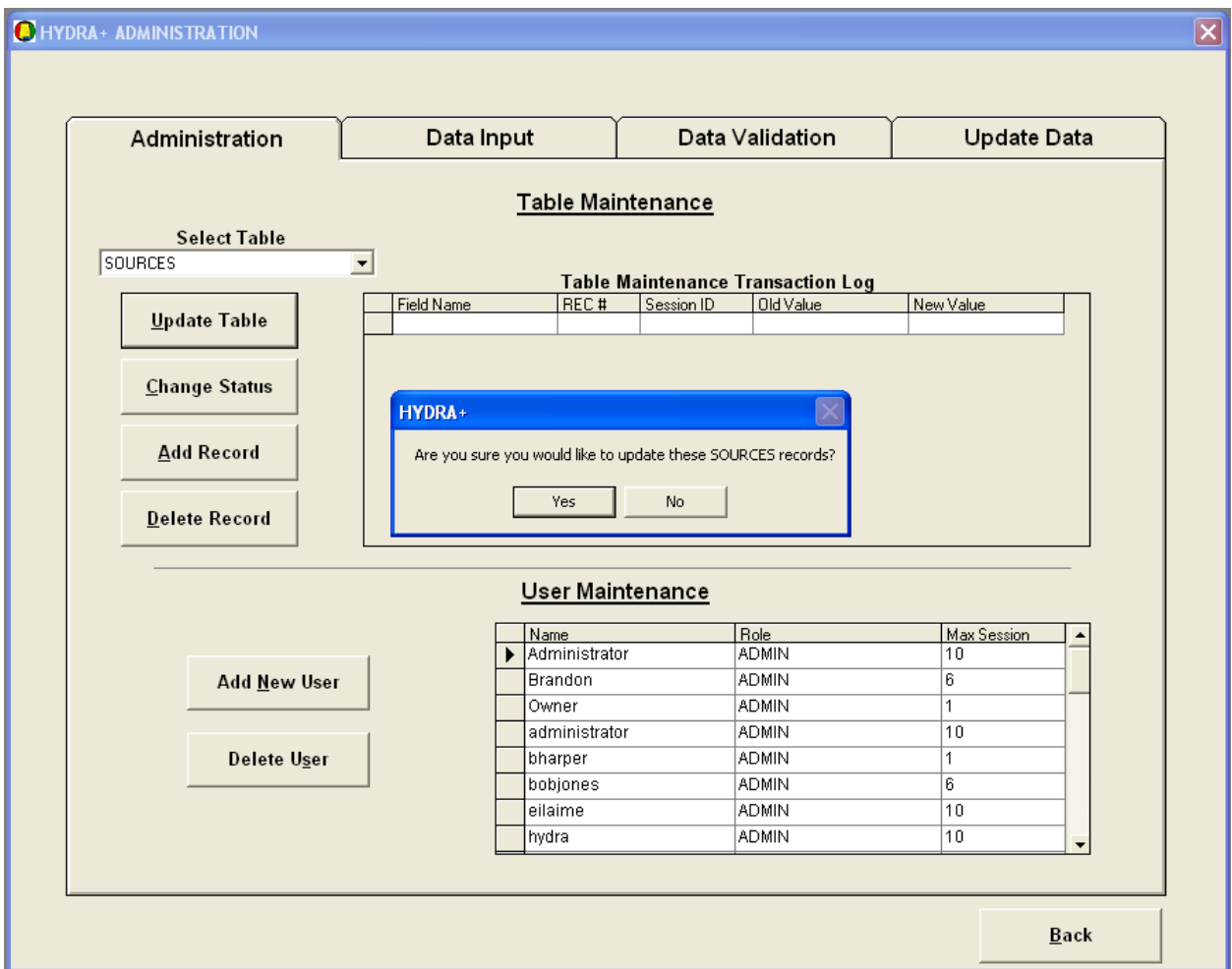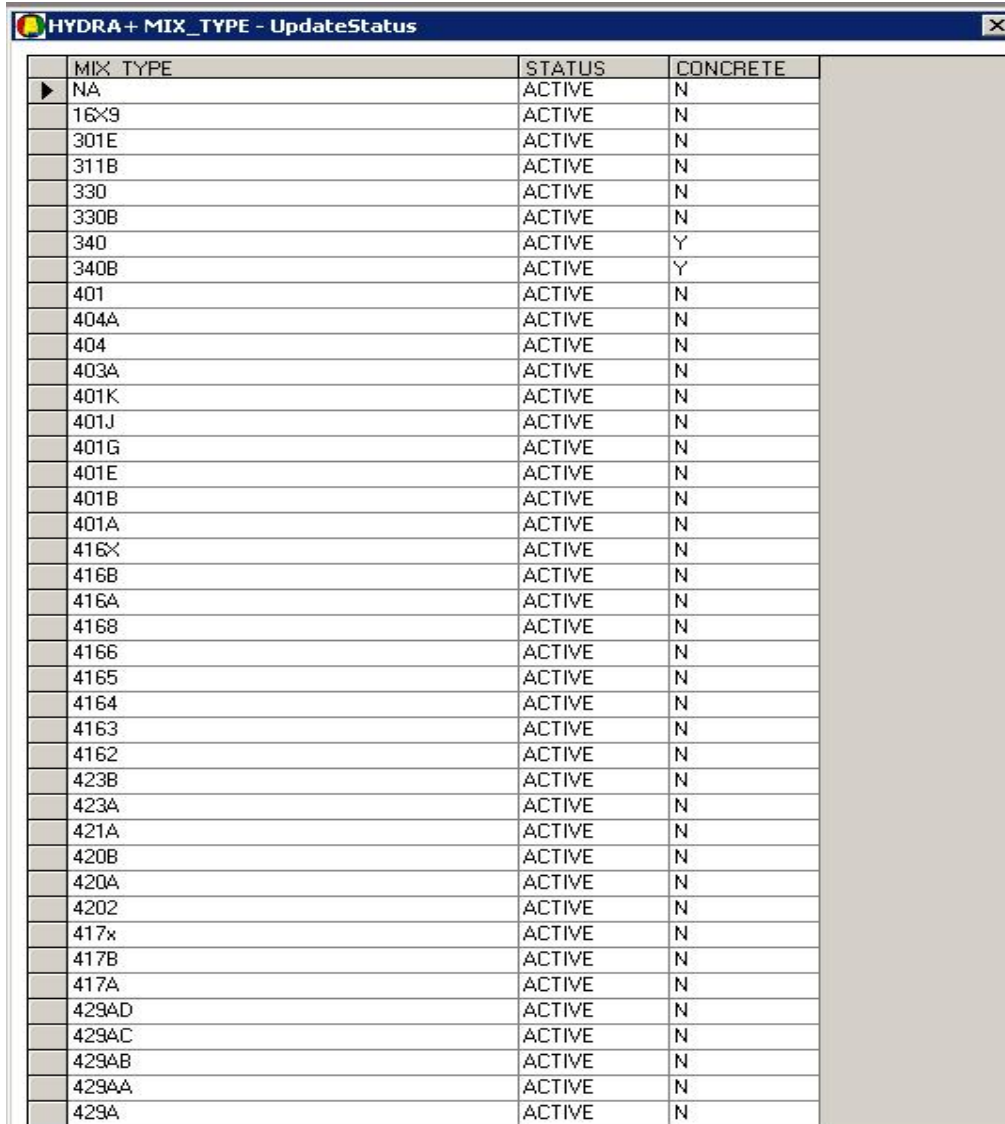
Figure B.3: Administration tab - table update confirmation

B. Change Status:

When this feature is selected all of the items from the selected static table appear (e.g. AGGTYPE table). The user can not change, delete, or add items; however, the user can change the Status to either **Inactive** or **Active**. The user can change the status of the mix type to concrete if applicable. Y designates the status as concrete and N designates the status as non-concrete. This also results in writing a record of any change to the appropriate Transaction Log Table.

Figure B.4: Administration tab - change status of record

C. Add Record:

This option allows the user to add records to the selected table. Once clicked, all of the items in the Main Table and the Temp Table will be displayed (shown below).

- **NOTE:** The user may not alter or delete any items in the table. Attempting to edit or delete an item will cause a warning box to appear. Selecting *OK* in the warning box will cause the data shown in the table to be refreshed.

To add an item, scroll to the end of the list to find a blank line for entry (see below). Enter all necessary fields on this line. If the record already exists or a required field is omitted, the changes that were entered will not be saved and the data grid will refresh itself with the initial set of data. The *Status* field and *Id* field are entered automatically by the system.

Figure B.5: Administration tab - add record

D. Delete Record:

Selecting this option will allow a user to delete records from the temp table associated with the selected table. A message box will appear to remind the user that a delete command results in immediate and permanent deletion of the selected record. Click *OK* to continue. The items in the related temporary table will then be displayed. In order to delete a record, the row must first be selected. Do this by clicking anywhere in the row and then clicking on the triangle that appears to the left of the record (see below). After the row is highlighted, press the delete button on the keyboard to delete the record.

- **NOTE:** Users may <u>not</u> alter items or add new rows from this screen. This function is intended only for deleting entire records. The delete option **<u>cannot</u>** be undone.

AGGTYPE	STATUS
gravel	TEMP
washed sand	TEMP
#103 slag screenings	TEMP
sand	TEMP
pea gravel	TEMP

HYDRA+ AGGTYPE - DeleteRecord
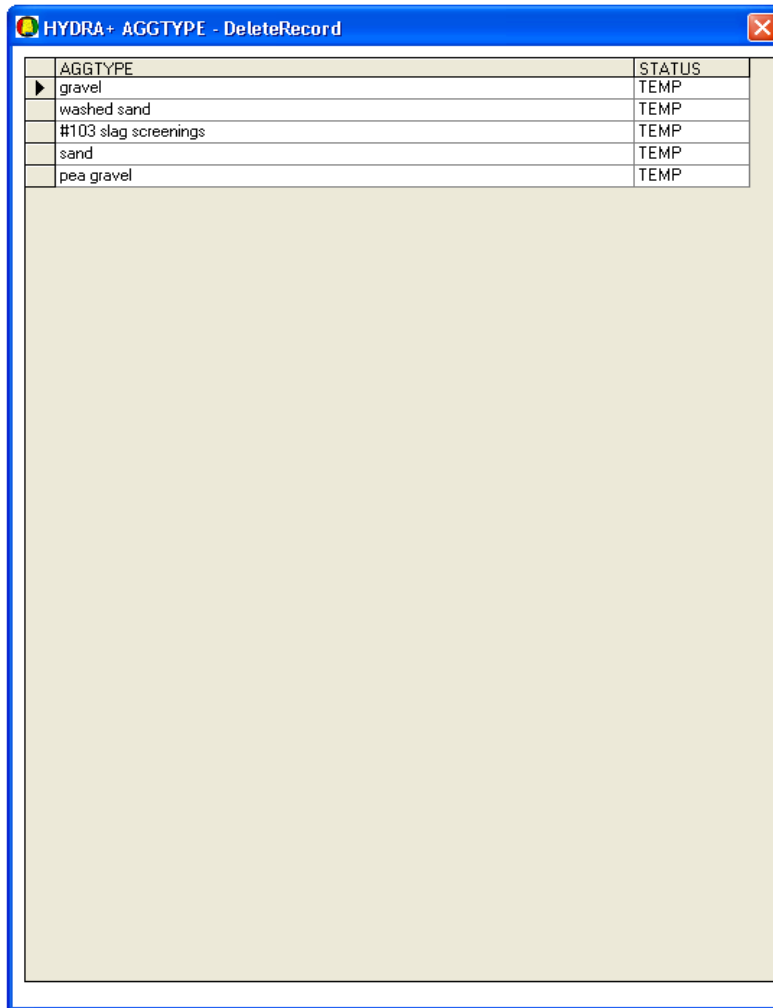
Figure B.6: Administration tab - delete record

E. Manipulate Table:

This option only applies to the *Concurrent_Routes*, *County, Division*, *Routes*, *Overlay_Projection_Error*, *Friction_Validation_Ranges*, *Condition_Validation_Ranges*, or *Traffic_Validation_Ranges* tables. For update options related to the *Aggtype*, *Fric_Modifier*, *Mix_Type*, *Placers*, *Producer*, or *Sources* tables, see sections I.A – D.
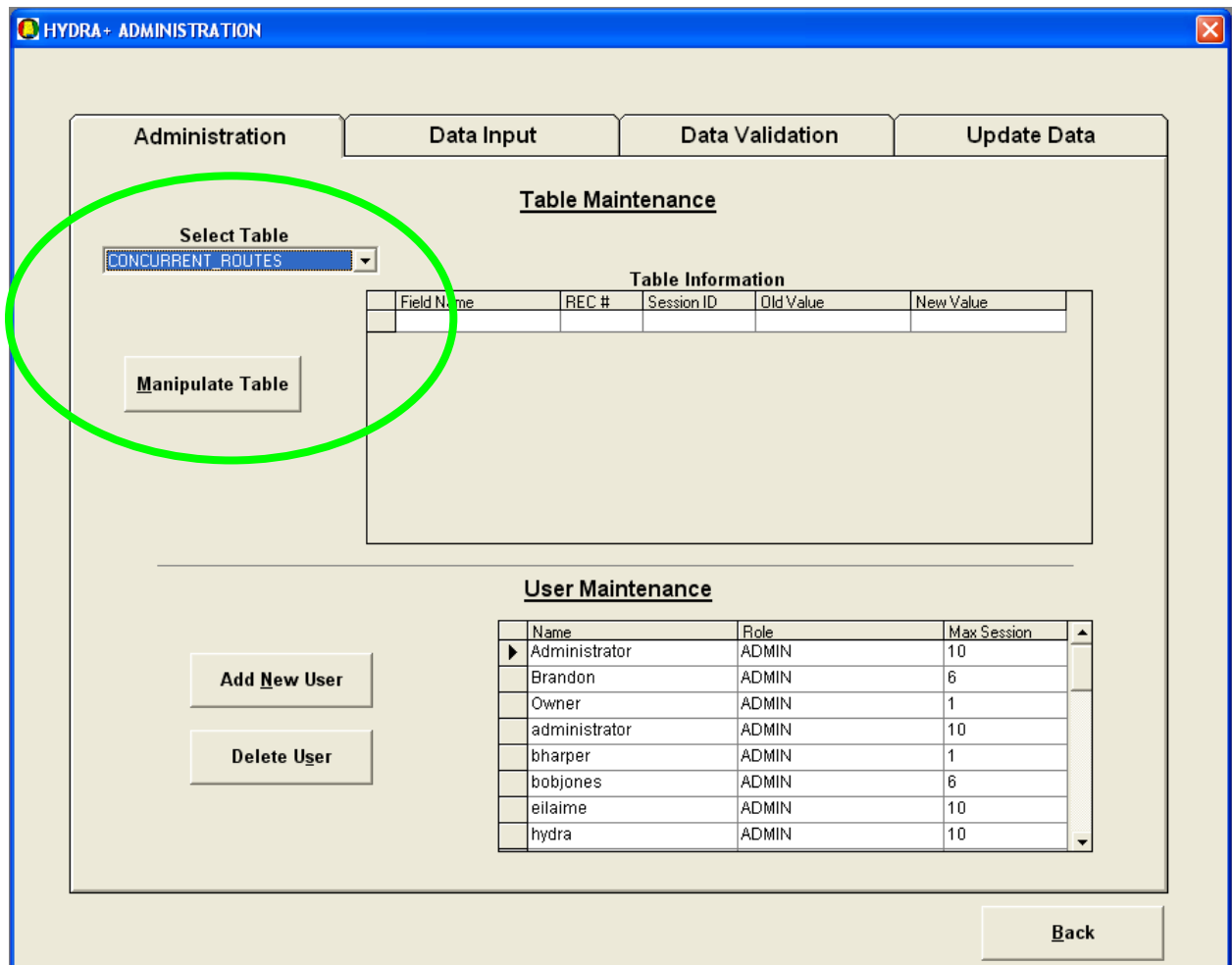
Figure B.7: Administration tab – manipulate table

When this option is selected the user can add or delete any record (row) in the table. The user can also change any item within a record (row) of the selected table. Once selected the Temp Table is displayed (see next page), and contains all the items from the last table updated, unless it has already been altered. *An error will occur for any duplicate items (PK) and for any fields that need to be filled in (Null).*

- **Note:** The user may not change the Record Number – this is used for logging purposes.

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ManipulateTable - CONCURRENT_ROUTES

TYPE	NUMBER	BEGIN MILE	END MILE	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	TYPE 6	TYPE 7	TYPE 8	TYPE 9	TYPE 10	NUM 1	NUM 2	NUM 3	NUM 4
AL	00003	177.262	178.494	AL										00021			
NH	00003	178.494	186.018	US										00082			
NH	00003	186.927	190.356	US										00031			
NH	00003	190.356	190.775	NH	US									00014	00031		
AL	00003	190.775	208.202	US										00031			
AL	00003	208.202	213.408	US										00031			
AL	00003	213.408	221.71	AL	US									00022	00031		
AL	00003	221.71	240.565	US										00031			
AL	00003	240.565	242.795	US										00031			
AL	00003	242.795	242.955	AL	US									00025	00031		
AL	00003	242.955	253.652	US										00031			
AL	00003	253.652	260.473	AL	US									00019	00031		
AL	00189	16.604	16.934	AL										00087			
AL	00183	34.458	34.904	AL										00219			
IN	0359S	2.789	2.605	NH	NH	US								0013S	0069S	00043	
NH	0013S	195.249	194.502	NH	US									0069S	00043		
NH	0001S	295.247	297.304	NH										0079S			
IN	00359	0	2.594	NH	NH									00007	00069		
IN	00359	2.594	2.789	NH	NH	US								00013	00069	00043	
AL	00172	22.934	23.369	AL										00241			
AL	00171	35.486	52.775	US										00043			
AL	00171	60.236	68.598	US	US	US								00043	00078	00278	
AL	00171	68.598	73.355	US	US									00043	00278		
AL	00166	0	4.726	US										00084			
IN	00165	4.844	5.07	NH										0016W			
NH	00158	2.618	2.76	AL										00213			
AL	00133	12.869	13.661	AL										00157			
AL	00123	18.917	21.345	AL										00134			
AL	00118	19.692	26.232	AL	US									00171	00078		
AL	00118	26.232	28.252	US										00078			
NH	00118	28.252	29.652	NH	US									00129	00078		
NH	00118	29.652	36.951	US										00078			
NH	00118	36.951	57.315	US										00078			
AL	00088	0.973	1.406	AL										00134			
AL	00088	1.84	2.351	AL										00134			
AL	00087	23.434	24.038	AL										00134			
AL	00085	15.208	15.945	AL										00092			
AL	00085	20.375	21.225	AL										00134			
IN	00085	51.438	58.754	NH	US									00015	00029		
IN	00085	58.754	62.197	NH	NH	US	US							00015	00038	00029	00280
IN	00085	62.197	64.551	NH	US									00015	00029		
AL	00075	58.179	58.258	AL										00205			
AL	00074	4.837	26.094	US										00278			
NH	00074	26.094	28.076	US										00278			

Figure B.8: Administration tab – manipulate concurrent routes temp table

Section 3: Automatic Data Load User Information

The purpose of this process is to allow users to automatically load **Traffic** and **Condition** data. This process will load data from Microsoft Access tables into temporary Oracle tables after a series of validation procedures are completed.

