Pollution Prevention in India:
Hyderabad Water Management Information System (IND)
HyWaMIS

IND 4-27
Contract No. ASI/B7-300/95/140-53

User Manual

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1 Introduction

General Water Management Information System addresses water management problems and requirements and availability of data. HyWaMIS is designed as a modular and open structure combining modules of different water management sectors. Initially, Industrial module is being developed; further modules could be added in future in a similar way.

HyWaMIS is being implemented based on Microsoft Visual Studio VB.Net framework as a