A. Traffic Automated Data Load

<u>**Step 1:**</u>

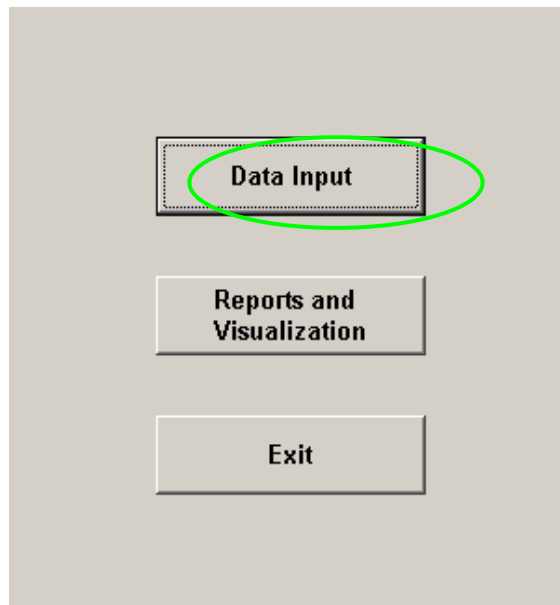Open the HYDRA+ program and select the **Data Input** option from the main interface selection screen:

Figure B.9: Interface selection screen

Step 2:

Select the **Traffic** radio button from the **Data Type** field. Then click the **Input Data** button.
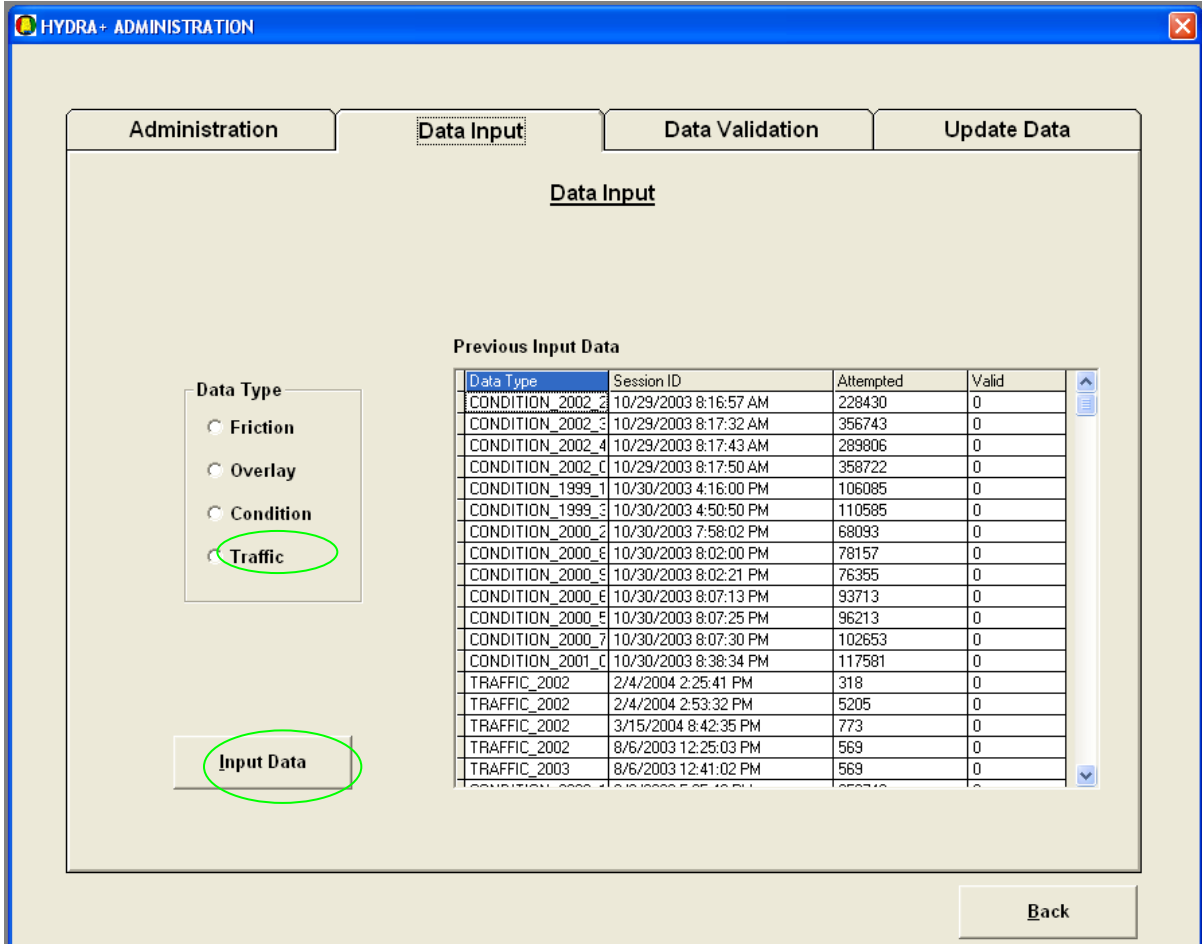
Figure B.10: Data input tab, traffic

Step 3:

Begin entering the required information for the TRAFFIC data to be loaded.
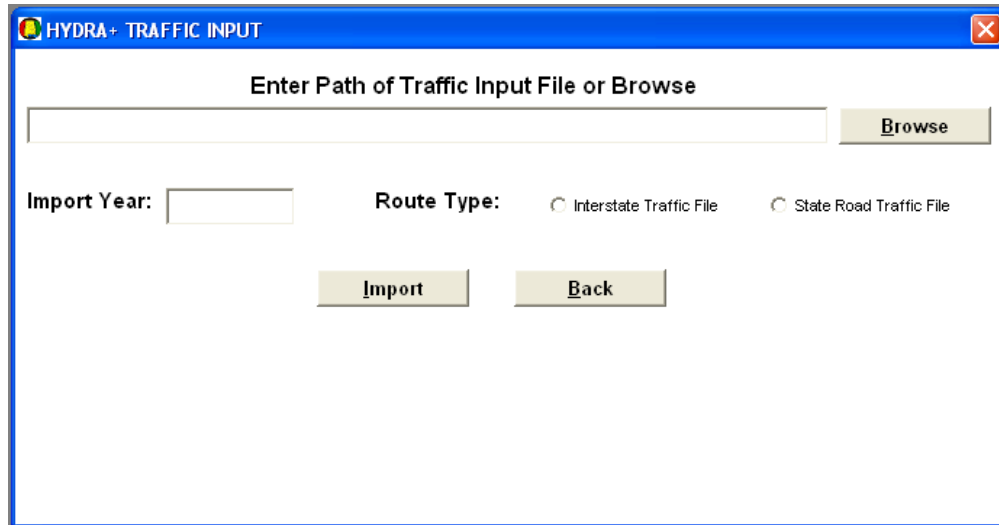
Figure B.11: Traffic data input interface

Description of Features and Fields

- **Browse**:

  Allows the user to locate the desired file by manually looking through directories. Selecting this will produce the following user interface window:
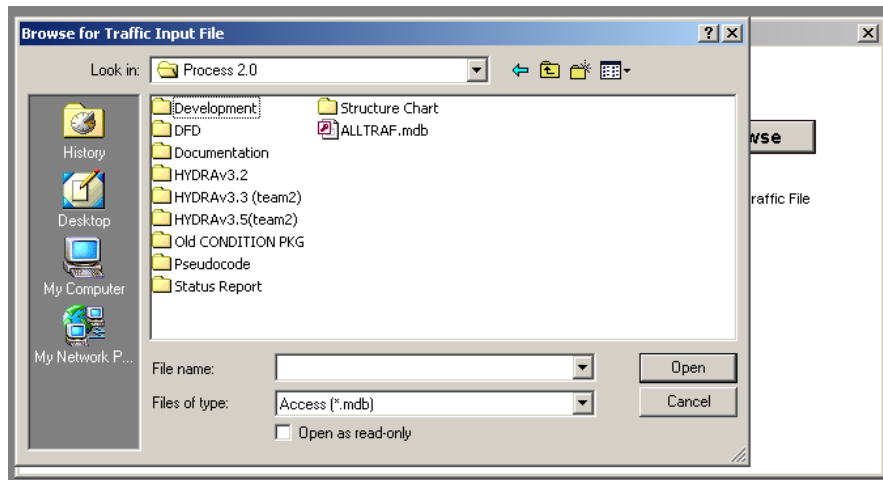
Figure B.12: Choose traffic input file

  Select the Microsoft Access database that contains the desired TRAFFIC (in this example, the user should select the file 'ALLTRAF.mdb').

After finding and selecting the appropriate TRAFFIC database, select the **Open** button; this will transfer the pathname of the file to the HYDRA+ user interface.

- o **NOTE:** The traffic tables **MUST** be named '*TRAFFICYYYY*' where YYYY is the year (ex: 'TRAFFIC2003'). The field names and the data types in the table must match the table structure defined in Appendix A.

- **Import Year**:

The user should enter the year corresponding to the data that is to be loaded. The format is 'YYYY' (example: 2003). This should match the year in the table name in the Access database.

- **Route Type**:

The user must select one of the following radio buttons: Interstate Traffic File or State Road Traffic File. This selection provides the data load process with necessary reporting and querying functionality.

- **Import**:

Clicking the **Import** button initiates the data import process from the selected Microsoft Access database.

- o **NOTE:** All necessary fields must be filled correctly in order for the automated data load to execute properly.

- **Back**:

Selecting **Back** aborts the current data load session and returns to the **Data Input** tab screen (see Step 2 in section II. A).

Step 4:

Select the **Import** button to initiate automated TRAFFIC data load. The user will be shown a progress screen that will display the status and estimated completion of the TRAFFIC data load.

After the data load is complete, the following screen will appear to provide the user with summary statistics of the data import:
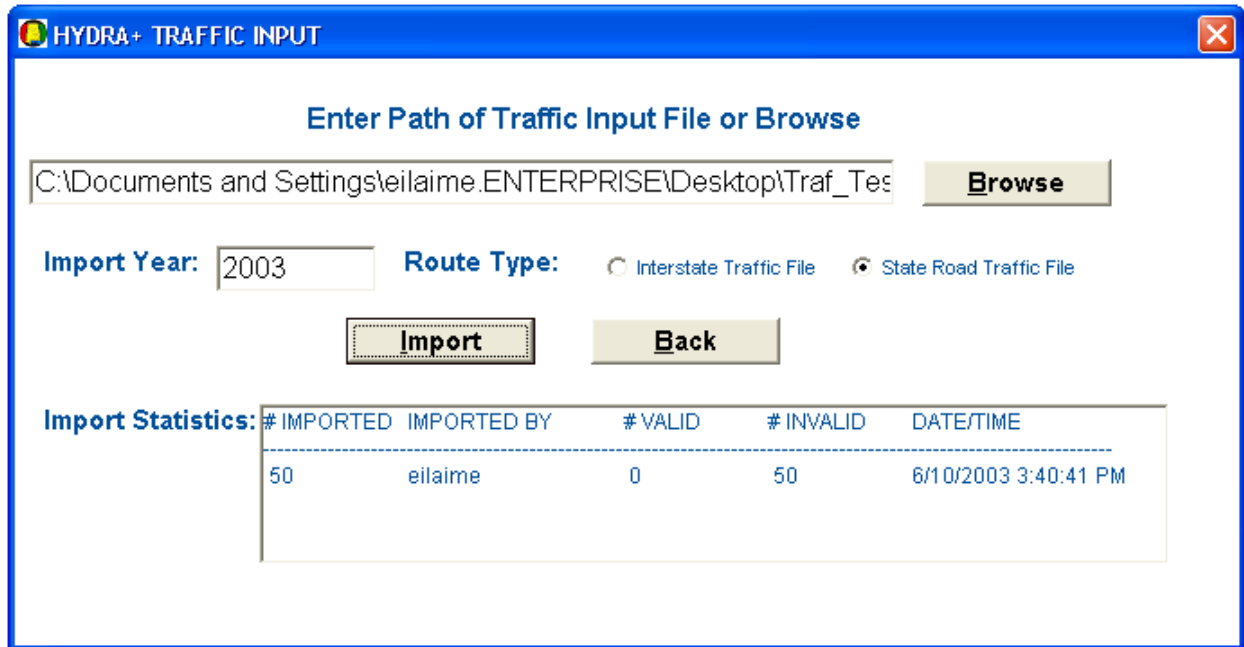
Figure B.13: Traffic data import results and statistics

Step 5:

To view any errors associated with the automated data load, begin by opening the HYDRA+ program and select the **Data Input** option from the interface selection screen:
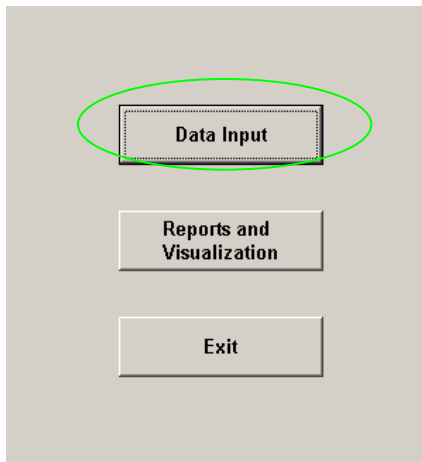
Figure B.14: Interface selection screen

Step 6:

Select the **Data Validation** tab and click the Traffic radio button from the **Data Type** field. Select a year from the drop-down menu. This will enable the **Correct Invalid Data** button. Click it to begin correcting invalid records.
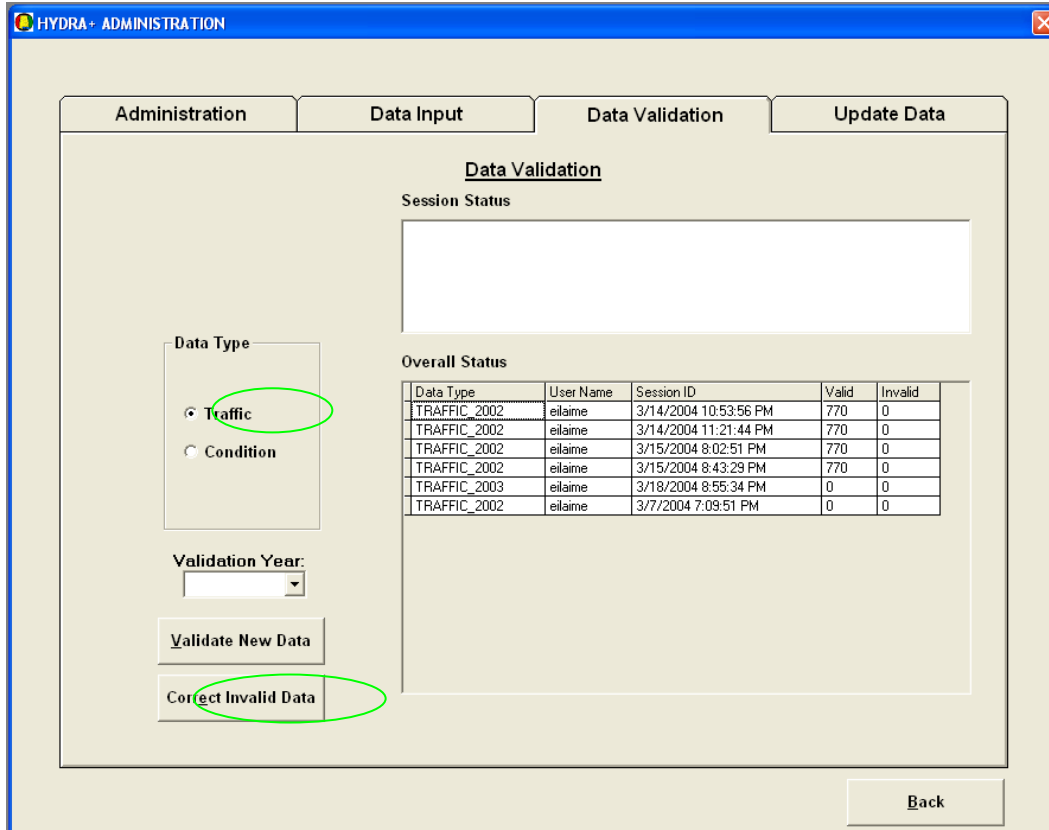
Figure B.15: Data validation tab, traffic

Step 7:

On the following screen a list of records and their corresponding errors are shown. The user must first click on a record to see the errors associated with that record. The errors will appear in the table at the top of the screen. To correct the errors, click on the record and type the correct value into the corresponding field(s).

Error Log

HYDRA+ ERROR LOG

Code	Error Text	User	Time	Datatype	Record #	Session
129	Condition LONGTI3 out of range	eilaime	2003-06-09 21:09:50	CONDITION	166313	eilaime6/9/2003 6:10:00 P
162	Condition Sum of Longitudinal Cracking Exceeds .5 * Lane Width * Sample Size	eilaime	2003-06-09 21:09:50	CONDITION	166313	eilaime6/9/2003 6:10:00 P

Invalid Records

Division	Route T	Route	Directio	Lane	Milepos	Date R	IRI1	IRI2	TEX RM	TEX MF	RRUT	LRUT	Grade	LATDE	LATMIN	LATSE	LONGD	LONGM	LONGS	RATER	ARAN	Patchin	P
2	AL	24	S	1	75.354	1/15/20	1.22	1.76	0.64	0.942	3	6	0.4	34	28	25.05	-87	23	3.62	WX	1727	0	0
2	AL	24	S	1	75.304	1/15/20	1.1	2.27	1.113	1.39	4	3	0.3	34	28	24.46	-87	23	5.43	WX	1727	0	0
2	AL	24	S	1	75.154	1/15/20	1.45	1.63	0.89	1.226	3	6	-0.6	34	28	22.79	-87	23	10.95	WX	1727	0	0
2	AL	24	S	1	75.104	1/15/20	1.21	1.13	0.765	1.091	2	4	-0.8	34	28	22.21	-87	23	12.79	WX	1727	0	0
2	AL	24	S	1	75.004	1/15/20	1.51	1.6	0.754	1.14	4	3	-0.8	34	28	21.04	-87	23	16.44	WX	1727	0	0
2	AL	24	S	1	71.404	1/15/20	1.3	1.92	0.747	1.043	4	4	-0.4	34	28	11.59	-87	25	34.51	WX	1727	0	0
2	AL	24	S	1	71.304	1/15/20	1.29	2.14	0.565	0.9	6	3	-1.1	34	28	11.65	-87	25	38.44	WX	1727	0	0
2	AL	24	S	1	71.254	1/15/20	2.07	1.64	0.673	1.052	2	6	-0.4	34	28	11.69	-87	25	40.39	WX	1727	0	0
2	AL	24	S	1	71.204	1/15/20	1.91	1.85	0.606	0.851	2	5	-0.4	34	28	11.7	-87	25	42.34	WX	1727	0	0
2	AL	24	S	1	71.154	1/15/20	1.92	2.23	0.624	0.943	2	5	-0.2	34	28	11.74	-87	25	44.29	WX	1727	0	0
2	AL	24	S	1	71.104	1/15/20	1.59	1.37	0.59	0.973	2	7	0.2	34	28	11.77	-87	25	46.27	WX	1727	0	0
2	AL	24	S	1	71.054	1/15/20	1.44	2.28	0.58	0.894	3	3	1	34	28	11.81	-87	25	48.22	WX	1727	0	0
2	AL	24	S	1	70.004	1/15/20	2.22	1.97	0.663	0.987	4	5	-0.5	34	28	12.69	-87	26	29.34	WX	1727	0	0
2	AL	24	S	1	69.354	1/15/20	1.92	1.95	0.687	1.117	6	5	-1.3	34	28	13.34	-87	26	54.83	WX	1727	0	0
2	AL	24	S	1	69.154	1/15/20	2.82	3.9	0.594	0.888	4	3	-0.5	34	28	13.02	-87	27	2.62	WX	1727	0	0
2	AL	24	S	1	69.104	1/15/20	2.42	4.86	0.982	1.303	10	4	-0.1	34	28	12.69	-87	27	4.55	WX	1727	0	0
2	AL	24	S	1	69.054	1/15/20	1.82	2.59	0.931	1.42	5	3	0	34	28	12.33	-87	27	6.44	WX	1727	0	0
2	AL	24	S	1	69.004	1/15/20	1.76	2.55	0.761	1.174	5	3	0.2	34	28	11.84	-87	27	8.31	WX	1727	0	0
2	AL	24	S	1	66.254	1/15/20	1.46	1.2	0.473	0.745	6	2	-1.2	34	27	49.1	-87	28	52.22	WX	1727	0	0
2	AL	24	S	1	65.839	1/15/20	1.42	1.5	0.421	0.651	2	5	-0.6	34	27	49.68	-87	29	8.61	WX	1727	0	0
2	AL	13	N	2	485.408	1/15/20	0.54	0.91	0.262	0.356	2	1	0.6	34	35	14.92	-87	40	37.7	WX	1727	0	0
2	AL	13	S	2	499.409	1/16/20	1.54	1.32	0.424	0.64	2	2	-0.1	34	42	14.66	-87	40	2.9	WX	1727	0	0
2	AL	13	S	2	496.109	1/16/20	1.75	1.55	0.339	0.461	3	1	1.5	34	40	28.6	-87	39	52.63	WX	1727	0	0
2	AL	13	S	2	493.309	1/16/20	1.63	1.85	0.395	0.551	1	2	-3.4	34	39	2.67	-87	39	17.31	WX	1727	0	0
2	AL	13	S	2	493.059	1/16/20	1.27	1.48	0.407	0.574	2	1	-3.4	34	38	54.98	-87	39	14.18	WX	1727	0	0
2	AL	13	S	2	492.809	1/16/20	1.73	1.68	0.506	0.671	4	2	-2	34	38	47.3	-87	39	11.02	WX	1727	0	0
2	AL	13	S	2	484.098	1/16/20	1.01	1.36	0.27	0.404	1	1	3.6	34	34	34.51	-87	40	59.12	WX	1727	0	0
2	AL	13	N	2	484.908	1/15/20	0.67	1	0.316	0.396	1	1	-1.8	34	34	60	-87	40	45.42	WX	1727	0	0
2	AL	19	N	1	41.989	1/19/20	2.19	2.53	0.242	0.267	2	2	-3.7	34	20	58.11	-88	1	60	WX	1727	0	0

Clear   Print Report   Resubmit   Back

Figure B.16: Correct invalid traffic records

Step 8:

If the **Print** button is clicked, a progress box will appear to indicate that an exception report is being generated in an Excel spreadsheet. When the printing process completes, the user may return to the ***Error Log*** screen and correct the errors. The user may print the generated report by using the **Print** function inside Excel. The user may also save the report by using Excel's **Save** function.
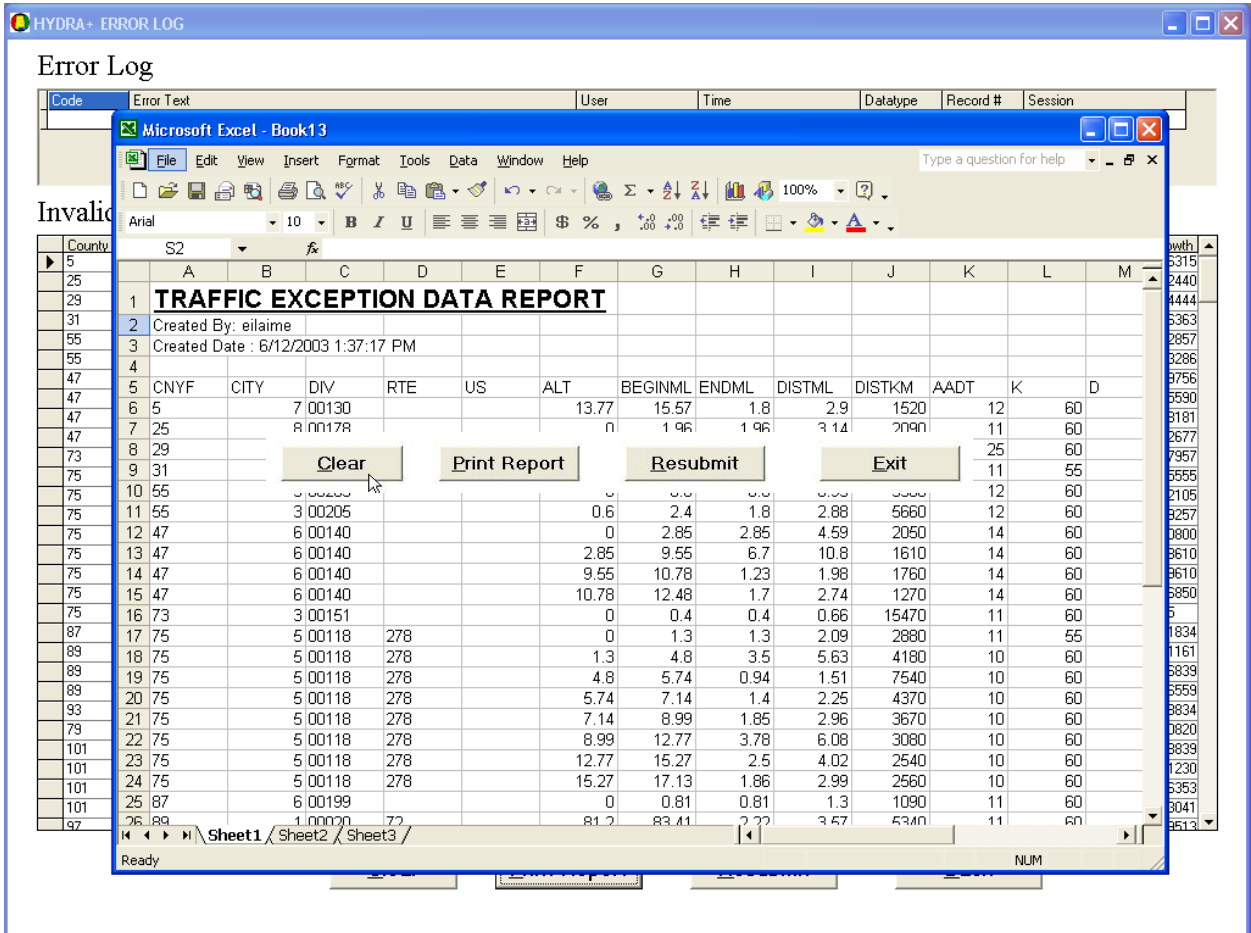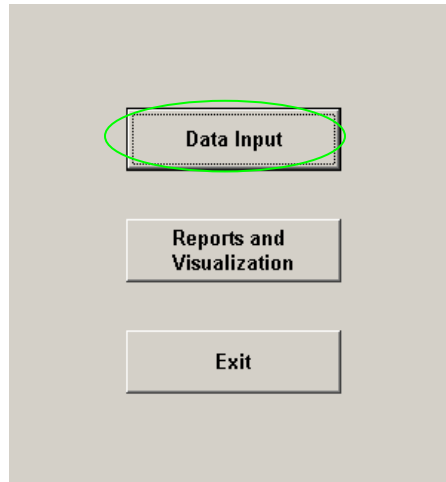
Figure B.17: Traffic exception data report (Excel)

B. Condition Automated Data Load

Step 1:

Open the HYDRA+ program and select the **Data Input** option from the interface selection screen:

Figure B.18: Interface selection screen

<u>Step 2:</u>

Select the CONDITION radio button from the **Data Type** field. Then select the **Input Data** button.
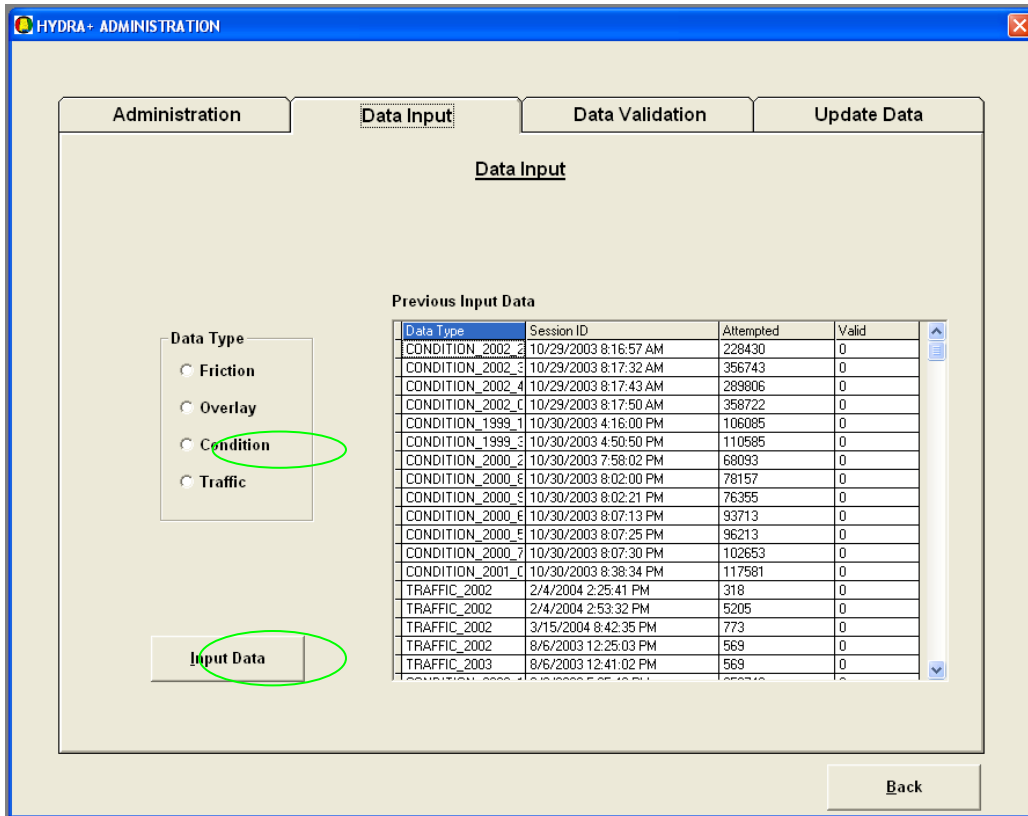
Figure B.19: Data input tab, condition

Step 3:

Begin entering the required information for the CONDITION data to be loaded.
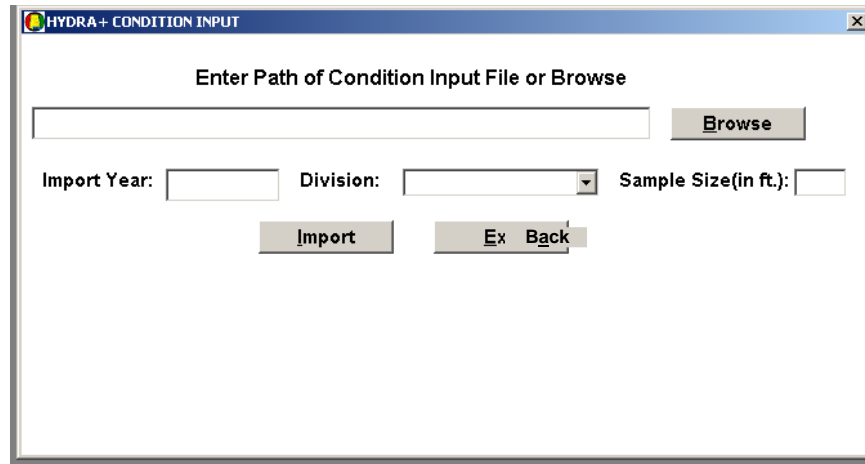
Figure B.20: Condition data input interface

Description of Features and Fields

- **Browse:**
  This allows the user to locate the desired file by manually looking through directories.

  Selecting this will produce the following user interface window:
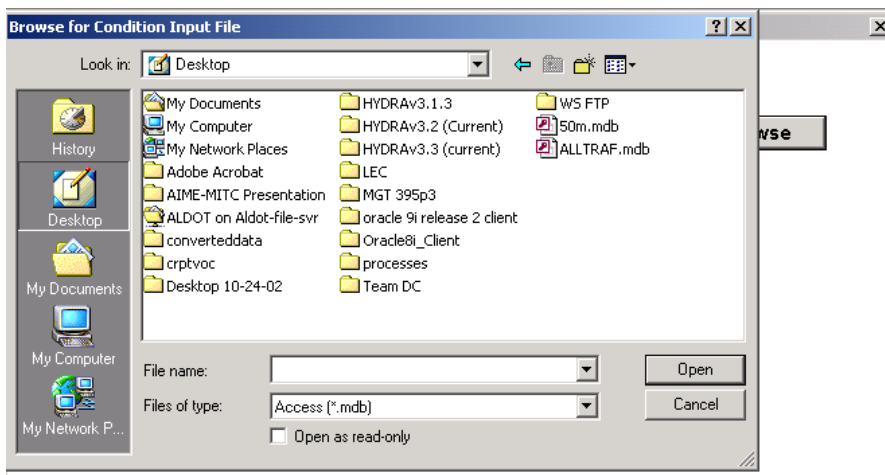
Figure B.21: Choose condition file

Select the Microsoft Access database that contains the desired CONDITION (in this example, the user should select the file '50m.mdb').

After finding and selecting the appropriate CONDITION database, select the **Open** button; this will transfer the pathname of the file to the HYDRA+ user interface.

- o **NOTE:** The condition tables **MUST** be named '*CONDITIONYYYY*' where YYYY is the year (ex: 'CONDITION2003'). The field names and the data types in the table must match the table structure defined in Appendix B.

- **Import Year:**

    The user should enter the year corresponding to the data that is to be loaded. The format is 'YYYY' (for example: 2003). This should match the year in the table name in the Access database.

- **Sample Size:**

    This field is intended to describe the length, **in feet**, of road surface that has been inspected regarding CONDITION data. The value entered must be of type integer, greater than 0, and no more than 1000.

- **Division:**

    The user must select a specific Division, #1-9. This selection will provide the data load process with necessary reporting and querying functionality.

- **Import:**

    Selecting **Import** initiates the data import process. All necessary fields must be filled correctly in order for the automated data load to execute properly.

- **Exit:**

    This feature aborts the current data load session and allows the user to return to the **Data Input** tab screen (see Step 2 on page 19).

Select **Import** button to initiate automated CONDITION data load. The user will be shown a progress screen that will visually represent the status and estimated completion of the CONDITION data load.

After the data load is complete, a statistic screen will appear (similar to the TRAFFIC statistic screen in Automated TRAFFIC Load) to provide the user with summary statistics of the data import.

Step 5:

To view any errors associated with the automated data load, begin by opening the HYDRA+ program and select the **Data Input** option from the interface selection screen:
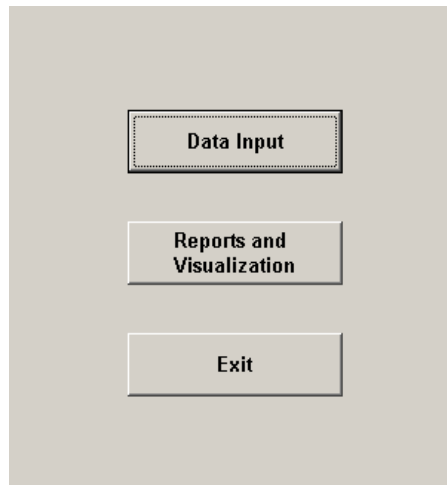
Figure B.22: Interface selection screen

Step 6:

Select the **Data Validation** tab and click the CONDITION radio button from the **Data Type** field. Then select the **Correct Invalid Data** button.
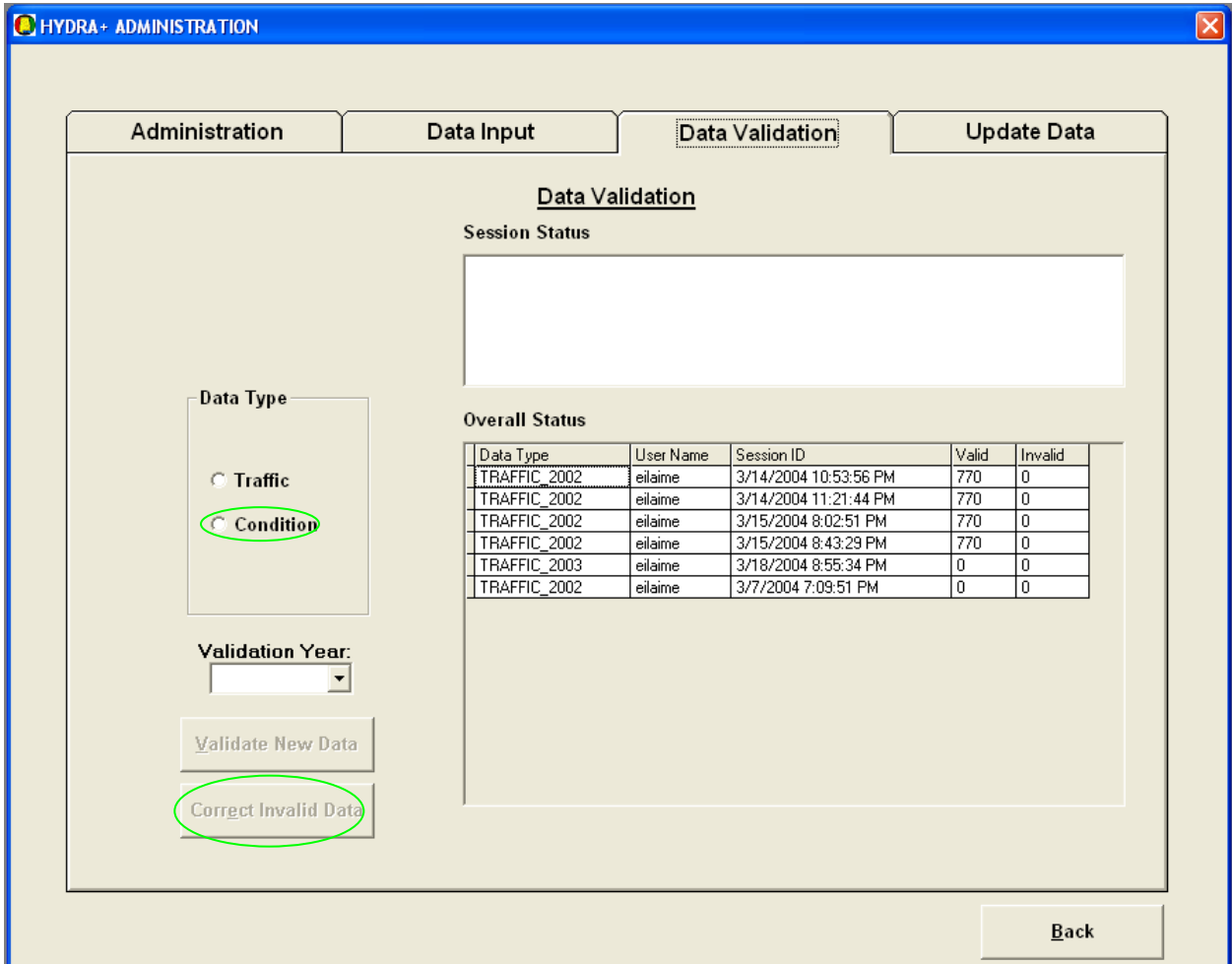
Figure B.23: Data validation tab, condition

Step 7:

On the following screen a list of records and their corresponding errors will be shown. The user must first click on a record to see the errors associated with that record. To correct the errors, click on the record and type the correct value into the corresponding field.

Corrected records should then be resubmitted for revalidation. The corrected records will be removed from the Invalid Records list.

Figure B.24: Correct invalid condition records

Step 8:

If the print button is clicked, a progress box will appear, indicating an exception report is being generated in an Excel spreadsheet. This will allow the user to print all the errors so that he/she may look through them by hand. Once done, the user can come back to the above screen and correct the errors. The user may print the report by using the Print function inside Excel. The user may also save the report by using Excel's Save function. There is also a Resubmit button that resubmits the re-entered data (this will be better explained later in the manual).
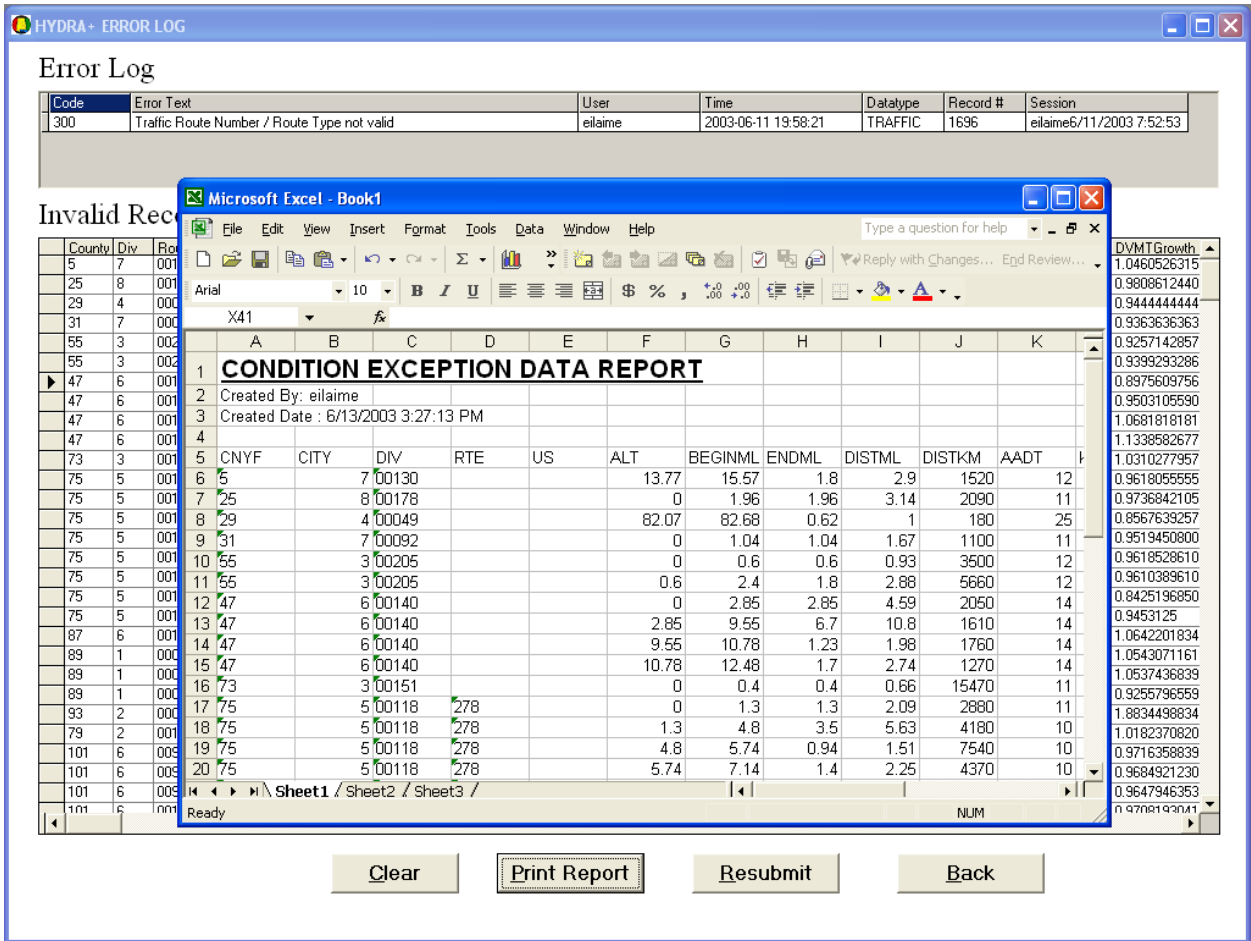
Figure B.25: Condition exception data report (Excel)

Section 4: Manual Data Load User Information

A. Manual Friction Data Load

The purpose of this process is to allow users to manually input Friction records. This process will constrain the range and types of data entered according to the limits given by the Alabama Department of Transportation. Follow the steps and diagrams below to input friction data manually.

> **Note:** Manual data inputting is the only functionality of the system available to users with role of Supervisor.

Step 1:
Open the HYDRA+ program and select **Data Input** from the interface selection screen.
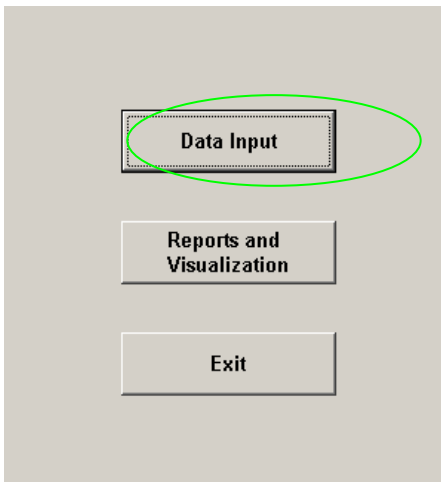
Figure B.26: Interface selection screen

Step 2:
Select the **Data Input** tab.
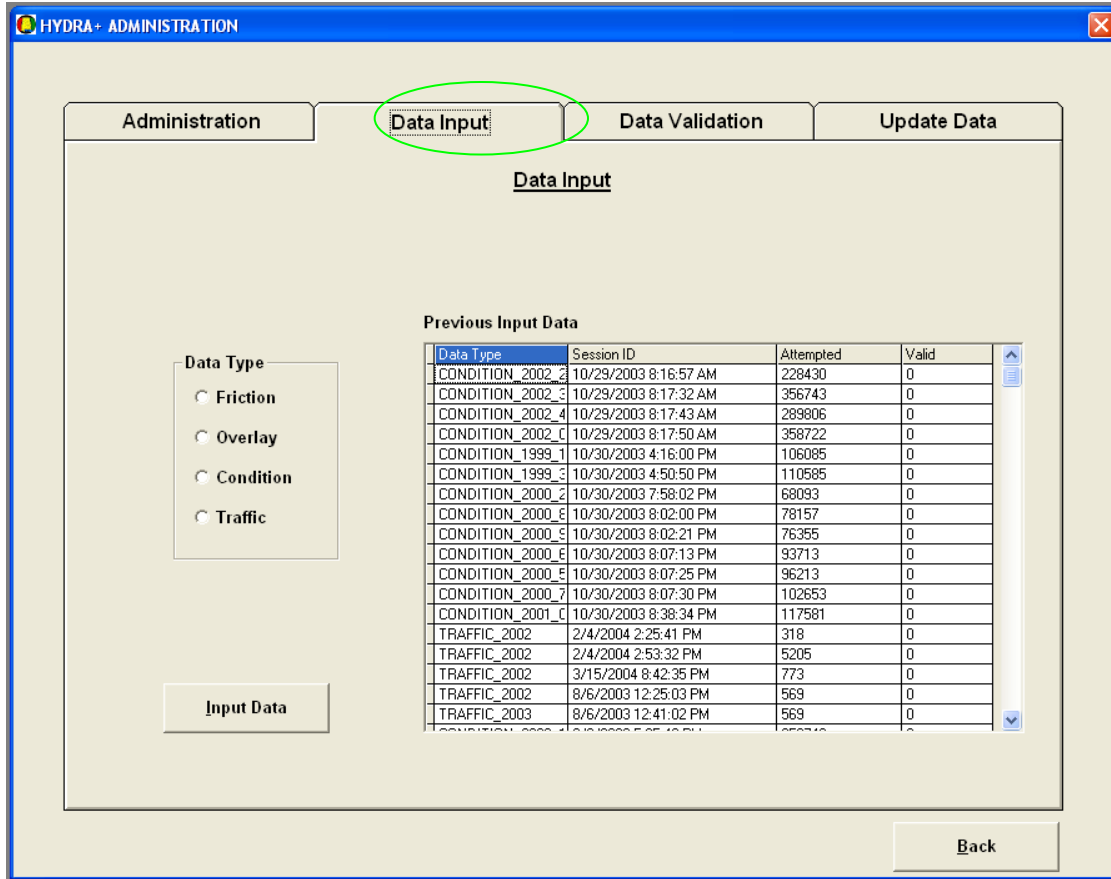
Figure B.27: Data input tab

Step 3:

Select the **Friction** from the **Data Type** box. Then click the **Input Data** button.
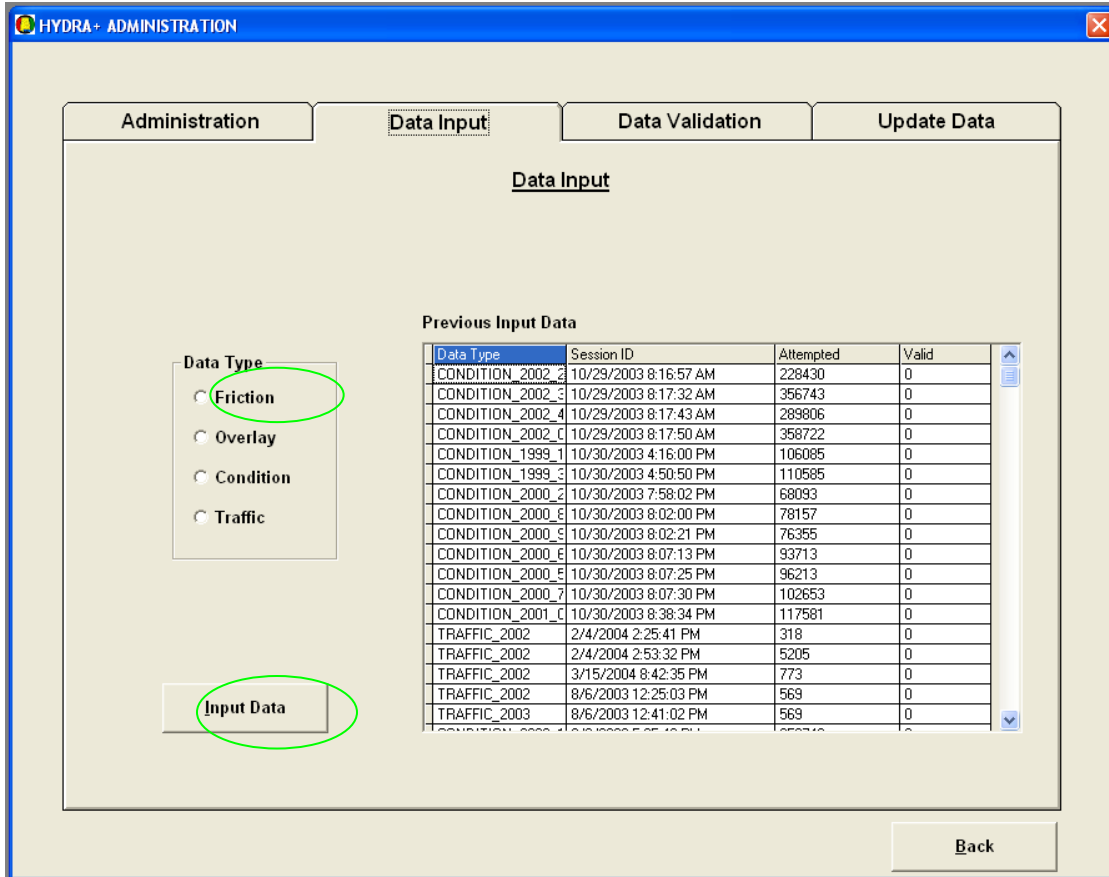
Figure B.28: Data input tab, friction

Step 4:

Enter the year of the data being entered and click the **OK** button.
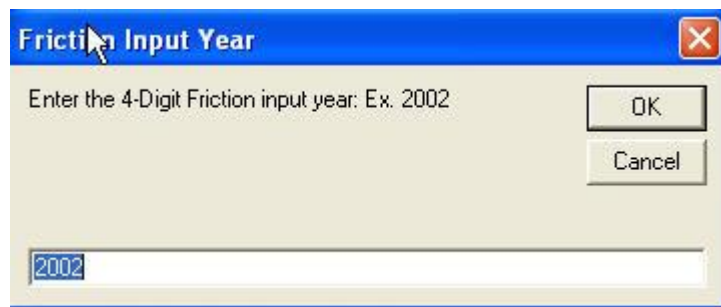
Figure B.29: Friction input year selection

Step 5:

Use the form below to manually input friction information into the database.

Figure B.30: Manual friction data entry

Description of Features and Fields for Friction Input

- **Division:**
  Valid data is a number 1-9 representing the divisions of the state.

- **Route Type:**
  Valid data is IN (Interstate) or AL (Alabama) which can be selected from the drop down menu. A user can also type in the Route Type.

- **Route Number:**
  Valid data must be a whole number greater than zero. Ex. 256
  Note: The system will not allow the user to input Route Numbers if the combination of a Route Number and Route Type are not inside the specified division. An Error Message will appear showing the record is invalid.

- **Mile Post:**
  This is Mile post where the Friction has taken place. Valid data is a number with up to one decimal point. Ex: 136.5

Note: To insert continuous Mile Posts with all the other same fields just change the Mile Post field and press Add. If the Mile Post has a different Modifier, press the Reset button and insert new data into the reset fields.

The system will not allow the user to input Mile Posts that are not within an overlay. The system verifies that the combination of a Route Number, Route Type and Mile Post are inside a division; otherwise, an Error Message will appear showing the record is invalid.

- **Direction:**
  Valid data is N (north), E (east), S (south), or W (west) which can be selected from the drop down list. A user can also type in the direction.
  Note: For odd Route Numbers only N (north) and S (south) directions are valid. For even Route Numbers only E (east) and W (west) directions are valid. If invalid data is entered, the system will give an Error message.

- **Date:**
  Valid data must be entered in the following format: mm/dd/yyyy. Ex: 04/07/2002

- **Friction Number:**
  Valid data is a whole number between 0 and 100. However, any value less than 20 or greater than 65 is considered to be an abnormal rating therefore a warning will appear asking the user if he/she is certain the value entered is correct. Ex: 54

- **Modifier:**
  Valid data is ($) Lime, (A) Overlay, (B) Bridge, (C) Concrete, (D) Detour, (E) Full patch, (F) Bleeding, (G) Ground, (H) Raveled, (L) Older, (M) Muddy, (N) Newer, (O) Oily, (P) Patching, (R) Old Pavement, (S) Skin Patch, (V) Leveling, (W) Wheel Path Level, and (X)Leveling will appear as a drop down list. Ex: (A) Overlay
  Note: This field will not accept user input by keyboard.

- **Air Temp:**
  Valid data is a whole number between 30 and 110. Ex: 74

- **Back Button:**
  Clicking this button will exit the data entry session and take the user back to the administration screen.

- **Add Button:**
  Click this button to add the Friction Input into the HYDRA+ system. To submit a new Friction Input, all the fields must contain values except the Modifier. If there are values that have not been entered, the system will notify the user that the Add process can not take place until the values are filled.
  Note: The system will not allow the user to input the same Input Record twice. An error message will appear showing that the record is a duplicate.

- **Reset Button:**
  Clicking this will allow the user to reset all the fields on the screen to blank.

- **Update Button:**
  Clicking this will allow the user to update selected data already in the friction table with the new data entered into the friction data input fields.
  Note: The system will verify if the updated Record is consistent with all of the above requirements; otherwise, an Update will not be performed.

B. Manual Overlay Input User Information

The purpose of this process is to allow users to input data about all of the Overlays that are completed within a given reporting year. This process will constrain the range and types of data entered according to the limits given by the Alabama Department of Transportation. Follow the steps and diagrams below to input overlay data.

Step 1:
Open the HYDRA+ program and select **Data Input** from the interface selection screen.
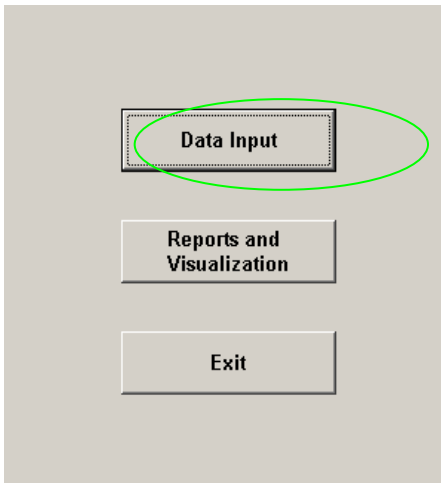
Figure B.31: Interface selection screen

Step 2:

Select the **Data Input** tab.

Step 3:

Select the **Overlay** radio button from the **Data Type** field. Then click the **Input Data** button.
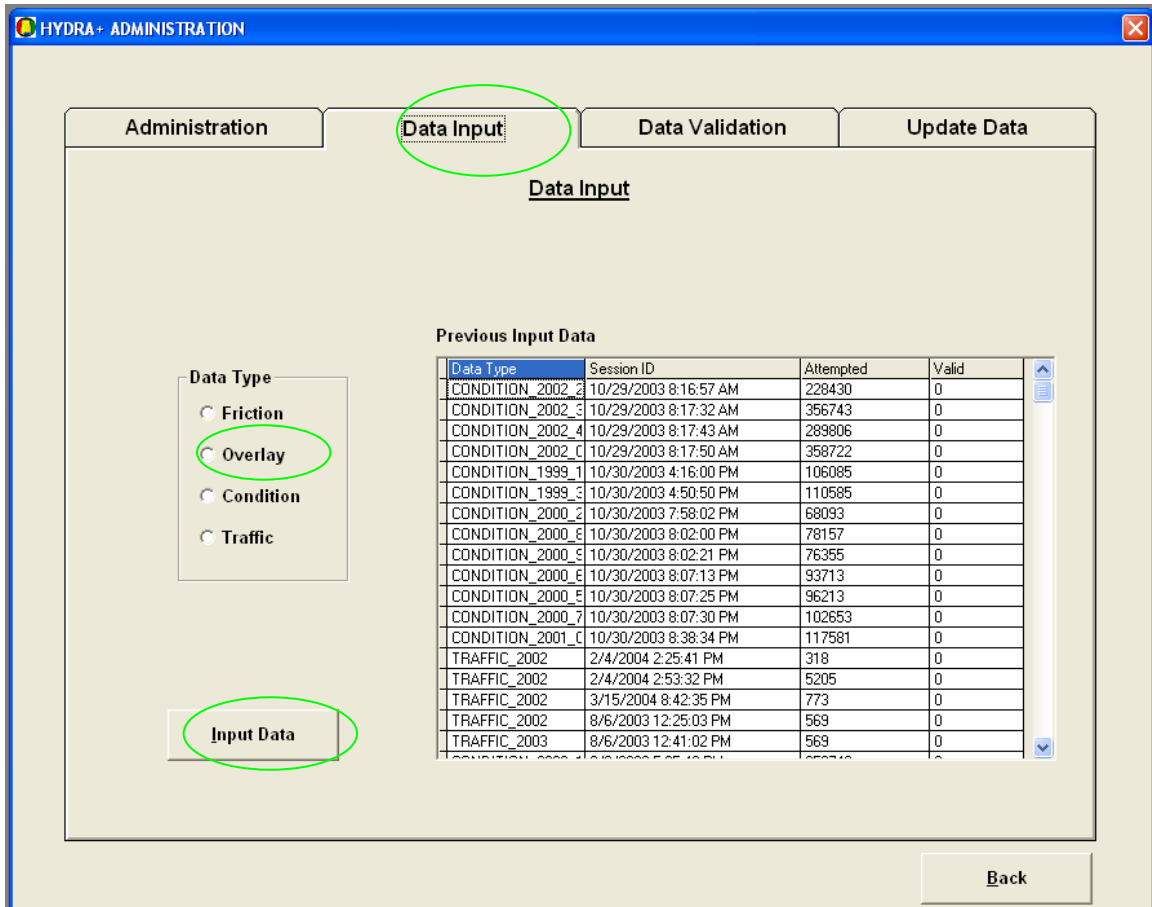
Figure B.32: Data input tab, overlay

Step 4:

Enter the **Input Year** for the overlays to be entered and click the **OK** button.
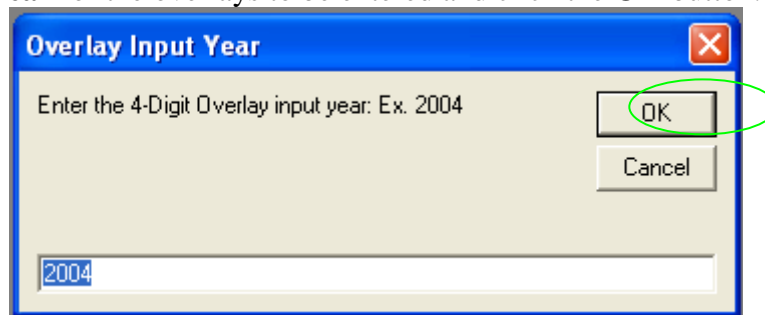
Figure B.33: Overlay input year selection

Step 5:

Begin entering valid data according to the form guidelines.

Figure B.34: Overlay data input

Description of Features and Fields for Overlay Input

General Overlay Condition

- **Route Type:**
  This is the type of route on which the Overlay has been placed which can be selected from the drop down box. Ex: IN or AL

- **Route Number:**
  This is the specific route number where the Overlay has been placed. Must be a whole number greater than zero. Ex: 256

- **County Name:**
  This is the county where the Overlay has taken place. All available counties will be in the drop-down list. This field has auto-completion capabilities for keyboard input but will only allow the user to type in values that are in the list.

- **Division:**
  This is the division number (1-9) where the Overlay has taken place. All division numbers will be in the drop-down list. This field will also take keyboard input.

- **Maintenance Section:**
  This is the Maintenance Section ID that is related to the Overlay being entered. This field should follow **standard** Alabama Department of Transportation Format for Maintenance Section ID's. **Ex. 17-002-01AP1**.
    - **Standard →** The first two digits of the Maintenance section ID will be the FIPS county number or the line number of the county record in the flat file. The next 3 digits after the dash represent the state route number. The next two digits represent whether the segment falls within rural (01-49) or urban (50 and up) areas. The letter following represents the paving type (A – Asphalt, C – Concrete, B – Bridge, T – Tunnel). The next letter will be a "P." The last two digits are reserved for the paving segment number. This will be a number but may not always fill two digits. Ex: 1 instead of 01 and the number can go higher than 10.

- **Beg MP:**
  This is the milepost that marks the beginning of an Overlay. The field will accept positive values up to 9999.999.

- **End MP:**
  This is the milepost that marks the end on an Overlay. The field will accept positive values up to 9999.999. The ending milepost should be the larger of the two numbers. Ex: Beg MP = 26.5   End MP = 34.7

- **Beg KM:**
  This is the kilometer post that marks the beginning on an Overlay. The field will accept positive values up to 9999.999. Input to this field has been disabled to avoid confusion, although it will still auto-populate when miles are entered.

- **End KM:**
  This is the kilometer post that marks the end on an Overlay. The field will accept positive values up to 9999.999. Input to this field has been disabled to avoid confusion, although it will still auto-populate when miles are entered.

- **Description:** This is general descriptive information about the physical location of the Overlay.

- **Producer:**

This is the name of the producer associated with the aggregate mix as related to an overlay. All available producers will be in the drop-down list. This field has auto-completion capabilities for keyboard input but will only allow the user to type in values that are in the list.

- **Placer:**
  This is the name of the placer responsible for the completion of the overlay. All available placers will be in the drop-down list. This field has auto-completion capabilities for keyboard input but will only allow the user to type in values that are in the list.

- **Mix Type:**
  This is the mix type code used for the overlay. All active mix types will be in the drop-down list. This field has auto-completion capabilities for keyboard input but will only allow the user to type in values that are in the list.

- **Date Placed:**
  This is the date that the overlay was completed. The acceptable format for date entry includes the month and year of the overlay. e.g. (MM/YYYY) - 03/2004

- **Project Number:**
  This is the project number associated with the overlay. The project number should follow the standards used by the Alabama Department of Transportation. Ex. FR-481

  - **NOTE:** The system will not allow the user to enter the same overlay twice.

Aggregate Information (Coarse and Fine)

- **Agg. Description / Type:**
  This contains aggregate names and descriptions that the user may add to the aggregate list for the overlay. All available aggregates will be in the drop-down list. This field has auto-completion capabilities for keyboard input but will only allow the user to type in values that are in the list.

- **%:**
  This is the mix percentage of the aggregate being added to the aggregate list. It allows the user to enter positive whole numbers from 0 – 100. The % values for all aggregates (fine and coarse) must total to 100%.

- **Source Name / Location:**
  This is the pit name and location of the source of the aggregate. All available sources will be in the drop-down list. This field has auto-completion capabilities for keyboard input but will only allow the user to type in values that are in the list.

- **Add Button:**

Click this button to add an aggregate record to the list of aggregates used in the mix for an Overlay. In order to add a new aggregate to the list, all of the relating fields must contain a value (Agg. Description / Type, %, and Source Name / Location). There can be no more than 15 aggregates added to each of the two lists (coarse and fine).

- **Delete Button:**
  Click this button to delete one of the aggregate records that is in the list. In order to delete an aggregate, the corresponding record must be highlighted in the list.

General Function Buttons

- **Submit Button:**
  Click this button to add the Overlay into the HYDRA+ system. To submit a new Overlay all of the fields must contain values. If there are values that have not been entered, the system will notify the user that the submit process can not take place until the values are filled. If the aggregate list total does not equal 100%, the user will be notified and he or she will be given the opportunity to continue using the incorrect data, or correct this error.

- **Reset Button:**
  Click this button to reset all of the fields on the screen to blank.

- **Search Button:**
  Click this button to begin a search of a previously entered Overlay that is within the current input year. The *first* time the user clicks this button, the search screen will be setup and only allow the key fields to be entered (Type, Route, Beg MP, and End MP – all required). Once the search criteria has been entered, click the Search button *again (second time)* and it retrieves actual data between the input parameters for that year. Then the next and back buttons allow for navigating through those data sets.

  NOTE: pressing this button will enter Search and Edit mode, and the user will not be allowed to enter new records until returning to Overlay Input.

- **Edit Overlay Button:**
  Click this button to edit an Overlay that has been returned by a search and has now populated all of the fields on the screen. This will enable the user to alter the values in each of the Overlay input fields as needed. The user will only be able to click this button if a previously entered Overlay has been searched and found within the current input year.

- **Update Button:**
  Click this button to add an updated (changed) Overlay into the HYDRA+ system. When the update button is clicked, all of the fields on the screen will take the place of the old Overlay record in the HYDRA+ system. In the event that the user

needs to retrieve old values for the Overlay, the changes are placed in an Overlay transaction log (contact your database administrator to retrieve the old values). If there are values that have not been entered, the system will notify the user that the update can not take place until the values are filled. If the aggregate list total does not equal 100%, the user will be notified and he or she will be given the opportunity to continue the update with incorrect data or correct this error.

- **<u>Return to Input Button:</u>**
  Click this button to return to the normal new Overlay Input mode. The user has the ability to click this button at any point in the search, find, and edit modes of the Overlay Input section of HYDRA+ to return to standard input.

- **<u>Exit Button:</u>**
  Clicking this button will exit the data entry session and return the user to the administration screen.

Section 5: Automated Input Data Validation

The data validation function allows the user to validate data that has been entered in the current session or any data from previous sessions which have not yet been validated. Functionality is also provided to correct errors that have been found in data that has been loaded.

<u>**Step 1:**</u>

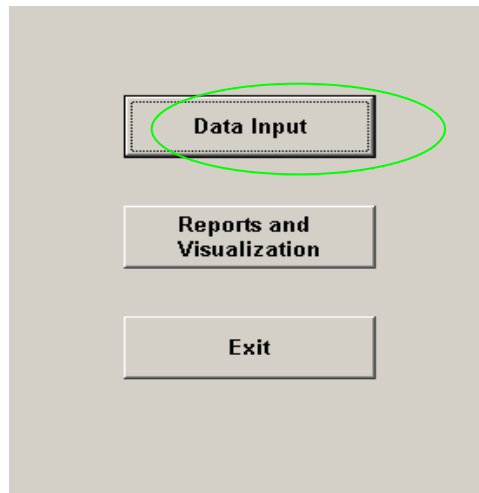Open the HYDRA+ program and select the **Data Input** option from the interface selection screen

Figure B.35: Interface selection screen

Step 2:

Select the **Data Validation** tab then select the type of data and year of data that you would like to validate by clicking the radio button associated with the data type.
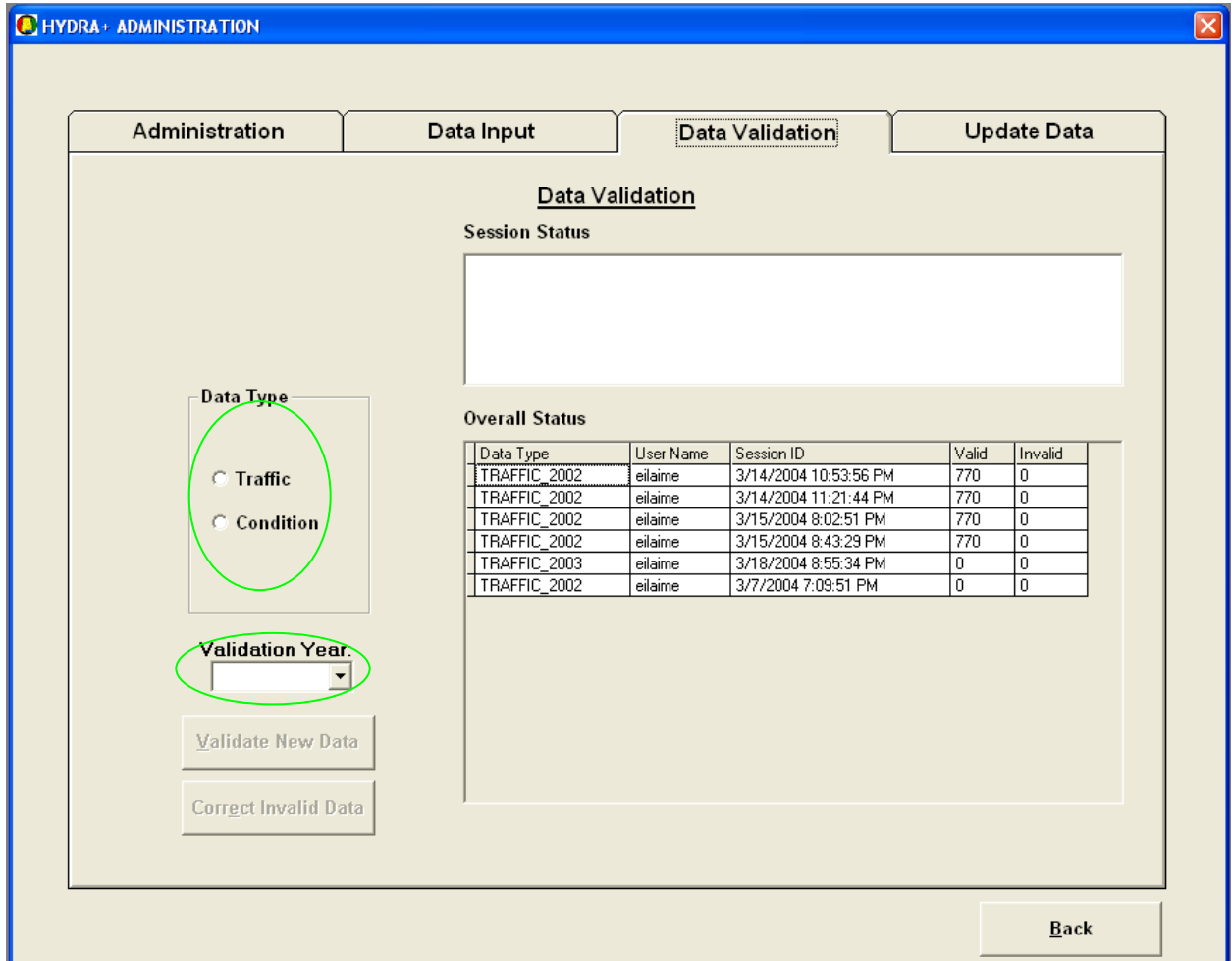
Figure B.36: Data validation tab

Step 3:

Click the **Validate New Data** button and a message will be shown indicating that the validation is in process.

- **NOTE:** The amount of time required to validate the data will vary depending on the size of the data set.

Step 4:

Once the validation is complete for a data set, some basic information about the validation process will be displayed in the **Session Status** window. This information includes the number of valid and invalid records as well as the user name and session ID associated with that particular validation process.
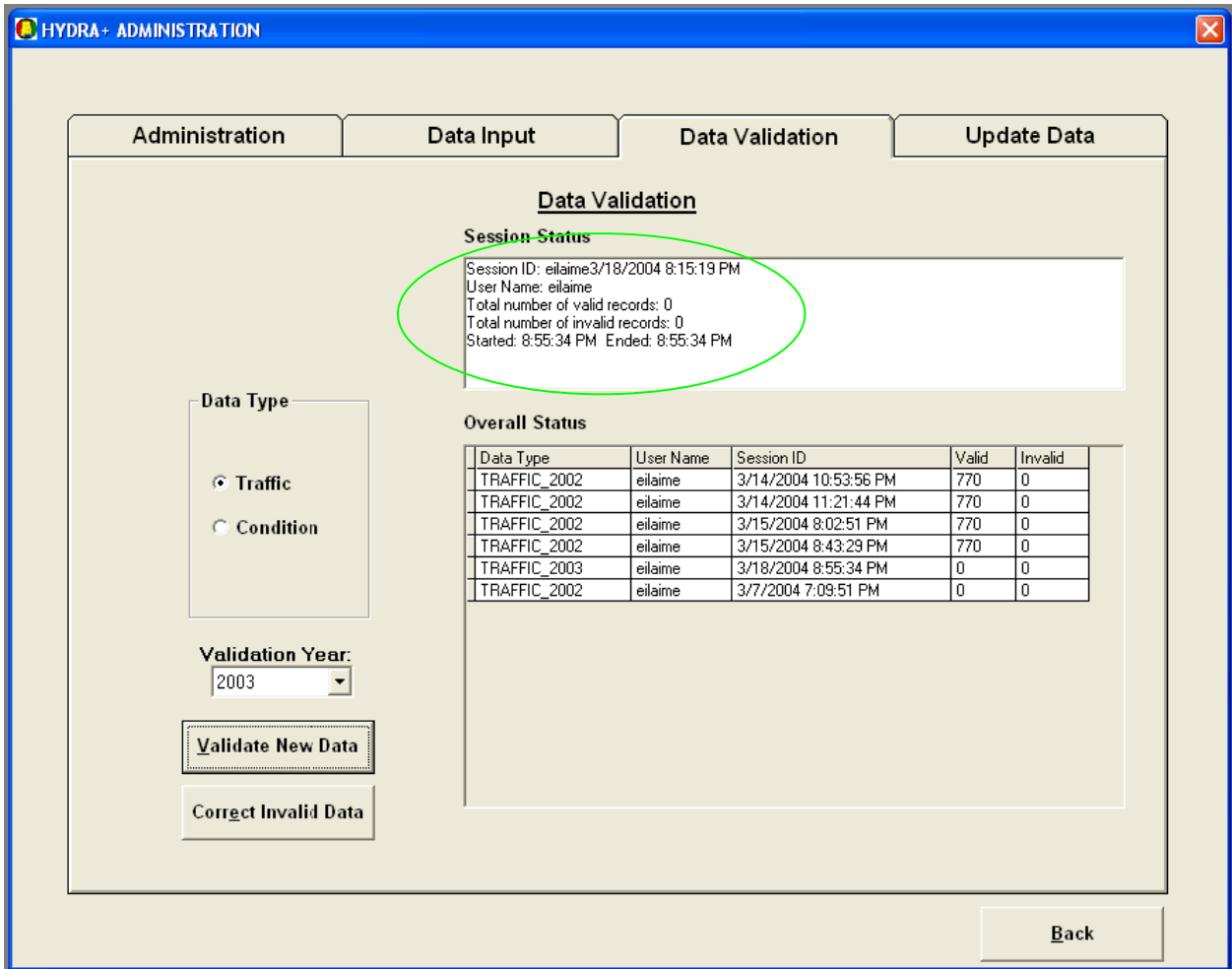
Figure B.37: Data validation tab, traffic

Step 5:

If the validation procedure has found records that are invalid then the user can correct those records by selecting the desired data type radio button, then clicking the **Correct Invalid Records** button. When the button is clicked a screen will be displayed containing two data grids. The data grid on the top contains the "errors" associated with a record and the data grid on the bottom contains the contents of the entire record. To correct records, click on a record to see what errors are associated with it. Then click in the field that you would like to change and enter the desired value. You can change multiple records before resubmitting them.

Error Log

Code	Error Text	User	Time	Datatype	Record #	Session
131	Condition TRANS2 out of range	eilaime	2004-06-18 00:50:43	TEMPCONDITION2001	108823	INVALID

Invalid Records

ID	Division	Route Type	Route	Direction	Lane	Milepost	Date Rated	IRI1	IRI2	TEX RMS	TEX MPD	RRUT	LRUT	Grade	LATDEG	LATMIN	LATSEC	LONG
109125	0	IN	59	N	1	177.096	2/4/2001	1.09	1.16	0.495	0.582	0	0	-1.6	33	23	12.34	-86
109126	0	IN	59	N	1	177.146	2/4/2001	1.45	1.75	0.559	0.624	0	0	-1.6	33	23	13.82	-86
109127	0	IN	59	N	1	177.196	2/4/2001	1.26	1.08	0.534	0.538	0	0	-1.5	33	23	15.31	-86
109128	0	IN	59	N	1	177.246	2/4/2001	3.35	3.61	0.443	0.469	0	0	-1.6	33	23	16.79	-86
109129	0	IN	59	N	1	177.296	2/4/2001	3	2.25	0.376	0.491	0	0	-1.5	33	23	18.27	-86
109130	0	IN	59	N	1	177.346	2/4/2001	1.77	1.26	0.453	0.488	0	0	-1.5	33	23	19.76	-86
109131	0	IN	59	N	1	177.396	2/4/2001	3.43	2.7	0.367	0.403	0	0	-1.6	33	23	21.24	-86
109151	0	IN	59	N	1	178.396	2/4/2001	1	1.14	0.231	0.289	0	0	-1.2	33	23	50.3	-86
109152	0	IN	59	N	1	178.446	2/4/2001	1.43	1.49	0.452	0.54	0	0	-1.5	33	23	51.7	-86
108822	0	IN	59	N	1	161.878	2/4/2001	1.05	0.99	0.336	0.674	7	7	-1.9	33	16	57.59	-87
108823	0	IN	59	N	1	161.928	2/4/2001	1.4	1.67	0.32	0.642	4	8	-1.7	33	16	58.69	-87
107775	0	IN	59	N	1	109.33	2/4/2001	1.42	1.35	1.115	1.468	7	5	-0.2	33	9	0.68	-87
107809	0	IN	59	N	1	111.03	2/4/2001	0.85	1.36	1.232	1.509	5	5	-0.1	33	9	19.56	-87
107757	0	IN	59	N	1	108.43	2/4/2001	1.33	1.94	1.52	1.881	8	10	0.1	33	8	49.42	-87
107758	0	IN	59	N	1	108.48	2/4/2001	1.03	1.44	1.241	1.619	6	6	0	33	8	50.04	-87
107794	0	IN	59	N	1	110.28	2/4/2001	0.99	1.77	1.106	1.517	6	6	-0.2	33	9	11.83	-87
107856	0	IN	59	N	1	113.38	2/4/2001	2.05	2.04	1.152	1.413	6	8	-0.9	33	9	51.22	-87
117126	0	IN	59	S	1	197.892	2/5/2001	1.93	2.54	0.519	0.568	0	0	-0.2	33	31	12.36	-86
117129	0	IN	59	S	1	197.742	2/5/2001	1.72	2	0.174	0.21	0	0	-0.1	33	31	10.83	-86
117130	0	IN	59	S	1	197.692	2/5/2001	1.9	1.56	0.193	0.238	0	0	-0.2	33	31	10.31	-86
117131	0	IN	59	S	1	197.642	2/5/2001	3.15	2.85	0.314	0.4	0	0	-0.2	33	31	9.79	-86
117132	0	IN	59	S	1	197.592	2/5/2001	1.96	2.21	0.176	0.226	0	0	-0.3	33	31	9.27	-86
117135	0	IN	59	S	1	197.442	2/5/2001	1.93	2.52	0.309	0.428	0	0	-0.6	33	31	7.76	-86
117144	0	IN	59	S	1	196.992	2/5/2001	1.23	1.35	0.249	0.346	0	0	-0.3	33	31	3.13	-86
117145	0	IN	59	S	1	196.942	2/5/2001	1.34	1.82	0.279	0.394	0	0	-0.6	33	31	2.59	-86
117146	0	IN	59	S	1	196.892	2/5/2001	2.16	2.83	0.393	0.488	0	0	-0.6	33	31	2.02	-86
117158	0	IN	59	S	1	196.292	2/5/2001	4.33	1.74	0.352	0.429	0	0	0.7	33	30	51.2	-86
117215	0	AL	15	S	1	182.027	2/6/2001	1.69	2.1	0.48	0.821	6	3	0.6	31	48	57.89	-85

Clear   Print Report   Resubmit   Back

Figure B.38: Traffic error log

Step 6:

After correcting the invalid fields, click the **Resubmit** button. This will take you back to the Validation screen.

Step 7:

To re-validate your new data, select the year and type of data just corrected, and click the **Validate New Data** button.

Section 6: Updating Data

This function allows the user to review, update and correct (as necessary) any data modified or added since the last update. This function is used to associate overlays to all other types of data for reporting purposes, and commits the data to the database.

Step 1:

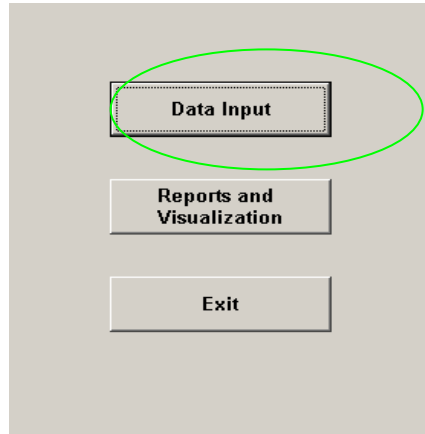Open the HYDRA+ program and select the **Data Input** option from the interface selection screen:

Figure B.39: Interface selection screen

Step 2:

Select the **Update Data** tab then select the type of data and year that you would like to update by clicking the radio button associated with the data type.

Figure B.40: Update data tab (data type)

- **NOTE:** Every year's data must go through the update data process, whether or not data exists for that year. For example: Condition data may only be available every other year, such as 2000 and 2002. Although condition data for 2001 may not be available, it is still necessary to choose that year and update the data before updating 2002 so that associations and projections will be valid for the next year.

Step 3:

Click the **Update Data** button and a message will be shown indicating that the update is in process.

- **NOTE:** The amount of time required to update the data will vary depending on the size of the data set.

Step 4:

Once the update is complete for a data set, some basic information about the process will be displayed in the window to the right. This information includes the type of data updated, the time the process completed, the number of records, and the user ID of the person who ran the update process. This list is cumulative, so it will show previous update processes as well. The most recent record will appear at the bottom.
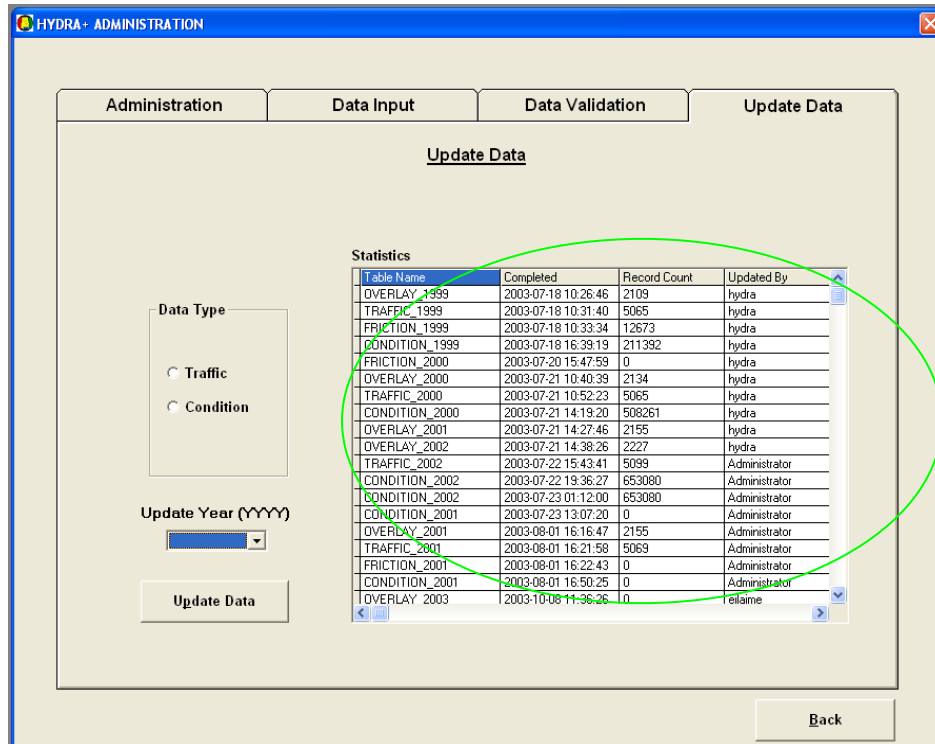
Figure B.41: Update data tab (statistics)

Once all of the data types for a year have been processed, reports may then be run on that data. *Failure to update data before running a report will produce incorrect results*.

Section 7: Reporting Options

A. GASB 34

Step 1:
Open the HYDRA+ program and select **Reports and Visualization** from the interface selection screen.
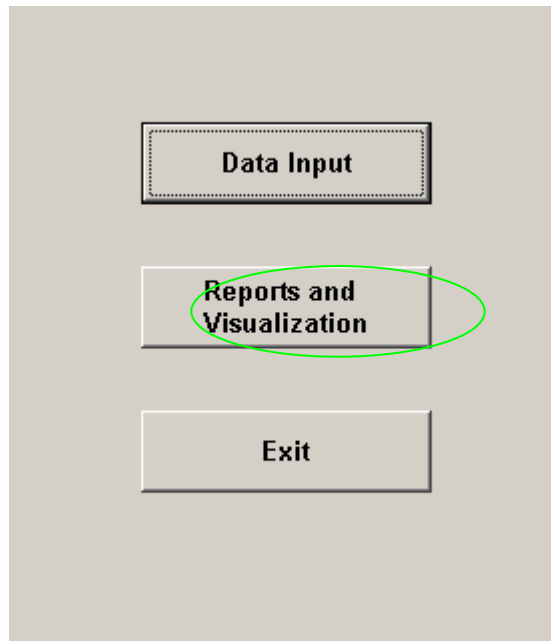
Figure B.42: Interface selection screen

- **NOTE:** The primary reporting screen will then appear. To change screens, select the desired report by clicking on the appropriate tab at the top of the form.

- **NOTE:** After the GASB report has been created for the current year, it cannot be recreated for that same year. If the GASB report is resubmitted at anytime that same year, a copy of the original report is given.

Step 2:

Click on the **GASB 34** tab. From this screen the GASB 34 report will be run. The only option available to select is the year. The available years are loaded in the **Select Year** list box.

Step 3:

After choosing a year, click on the **Submit** button.
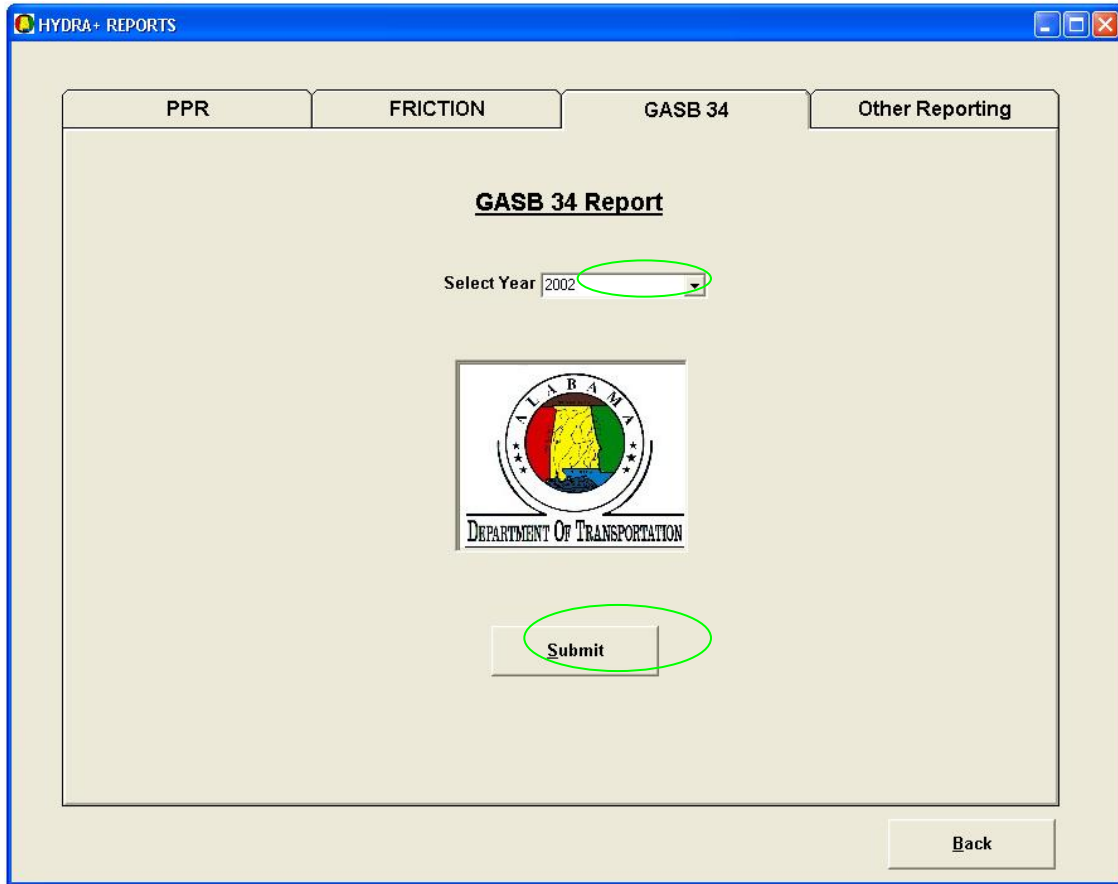
Figure B.43: GASB 34 reporting tab

- **NOTE:** The report is then generated and formatted into an Excel spreadsheet.

Step 4:

At this point, you may use the Excel commands to print or save the report.

Step 5:

Click on the **Back** button to return to the interface selection screen.

B. Preliminary Prioritization Report (PPR)

<u>**Step 1:**</u>
Open the HYDRA+ program and select **Reports and Visualization** from the interface
selection screen.
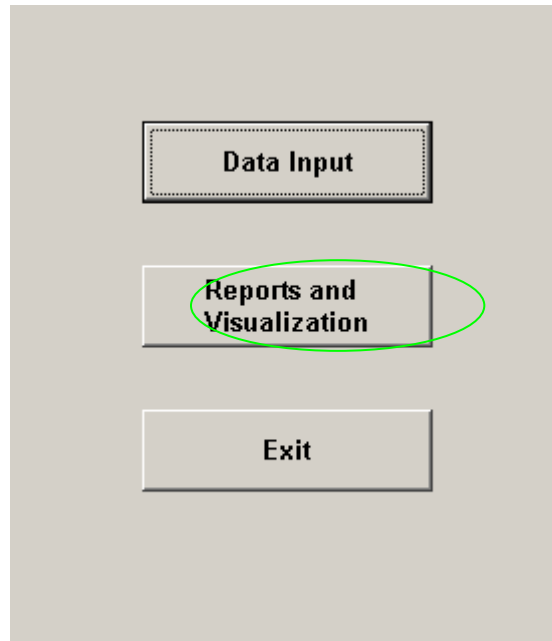
Figure B.44: Interface selection screen

- **NOTE:** The primary reporting screen will then appear. To change screens, select the
  desired report by clicking on the appropriate tab at the top of the form.

Step 2:

Click on the **PPR** tab. The following screen will appear:

Figure B.45: PPR tab

- **NOTE:** To run a report for each Division and Interstate back-to-back, click the **Run Batch PPRs** checkbox. This will automatically start with an *Interstate PPR*; therefore you *will not* have to choose a Division. This option will allow for every PPR to be run without running them individually. A message box will let you know when the PPRs are done.

- **NOTE:** When the option *ALL* is selected for Division, a PPR will be created that shows all routes in the state from beginning to end. When a specific division is selected, a PPR will be created for routes in that division. After choosing an As-Of Date you must enter Projection Increments. These increments should not exceed a length of 10 years as that data would not be reliable.

Step 3:

After the Year, Division, As-Of Date, and Increments have been selected, click **Submit**.

- **NOTE:** If you make a mistake, press the **Reset** button to clear the form.
- **NOTE:** If you wish to generate the report into a PDF select the Create PDF button before pressing submit.

Step 4:

The report will be processed and formatted as an Excel spreadsheet and saved to the Desktop. From here, it can be opened for viewing and printing.

- **NOTE:** If a connection is lost during batch PPR generation, you can look on the Desktop to see the last PPR finished and just run each PPR individually after that.

Step 5:

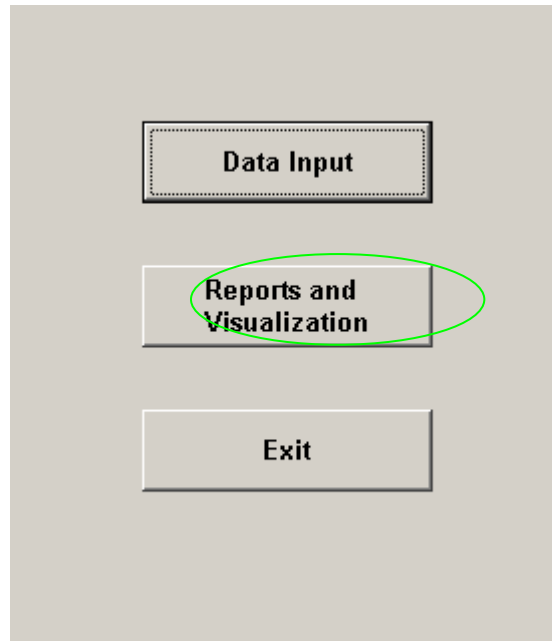If you wish to clear the chosen options and start again, click the **Reset** button.

Step 6:

Click on the **Back** button to return to the interface selection screen.

C. Friction Report

Step 1:

Open the HYDRA+ program and select **Reports and Visualization** from the interface selection screen.

Figure B.46: Interface selection screen

- **NOTE:** The primary reporting screen will then appear. To change screens, select the desired report by clicking on the appropriate tab at the top of the form.

Step 2:
Click on the **Friction** tab. The following screen will appear:

Figure B.47: Friction reporting tab

- **NOTE:** The only option necessary for processing is the year. If no other option is chosen, then the program automatically generates a report for the entire state. Along with the year, any combination of options is possible.

Step 3:

Choose your selections and click on **Submit**.

- **NOTE:** After choosing a value in each box, the box will be grayed out, saving your selection. If you make a mistake, press the **Reset** button to clear the form.

Step 4:

The report will be processed and formatted to an Excel spreadsheet for printing or saving.

Step 5:

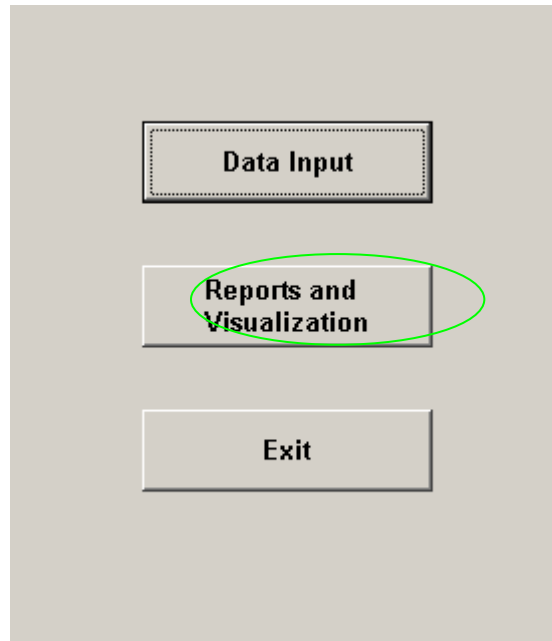If you wish to clear the chosen options and start again, click on the **Reset** button.

Step 6:

Click on the **Back** button to return to the interface selection screen.

D. Other Reporting

Step 1:

Open the HYDRA+ program and select **Reports and Visualization** from the interface selection screen.
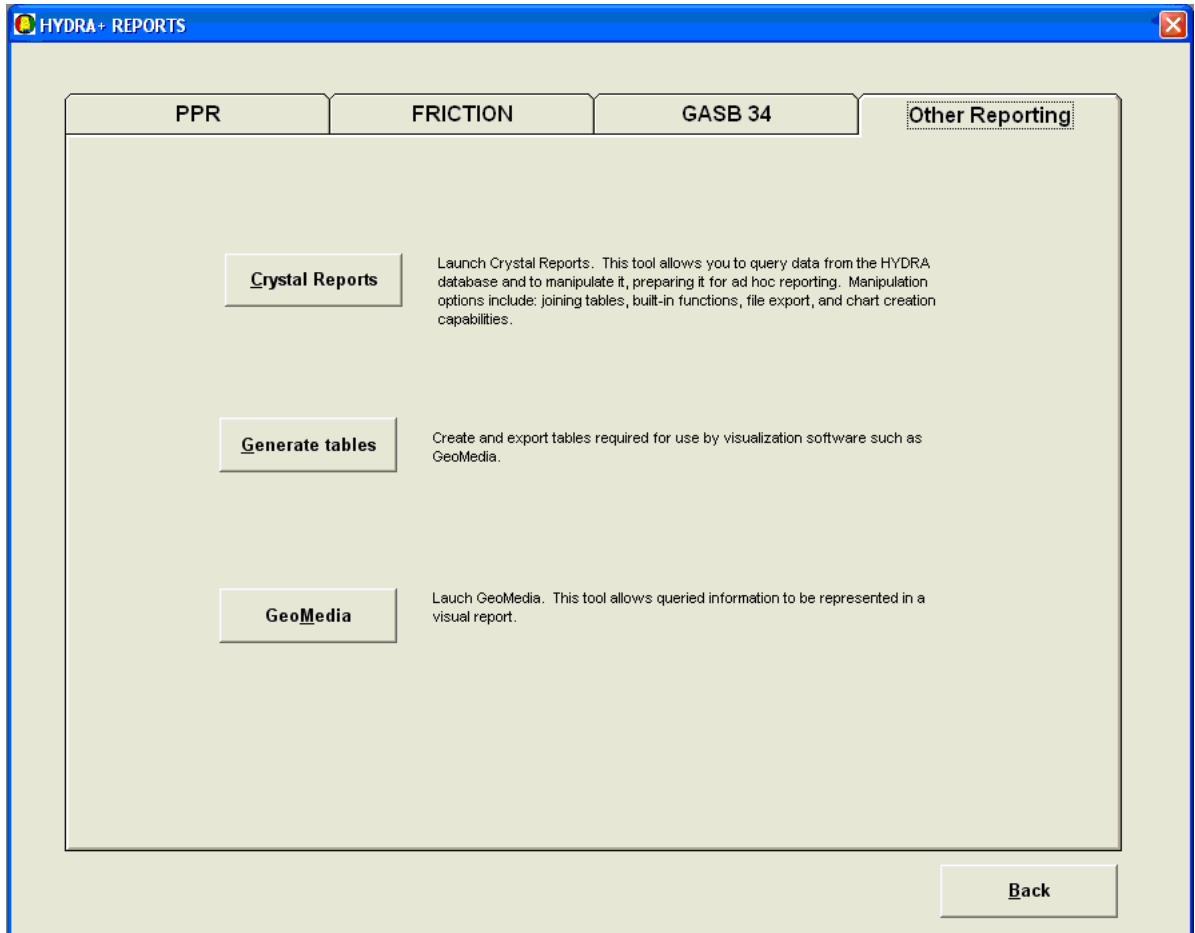

Figure B.48: Interface selection screen

- **NOTE:** The primary reporting screen will then appear. To change screens, select the desired report by clicking on the appropriate tab at the top of the form.

Step 2:

Click on the **Other Reporting** tab. The following screen will appear:


Figure B.49: Other reporting tab

Step 3a:

Choose from either **Crystal Reports** or **GeoMedia**. The program will find the chosen utility on the local computer and open it automatically. If the utility is not found, a message box will inform the user.

- **NOTE:** This process may take several seconds, because the hard drive is searched to find the desired program.

<u>**Step 3b:**</u>

Choose **Generate Tables** to create the condition tables needed for GeoMedia. You will see the following box:
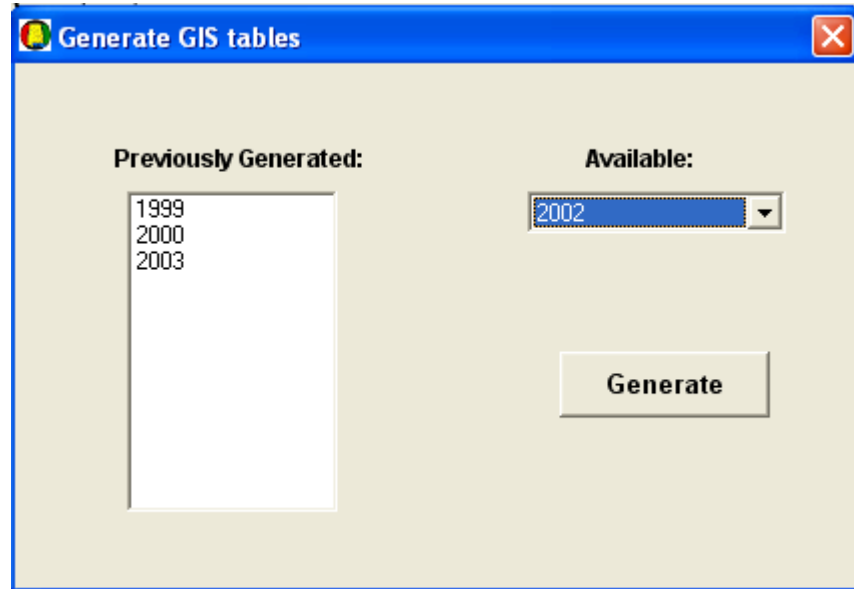
Figure B.50: Generate GIS table

The list on the left shows years for which GIS data has already been generated. The drop-down box on the right contains all the years that are available to generate GIS tables. Once a year's tables have been generated, they no longer appear in the drop-down box, but appear in the list on the left.

<u>**Step 4:**</u>

Choose a year from the drop down box and click the **Generate** button. The mouse pointer will change to an hourglass, indicating that the tables are being generated.

- **NOTE:** The time involved in this process will vary based on the amount of condition data for that year.

When the tables have been generated, a message box indicating success will appear and the user will be returned to the Other Reporting screen.

Appendix C: Friction Tester's Manual

I. Manual Data Load User Information

A. Manual Friction Data Load

The purpose of this process is to allow users to manually input Friction records. This process will constrain the range and types of data entered according to the limits given by the Alabama Department of Transportation. Follow the steps and diagrams below to input friction data manually.

Step 1:
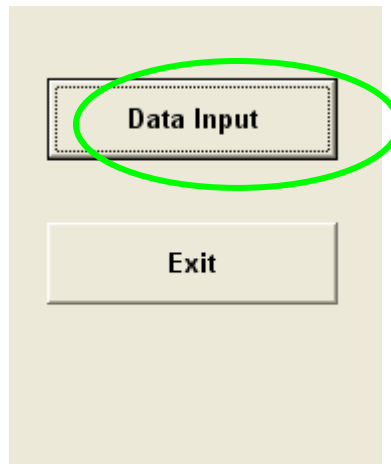Open the HYDRA+ program and select **Data Input** from the interface selection screen.

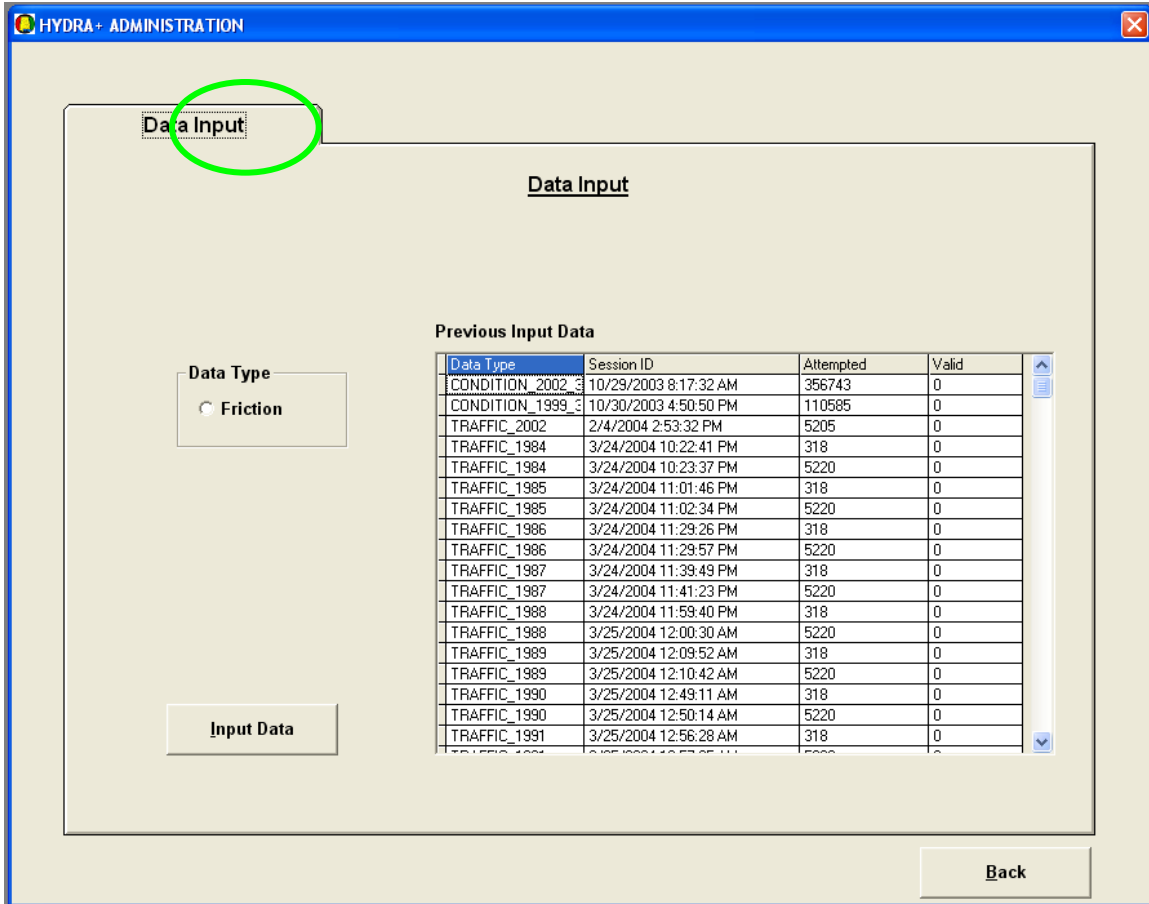**Figure C.1: Interface selection screen**

Step 2:
The **Data Input** tab will open.

Figure C.2: Data input tab

Step 3:

Select the **Friction** from the **Data Type** box. Then click the **Input Data** button.
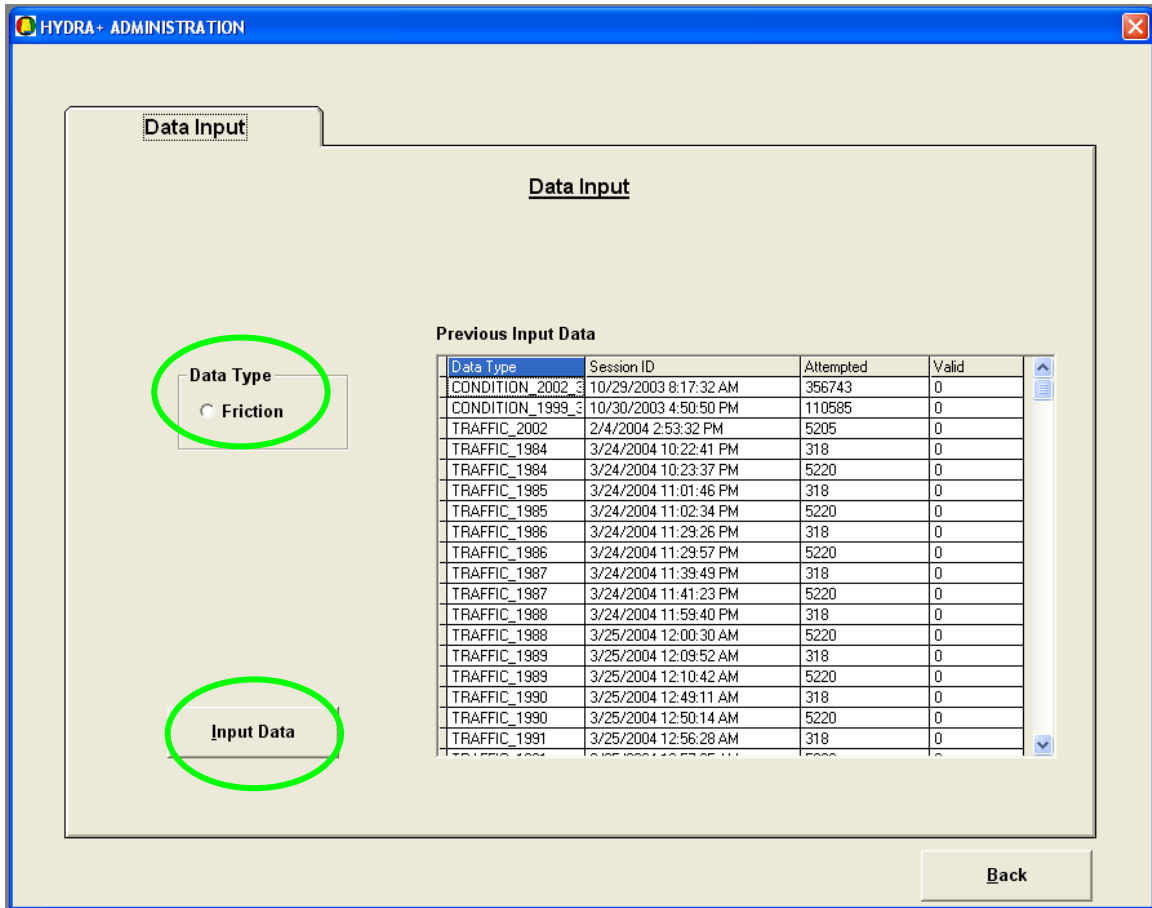

Figure C.3: Friction input selection

Step 4:

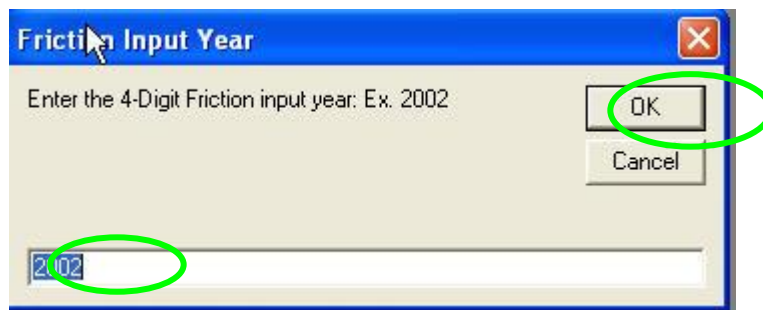Enter the year of the data being entered and click the **OK** button.

Figure C.4: Select friction input year

Step 5:

Use the form below to manually input friction information into the database.

Figure C.5: Friction input screen

Description of Features and Fields for Friction Input

- **Division:**
  Valid data is a number 1-9 representing the divisions of the state.

- **Route Type:**
  Valid data is IN (Interstate) or AL (Alabama) which can be selected from the drop down menu. A user can also type in the Route Type.

- **Route Number:**
  Valid data must be a whole number greater than zero. Ex. 256
  Note: The system will not allow the user to input Route Numbers if the combination of a Route Number and Route Type are not inside the specified division. An Error Message will appear showing the record is invalid.

- **Mile Post:**
  This is Mile post where the Friction has taken place. Valid data is a number with up to one decimal point. Ex: 136.5

Note: To insert continuous Mile Posts with all the other same fields just change the Mile Post field and press Add. If the Mile Post has a different Modifier, press the Reset button and insert new data into the reset fields.

The system will not allow the user to input Mile Posts that are not within an overlay. The system verifies that the combination of a Route Number, Route Type and Mile Post are inside a division; otherwise, an Error Message will appear showing the record is invalid.

- **Direction:**
  Valid data is N (north), E (east), S (south), or W (west) which can be selected from the drop down list. A user can also type in the direction.
  Note: For odd Route Numbers only N (north) and S (south) directions are valid. For even Route Numbers only E (east) and W (west) directions are valid. If invalid data is entered, the system will give an Error message.

- **Date:**
  Valid data must be entered in the following format: mm/dd/yyyy. Ex: 04/07/2002

- **Friction Number:**
  Valid data is a whole number between 0 and 100. However, any value less than 20 or greater than 65 is considered to be an abnormal rating and you must contact an Administrator in order to submit those ratings. Ex: 54

- **Modifier:**
  Valid data is ($) Lime, (A) Overlay, (B) Bridge, (C) Concrete, (D) Detour, (E) Full patch, (F) Bleeding, (G) Ground, (H) Raveled, (L) Older, (M) Muddy, (N) Newer, (O) Oily, (P) Patching, (R) Old Pavement, (S) Skin Patch, (V) Leveling, (W) Wheel Path Level, and (X)Leveling will appear as a drop down list. Ex: (A) Overlay
  Note: This field will not accept user input by keyboard.

- **Air Temp:**
  Valid data is a whole number between 30 and 110. Ex: 74

- **Back Button:**
  Clicking this button will exit the data entry session and take the user back to the administration screen.

- **Add Button:**
  Click this button to add the Friction Input into the HYDRA+ system. To submit a new Friction Input, all the fields must contain values except the Modifier. If there are values that have not been entered, the system will notify the user that the Add process can not take place until the values are filled.
  Note: The system will not allow the user to input the same Input Record twice. An error message will appear showing that the record is a duplicate.

- **Reset Button:**
  Clicking this will allow the user to reset all the fields on the screen to blank.

- **Update Button:**
  Clicking this will allow the user to update selected data already in the friction table with the new data entered into the friction data input fields.
  Note: The system will verify if the updated Record is consistent with all of the above requirements; otherwise, an Update will not be performed.

Appendix D: Cost-Budget Calculators

Cost-Budget Calculators

The contract proposal specified a database modification to support overlay structures. The Project Advisory Committee (PAC) requested a change that stated a budge and target condition calculator be substituted for the original overlay structure database modification.

Cost Calculator

The budget forecasting component of the Pavement Maintenance Cost Analysis Budget Calculator provides estimated future condition values. The user enters a budget amount to be spent per division per year, cost per lane mile for maintenance of state routes and interstate routes, the condition rating decay rate and the budget inflation rate. The budget calculator displays the state's budget for state and interstate routes and also the deflated budget for state and interstate routes. The cost calculator also displays the percentage of the state budget allocated to each division. Resultant condition ratings by division per year are shown based on the budget allocated to each division per year.

Figure D.1: Pavement cost calculator

Budget Calculator

The target condition component of the Pavement Maintenance Cost Analysis Budget Calculator allows the user to enter a cost per lane mile for state routes and interstate routes, the pavement condition rating decay rate, the desired condition rating to be achieved, the budget inflation rate and the number of years to achieve the desired rating. The calculator displays the current pavement condition ratings for every division in the state plus an average for all divisions. Once the forecast is generated, the calculator will display the budget for each year that must be allocated to achieve the desired rating for each division. The calculator also displays the percentage of the total state budget that must be allocated to each division and the total to be spent on that division in order to achieve the targeted pavement conditions.
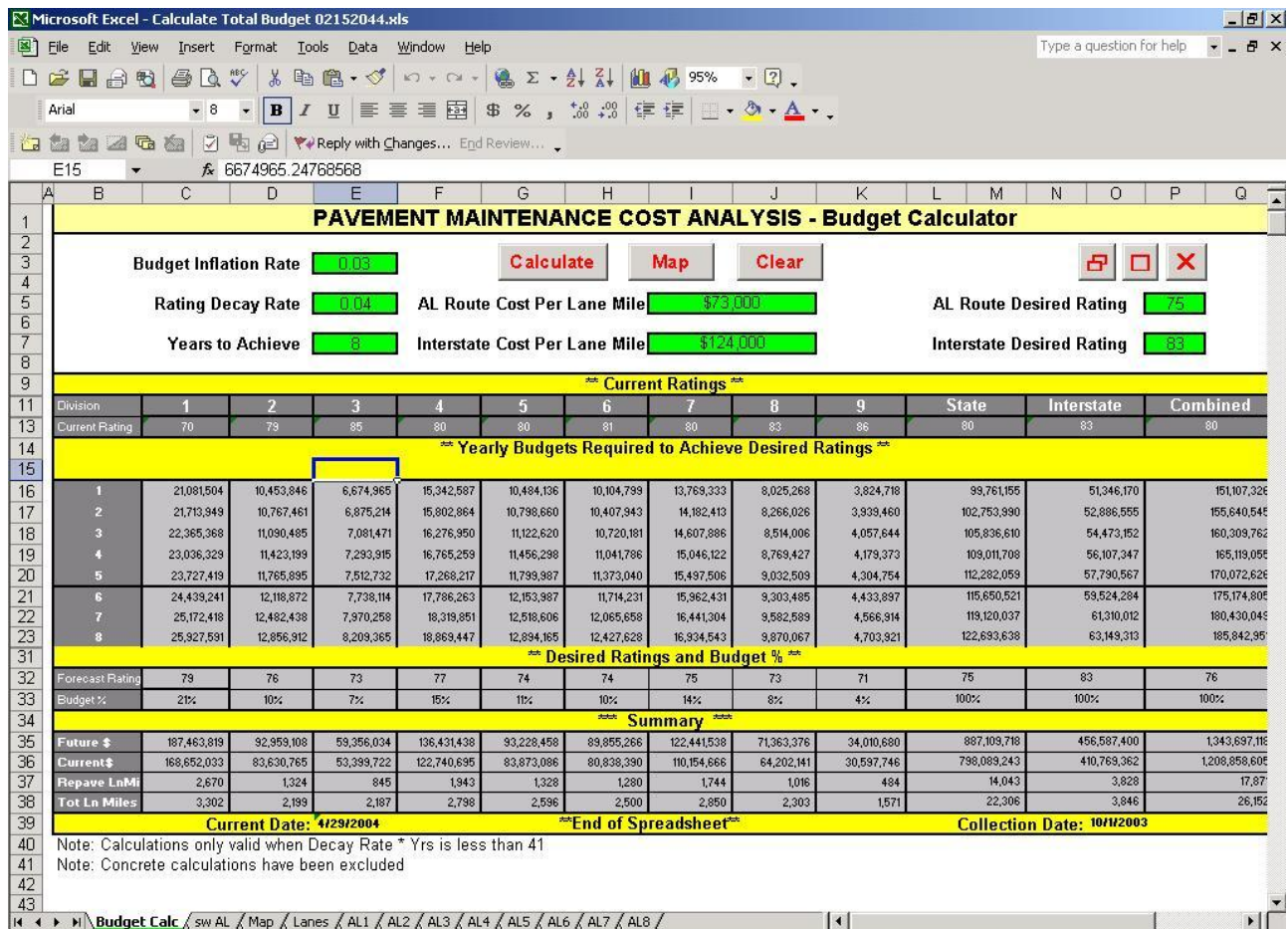

Figure D.2: Pavement budget calculator

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Appendix E: PPR Generation Process

This section identifies the steps required to generate the yearly Preliminary Prioritization Report (PPR) used by maintenance engineers to help prioritize resurfacing projects. This appendix will describe these steps as well as the specific locations within the HYDRA+ database that are changed during the process. This will allow for coordination with the database administrators (DBA) in the Computer Services bureau who are responsible for routine backups and can also assist with backups of tables or the entire database at specific points in the process. Also, the external activities necessary to complete the process will also be identified so that potential bottlenecks can be prevented.

This tool is a network level pavement management tool, not intended to be used on a project level. Any updates to database information outside the administrative console or routine data entry screens must be performed by a DBA to insure data integrity be maintained.

Process Overview
The diagram below shows the steps involved in the generation of the PPR. Many of these steps are accomplished within HYDRA+. The first row of activities is done within the software: the second row is external to HYDRA+.
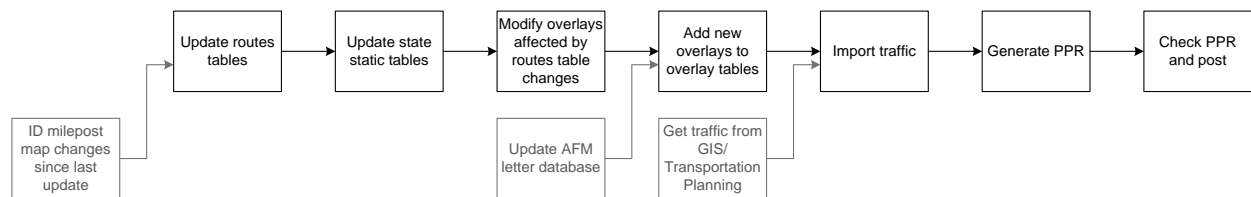
Figure E.1: Process overview

HYDRA+ Processes:
The following is a brief description of the major processes involved in the PPR generation process within HYDRA+. A more detailed description of each process follows this overview.

1. *Update routes tables.* New construction is accounted for in both the routes and the overlay tables in the application. The routes table provides the framework over which the overlays and the rest of the data are laid. For this reason, updating the routes table <u>must </u>be done first, using information gathered from the various milepost map updates issued from Transportation Planning. The updates are done using the manipulate tables function within the Administration tab in HYDRA+.
2. *Update overlay project and state static tables.* The overlay project tables provide the information necessary for creating new overlays and should be updated when attributes of an overlay such as new mix types, pavement producers, et cetera are being used. If these are not updated before adding overlays, the necessary information about an overlay will not be available and the insertion of new overlay records will have to be stopped until the necessary records are added.

3. *Modify overlays affected by routes table changes.* Some changes to the routes table may result in the relocation and/or extension/shortening of routes. These overlays should be adjusted to match the revisions made to the routes table. This adjustment has to be made external to the software by a DBA through the Oracle Enterprise Management Console, but is listed as a HYDRA+ process since it involves direct manipulation to a HYDRA+ table. Alternatively, if an overlay is greater than 1 ½ years old, it can be re-entered into the system through the software.

4. *Add new overlays to overlay tables.* Accepted for Maintenance (AFM) letters are received throughout the year and entered periodically into an Access database which allows interface with CPMS to verify the milepost and project number of the completed overlays. A report from this database provides the raw data for this step. The updates are done using the Data Input tab in HYDRA+.

5. *Import traffic.* Traffic data was formerly supplied directly from Transportation Planning; however, it is now processed by the GIS section of Computer Services. Once this data is finalized it can be imported into HYDRA+ using the Data Input tab and validated using the Data Validation tab. Finally this data is committed to the database using the Update Data tab.

6. *Generate PPR.* Since there is no new condition data to import, the next step in the process is to generate the PPR using the Reports and Visualization option on the main menu.

7. *Check PPR and post.* This step involves using previous years' PPRs and other sources to check the reasonableness of values shown on the PPR. After this is completed, the files can be formatted, printed to pdf format, and posted to the ALDOT intranet for use by Maintenance and the Divisions.

HYDRA+ Processes: Detailed Descriptions
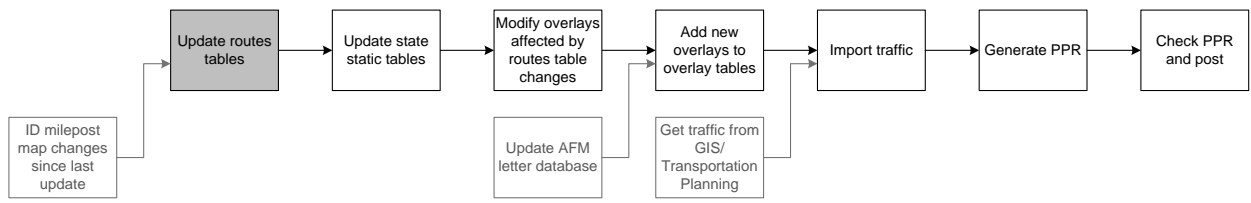
Figure E.2: Update routes tables

Step 1:
Update Routes table

> *Predecessor:* Identify milepost map changes since last HYDRA+ update
> *Suggested backups:* full database

Once the milepost map changes since the last HYDRA+ update have been identified, these changes should be applied to the current year's routes table within HYDRA+. This process is performed by clicking the "Data Input" button on the Interface Selection

screen. From here, click the "Administration" tab and select "ROUTES" from the "Select Table" dropdown box, and then click the "Manipulate Table" button. This will load all the records from the current year's routes table into a temporary table that can be manipulated.

After all changes have been made to this table, the cursor must be changed from the record that has been changed to a different record. This commits the changes to the temporary routes table. Once the cursor has been moved, close the window. A message box appears and requests confirmation that the table should actually be updated. If "No" is clicked, no changes will be made to the routes table. By clicking "Yes", the updated records from the temporary tables are transferred to the current year's routes table. Additionally, when a route is added where there previously was not one the proper base section records are added to the base section table.

Note: If any of the new routes fall into the category of concurrent routes, the concurrent routes table should be updated in the next step to ensure proper handling. Concurrent routes are updated through the Administration tab by selecting the "CONCURRENT_ROUTES" option and modifying the table presented. To add a concurrent route, locate the primary route and then add the concurrent route number (CON_ROUTE_NUM), and the beginning and ending mileposts for the concurrent route. This is repeated for each additional concurrent route along the primary route.
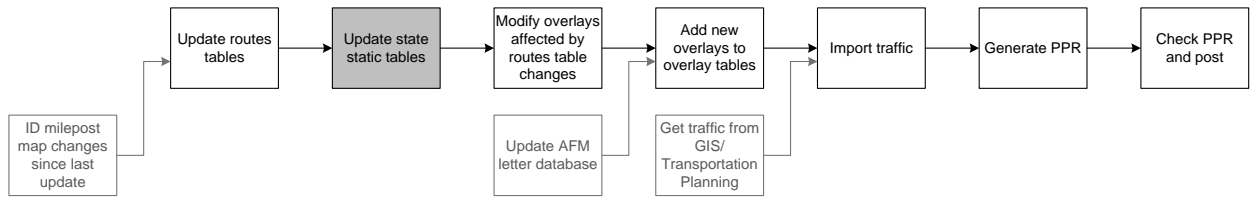
Figure E.3: Update state static tables

Step 2:

Update Overlay Project and State Static Tables

>*Predecessor:*   update routes table
>*Suggested backups:*   AGGTYPE, CONCURRENT_ROUTES,
>   CONDITION_VALIDATION_RANGES, COUNTY,
>   DIVISION, FRICTION,_VALIDATION_RANGES,
>   FRIC_MODIFIER, MIX_TYPE, PLACERS, PRODUCER,
>   SOURCES, TRAFFIC_VALIDATION_RANGES, and
>   OVERLAY_YEAR for year of change forward to present

After updating the routes table, necessary updates to the overlay project and state static tables should be made. These include AGGTYPE, CONCURRENT_ROUTES, CONDITION_VALIDATION_RANGES, COUNTY, DIVISION, FRICTION,_VALIDATION_RANGES, FRIC_MODIFIER, MIX_TYPE, PLACERS, PRODUCER, SOURCES, and TRAFFIC_VALIDATION_RANGES. These tables can be modified and updated by choosing "Data Input" from the Interface Selection screen, and then clicking the "Administration" tab. Then, select the appropriate table from the drop-down menu and update the necessary tables. This step is to ensure that records required for the next steps in this process are created and available (such as a producer or placer for a new overlay), as well as updating the validation ranges as appropriate for the traffic import.
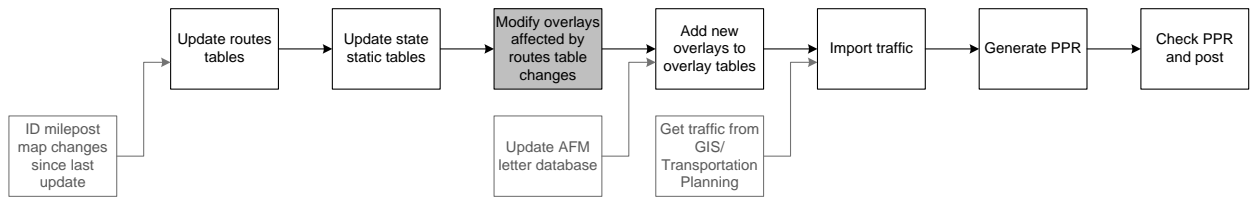
Figure E.4: Modify overlays affected by routes table changes

Step 3:

Modify overlays affected by routes table changes

> *Predecessor:*   update overlay project and state static tables
> *Suggested backups:*   overlay_*year* where *year* = current year

Alternatively, if the overlays affected are of sufficient age (>1.5 years), the overlays can be re-entered with their new limits.

Once the routes table has been updated with the most recent changes, any overlays that were located on a route that has been shortened will have to be modified by a DBA. It is not possible to change the route type, number, beginning, or ending mileposts within the application. Great care should be taken in updating overlays from the database side, and they should only be made when absolutely necessary. The updates should be applied only to the current year's overlay table, and must be performed by a DBA.
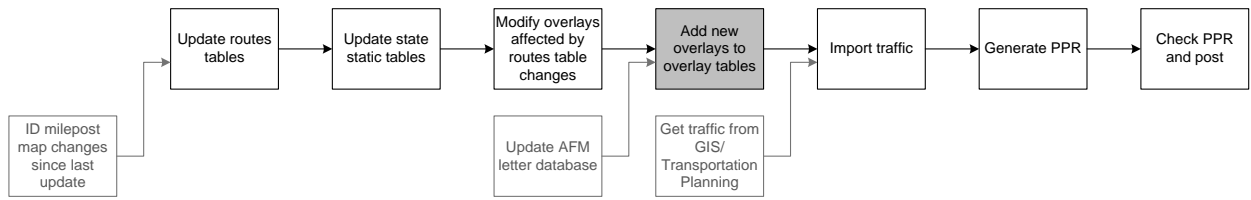
Figure E.5: Add new overlays to overlay tables

Step 4:

Add new overlays

> *Predecessors:* Modify overlays affected by routes table changes
> Update overlay project and state static tables as necessary
> (aggregates, producers, mix types, and placers)
> Update AFM letter database (external process)
> *Suggested backups:* overlay_*year* where *year* = current year

Once the routes, overlay project, and static tables have been updated and affected overlays have been shortened in the previous step, new overlays can be added to the overlay table. With the relatively small number of records added each year, special care should be taken in the addition of new overlay information, as these are not able to be updated within the application. In order to add new overlays, click the "Data Input" button on the Interface Selection screen. From here, click the "Data Input" tab and select the "Overlay" radio button. Once this is done, click the "Input Data" button below the radio button. The application then requests the overlay input year (which can be no greater than the current year). This then brings up the data input screen, where the information about the overlay is entered. The application checks that the overlay has been placed on a valid route within the mileposts of that route, as well as limits producer, placer, mix type, aggregate description/type, and source name/location to values that have already been entered into their respective tables.

When an overlay record is updated (as opposed to a new record being added), the changes made are reflected in each of the years where that overlay is present. For example, when overlay 605 is updated, each instance of overlay 605 is updated from 1984 to the present.

If an error is made while adding a new overlay record with the tool, it cannot be remedied by simply adding a new overlay over the one previously entered. For example, assume a record was entered incorrectly as having a beginning milepost of 10 and an ending milepost of 20. If the correct beginning milepost is 12, and a new overlay is entered as from milepost 12 to 20 this will leave a two mile portion of the previously entered overlay orphaned, and will cause the overlay table to be invalid.
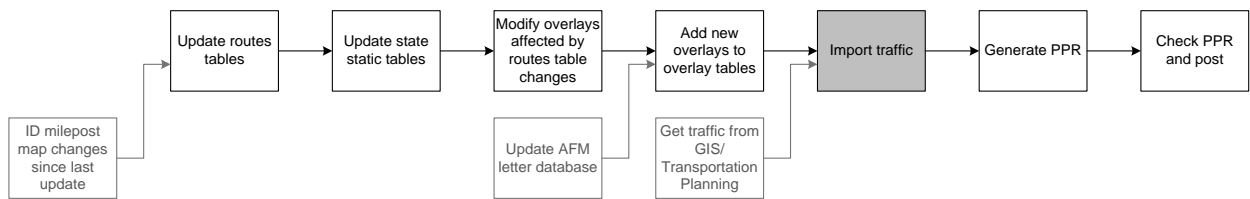
Figure E.6: Import traffic

Step 5:

Import traffic

> *Predecessors:* Add new overlays to overlay tables
> Obtain traffic data from GIS/Transportation Planning
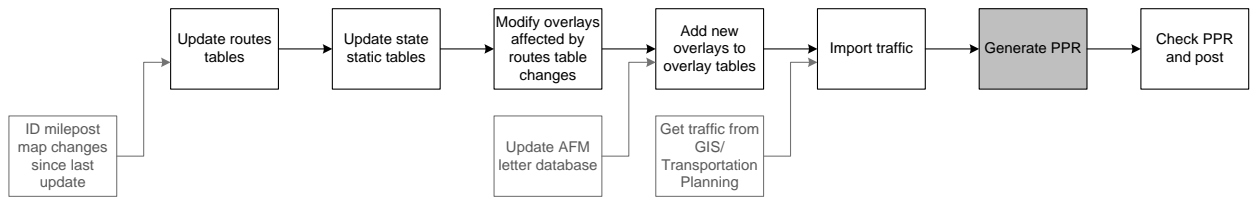> *Suggested backups:* none

Traffic data is input though an automated process that reads from a Microsoft Access database. To import a traffic file, from the interface selection screen click "Data Input", and then select the "Data Input" tab from the administrator panel. Select the "Traffic" radio button, and then click the "Input Data" button. This brings up a screen requesting that the traffic file to be imported be specified. Do this by clicking the "Browse" button, and navigate to the file to be imported. HYDRA+ requires that the file being imported have a table named in the format "TRAFFIC*YYYY*", where YYYY is the year being imported (ex: "TRAFFIC2006"). The Access file can have both the Interstate and State Routes table in it, but for each import the appropriate table has to be renamed in the format mentioned above. Additional information regarding the table structure of the data in the tables being imported can be found in the user manual. Once the file being loaded is specified, the year for the input must be specified, and should correspond to the year referenced in the table name above (in this case, 2006). Finally, the type of route for the data should be selected by clicking the radio button beside either "Interstate Traffic File" or "State Road Traffic File". Once this is completed, the "Input" button should be clicked, which will begin the automated traffic data load. There will be a progress screen showing the status and estimated completion time of the import.

Once the data is successfully loaded, there will be a summary screen that displays summary statistics for the data import that includes the number of valid and invalid records. To view any errors associated with the automated data load, once again select "Data Input" from the interface selection screen. Then, select the "Data Validation" tab and click the "Traffic" radio button, and select a year from the drop-down box below. This will enable the "Correct Invalid Data" button that will open a new window to all correction of invalid data. In this new window a list of records and their corresponding errors will be shown. To correct these errors, click on the invalid record and enter the correct value into the corresponding field or fields at the top of the screen. Adjustments to the validation ranges should have been made in Step 2; however, adjustments can be made and the data re-validated at this point if necessary.

Figure E.7: Generate PPR

Step 6:
Generate PPR

>*Predecessor:*   Import Traffic
>*Suggested backups:*   none

Once all the previous steps have been taken, a new PPR can be generated. To do this, click the "Reports and Visualization" button on the interface selection screen and then select the "PPR" tab. Then, select the year, division, as-of date, and projection increments as years from current for the report and click the "Submit" button. The report will be processed and formatted as an Excel spreadsheet and saved to the desktop. From here, it can be opened for viewing and printing. The report generation time for a single division can take more than thirty minutes. Several divisions may be run in batch mode overnight to make better use of computer time.
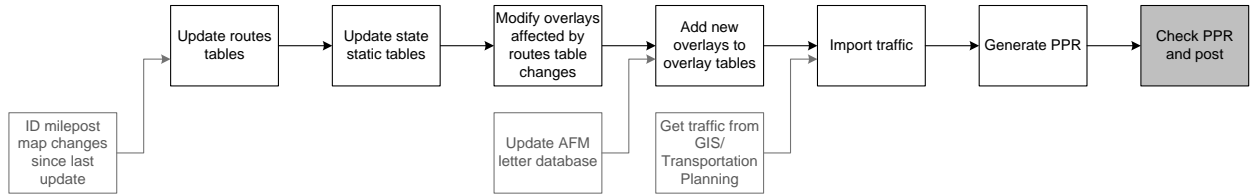
Figure E.8: Check PPR and post

<u>Step 7:</u>

Check PPR and post

> *Predecessor:* Generate PPR
> *Suggested backups:* full database

Following generation of the PPR, each Division's file is sorted by route and milepost to yield a second version of this report. Both reports are posted in .pdf form to the Materials & Tests intranet site after they are checked for reasonableness. These checks may include but are not limited to the following:

Worst first report—verify that:
1. Pavements with low PCR ratings have high traffic and/or are old pavements.
2. Pavements with low PCR ratings are not concrete pavements (date placed <1985 is a possible indicator, though there remain some pavements in service placed before 1985).
3. Pavements with low PCR ratings are longer than 0.5 mi long. Investigate pavements that do not fit this criteria.
4. Pavements with extremely high PCR ratings (>85) were placed in the previous four paving cycles.

Route and milepost report—verify that:
1. All portions of a route appear on the report. This should only affect those routes that were changed in steps 2 and 3 of this appendix for the current PPR cycle. It is generally easier to identify expected gaps in the route based on the milepost maps and check the PPR for those gaps rather than to check the PPR against the milepost maps.
2. Common/concurrent route sections do not appear on report. Again, this should only affect routes that were changed in the current PPR cycle.
3. All pavements have traffic values. If traffic values are not present, identify cause of missing values using Transportation Planning database, then HYDRA+ traffic table.
4. Short segments with ages that are significantly different than those of surrounding overlays are noted and investigated.

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Appendix F: GASB 34

Section 1: GASB 2004 Procedure & Issues

The 2004 GASB Report for Roadways was generated using the HYDRA+ for the first time since its development. Previously, the GASB 2002 and 2003 GASB reports were not generated using the HYDRA+ system, but were created using data and procedures that were later automated in the HYDRA+ system. Upon generating the 2004 GASB report, it was noted that the vales for the report were approximately 10 points too low based on the submitted 2002 GASB procedures and report. The decay algorithms used to deteriorate the roadway overlays were revised between 2002 and 2003. Thus, the 2003 GASB report had to use a procedure similar to the 2002 report to ensure consistency required to compare asset management across years. This same procedure is applied to the 2004 report for consistency—and will have to be applied until the new condition rating algorithm is in place. It is important that there is consistency in the number of center lane miles across the state from year to year. Only deviations based on new construction should affect the totals. These lane miles are based on designations of Interstate routes, National Highway Non-Interstate routes, and Alabama Non-National Highway routes found in the Routes table MINUS the center lane miles associated with Concurrent Routes.

2004 GASB Procedure:

- The only new data set available this year was the 2004 Interstate data set. Condition values from this set were checked against the most recent (2002) Interstate condition values (less the new overlays) to assess the rate of decay, which yielded an average decay rate of approximately 5% per year.
- As the 2004 automated procedure in HYDRA+ could not be applied, we used the 2003 GASB report values and decayed all the routes (Decayed Rating) by four points (4% per year). This is consistent with the rate of decay across the state.
- Using the 2004 New Overlay report (2004 New Overlays.pdf) obtained from Frank Bell, we then applied a value of 96 (new overlay rating) for the new overlays and applied the overlays (Total Miles New Overlay) to the appropriate route (NHS Non-Interstate vs Non-NHS). We used the Routes Tables extracted from HYDRA+ (Routes_Tables.mdb) which contain NHS designation and begin/end mileposts) to correctly apply the new overlays to the appropriate report section. We then determined the proportion of the entire route affected by the new overlay(s) by determining the length of the new overlay relative to the length of the corresponding route (Proportion Route Total Mi). We then adjusted the route's average condition value upward (Adjusted Decay Rating) to account for the new overlays. e.g. 10 mile route with an average condition rating of 76 and 5 miles of this route was overlaid in the current year, which receives a rating of 96. The entire route's value is an 86. (172 * 0.5). Finally, we determined the Decayed Weighted Rating for the route relative to the total number of miles for all routes in the designated section (Interstate, National Non-Interstate Routes, and Non-National Routes).

- Check length of each route per category (Interstate, National Highway Non-Interstate and Alabama Non-National Highway) against the overlay tables and the routes tables to ensure the correct number of miles is reported.
- Adjustments made for concrete/asphalt as per several files sent by Frank Bell to ensure these are consistent with those reported by the Planning Bureau. These adjustments were made to the Decayed GASB 2003 worksheet. This spreadsheet files is: Concrete mileage for FY 2004 GASB
  Issues with concrete: a. changed I165 to asphalt, b. included I10 and I65 bridge segments.
- Adjustments made to NHS and non-NHS flags based on adjustments associated with the following files send by Frank Bell: GASB vs Routes Table Comparison PDF file

Section 2: Roadway GASB 34 Summary Screen Shot

GASB34 Report
Road Condition

Report Generated:	**12/15/2004**
Data as of:	**2004**
Coverage Area:	**Statewide**
Condition Ratings as of 9/30/2004	

Summary for Alabama Non-National Highway Rating

This contains all rating data for Non-National Highways using lane 1 where rating has been performed.

Total Kilometers	Total Miles	Distress Rating
11489.26	7140.62	75.00

Summary for Alabama Non-Interstate National Highway Rating

This contains all rating data for Non-Interstate Highways using lane 1 where rating has been performed.

Total Kilometers	Total Miles	Distress Rating
4464.20	2774.52	77.95

Summary for Alabama Interstate Rating

This contains all rating data for Interstate Highways using lane 1 where rating has been performed.

Total Kilometers	Total Miles	Distress Rating
1150.13	714.81	83.73

Total Kilometers (Asphalt)	Total Miles (Asphalt)
17103.59	10629.95

Summary for Alabama Non-National Highway (Concrete)

This contains all data for Non-National Highways using lane 1 where rating has been performed.

Total Kilometers	Total Miles
20.74	12.89

Summary for Alabama Non-Interstate National Highway (Concrete)

This contains all data for Non-Interstate Highways using lane 1 where rating has been performed.

Total Kilometers	Total Miles
12.12	7.53

Summary for Alabama Interstate (Concrete)

This contains all data for Interstate Highways using lane 1 where rating has been performed.

Total Kilometers	Total Miles
307.17	190.91

Total Kilometers (Concrete)	Total Miles (Concrete)
340.03	211.33

Summary for Alabama Roads

This contains all rating data for Alabama Roads using lane 1 where rating has been performed.

Total Kilometers	Total Miles	Distress Rating
17443.62	10841.28	76.36

Figure F.1: GASB34 screenshot

Section 3: Auditor's Notes

1. Describe the <u>procedures</u>, both automated and manual, by which transactions are initiated, recorded, processed, and reported from their occurrence to their inclusion in the financial statements. **BE SURE TO DESCRIBE THE EXTENT TO WHICH INFORMATION TECHNOLOGY (IT) IS USED.**

   1) The Alabama Department of Transportation (DOT) has divided infrastructure into two networks, which consist of roads and bridges.
   2) Road and bridge projects will only be capitalized when the project is complete and has been accepted by National Highway Administration (NHA). For the 2003 Fiscal Year DOT has chosen to capitalize the road and bridge projects that were closed out on Comprehensive Project Management System (CPMS) during FY 2003. All costs for these projects (some projects began prior to FY 2003) from beginning to end will be capitalized. In some cases projects can be finished but not closed out for many years due to problems with acceptance by NHA. Infrastructure assets that were completed prior to fiscal year 2003 will not be reported this year. Retroactive reporting of infrastructure will be done possibly for FY 2003 CAFR.
   3) Infrastructure construction-in-progress will be reported to the Finance Department and will consist of road and bridge projects that have not been capitalized and are still open projects.
   4) Infrastructure costs that result in an increase in capacity, an improvement in the efficiency, or a replacement of a portion of the infrastructure network are capitalized and added to the historical cost of the assets.
   5) Costs that allow the infrastructure network to be used efficiently over the expected useful life of the assets are expensed as general maintenance costs.
   6) Certain maintenance costs that extend the useful life of the assets but do not increase capacity or efficiency are classified as preservation costs.
   7) DOT has established a measurement scale for the condition of its roads and bridges. See page ____ of this W/P for the preliminary RSI disclosure for the CAFR.
   8) DOT has disclosed that the weighted average of all State maintained roadways shall be "Satisfactory" or better.
   9) DOT has disclosed that the weighted average of all State maintained bridges and culverts shall be "Satisfactory" or better.

   DOT has an asset management system that has an up-to-date inventory of eligible infrastructure assets. DOT performs condition assessments of the eligible infrastructure assets and summarizes the results using a measurement scale. DOT also estimates each year the annual amount to maintain and preserve the eligible infrastructure assets at the established condition level.

   DOT's asset management system consists of several component systems including the Comprehensive Project Management System (CPMS), Pavement Management System (PMS), Alabama Bridge Information Management System (ABIMS), and the GASB 34 reporting program developed and maintained by the University of

Alabama. ABIMS and PMS provide the condition assessment data that the GASB 34 reporting program needs to produce the GASB 34 Road Condition Report and the GASB 34 Bridge Condition Report. These reports are the source of condition data reported in the Required Supplementary Information (RSI) section of the CAFR. CPMS's project cost accounting data is used by Bill Flowers, Assistant Finance Director, to produce the annual preservation cost amount that is reported in the (RSI) section of the CAFR.

Comprehensive Project Management System (CPMS)

The main cost accounting system for DOT is the Comprehensive Project Management System (CPMS). CPMS contains data on all construction and maintenance projects that are contracted out by DOT. Construction and maintenance projects are assigned work codes by GASB category.

Mr. Flowers has taken the total dollar amount that has been spent on maintenance projects from the GASB Expenditure Summary Report from CPMS and has averaged the last three years in order to determine the annual preservation cost to be reported in the RSI section of the CAFR.

Pavement Management System (PMS)

The Pavement Management System contains all of the condition assessment data for roads. Scott George, Acting Pavement Management Engineer, of the Materials and Test Bureau of ALDOT, has the responsibility of maintaining the Pavement Management System's day-to-day operations. DOT has contracted with Roadware to collect road stress data. Roadware takes videos roadways across the state. Roadware collects condition assessment data on Alabama interstate highways once a year. Other National Highway System (NHS) and other state non-NHS roads are collected once every two years. After the road data is collected, Roadware provides DOT with copies of the data on DVD's. These DVD's contain road stress information as well as moving video of the road surface. DOT performs quality control checks of Roadware data by sending pavement management technicians out to take samples of road conditions to compare back to data received from Roadware. Access to the pavement management system is controlled by user login by password. Data access permission is assigned to each user login by a needs only basis. Road condition data is provided to the University of Alabama for the GASB 34 reporting program on CD and by File Transfer Protocol (FTP) over the Internet.

Alabama Bridge Information Management System (ABIMS)

The Alabama Bridge Information Management System (ABIMS) contains all of the condition assessment data for all the state's bridges. Each bridge in the state is assigned a bin number to separately identify it. Lesley J. Morrissette, Bridge Management Engineer/Management & Training, of the Maintenance Division of DOT is the administrator of the ABIMS system. ABIMS is located on a mainframe computer at the DOT central office in Montgomery. Ed Phillips, P.E., Assistant State Maintenance Engineer/Management & Training, is Mr. Morrissette's immediate

supervisor. George Conner, P.E., Assistant State Maintenance Engineer/Bridges, is responsible for compliance in the area of bridge inspections.

The state is divided into nine divisions with each division having a bridge inspection team. Bridge inspection teams have at least one Chief Inspector who has completed the requirements for becoming a Certified Bridge Inspector. The Chief Bridge Inspector of that particular team enters inspections completed by the inspection team into ABIMS. Bridge inspection teams from other DOT divisions do not have the ability to change data entered by other divisions. Access to the ABIMS system for entering inspection data is user access controlled by password login. Bridge condition data is provided to the University of Alabama for the GASB 34 reporting program on CD and by File Transfer Protocol (FTP) over the Internet.

GASB 34 Reporting Program

The Alabama Department of Transportation contracted with the Center for Economic & Business Research (CBER) at the University of Alabama in May 2001 to assist ALDOT in establishing an "asset management system" as the driver of its modified method for reporting infrastructure investments, modifications, and maintenance. This new system will integrate data from the Alabama Bridge Information Management System (ABIMS), ALBRIDGE, Comprehensive Project Management System (CPMS), Proposal Estimate System (PES), and Pavement Management System (PMS).

CBER receives data from DOT by downloading the files from the Internet using File Transfer Protocol (FTP). Once the data is downloaded it is copied to a CD and stored in a locked cabinet for backup purposes. The GASB 34 program is housed in a secured lab only accessible by card access with three security checkpoints. Faculty and students working on the project must sign a non-disclosure form. Data is backed up weekly and a backup copy is stored off-site. Backups are destroyed weekly after a new backup has been created. Each user accessing the program is assigned a specific level of access.

Only those with administrative privileges can enter changes to the program. There are three faculty members (all PhD's) and one professional staff member working on the project. Detailed testing of the accuracy of the data and calculations is checked by graduate students of the University. CBER has performed black box and white box testing of the program. CBER has documented the program code and other information in a users manual and a developer's manual.

CBER provides DOT with two reports on an annual basis. These reports are the GASB 34 Road Condition Report and the GASB 34 Bridge Condition Report. CBER does not perform the condition assessments of the roads and bridges. The GASB 34 reporting program takes the condition assessment data received from DOT for each segment of roadway and for each bridge and weights them to calculate an overall road condition rating and an overall bridge condition rating.

2. Describe the <u>related accounting records</u>, whether electronic or manual, <u>supporting information,</u> and <u>specific accounts </u>in the financial statements involved in initiating, recording, processing and reporting transactions.

   The CPMS has various screens from which information about projects may be obtained. Some of these include:

   - The general purpose inquiry – this captures data related to particular projects including a description of the project, GASB work codes, payment history, stage, etc.
   - The payment by vendor history – lists all payment vouchers charged to a project.

   The construction-in-progress and capitalized projects listings are kept on the CPMS. These are the reports from which the infrastructure is reported on the CAFR.

3. Describe how the information system captures any other events or conditions that are significant to the financial statements. (*For example, commitments and contingencies, subsequent events, compliance with debt covenants, related party transactions, fair values of financial instruments, disclosures, etc.)*

   N/A

4. Describe any other procedures used to record recurring and nonrecurring adjustments to the financial statements. (*For example, reclassifications, adjusting journal entries, etc*.)

   N/A

5. Describe the significant controls, both electronic and manual, which appear to exist. **BE SURE TO INCLUDE ANY IT RELATED CONTROLS.**

   A) Access to each component of ALDOT's asset management system is controlled by user login by password.
   B) ALDOT performs quality control checks of Roadware data by sending pavement management technicians out to take samples of road conditions to compare back to data received from Roadware.
   C) Detailed testing of the accuracy of the data and calculations from the GASB reporting program is checked by graduate students as part of a senior class project.

6. List and describe any supporting documents that are used and/or generated in the process above, including any journal or subsidiary ledger used in the recording process.

   A. Vouchers, material receipts, etc., are used when roads and bridges are constructed.

7. List and describe any computer reports or other input or output data that is used in the recording process.

   A) GASB Expenditure Summary Report – A CPMS report that details the total annual dollar amount of maintenance projects by GASB code.
   B) GASB Expenditure Detail Report – A CPMS report that is the detailed version of the GASB Expenditure Summary Report broken down by project.
   C) GASB Capital Project Detail Report – A CPMS report that summarizes the total dollar amount of capitalized infrastructure projects by GASB code.
   D) GASB Active Capital Project Summary Report – A CPMS report that summarizes the infrastructure projects that have not been capitalized and are still in Construction-in-progress.
   E) GASB 34 Road Condition Report – Report generated by the GASB 34 reporting program developed by the University of Alabama that is used to prepare the RSI section of the CAFR.
   F) GASB 34 Bridge Condition Report – Report generated by the GASB 34 reporting program developed by the University of Alabama that is used to prepare the RSI section of the CAFR.

8. a) Do the controls identified in No. 5 above appear to be effective?   Yes
   b) If yes, are there efficiencies to be obtained from testing the controls?   No

9. Will control risk be assessed below the maximum?   No
    If yes, be sure and include the tests of controls which will be performed on the audit program(s) as well as   indicate them on the *Summary of Internal Control and Control Risk Assessment* Form.

9. Based on the understanding gathered above, were any reportable conditions noted? If so, describe below as well as include on the *Summary of Internal Control and Control Risk Assessment* Form.

Based on our understanding of the internal control, there appear to be no reportable conditions.

Acknowledgements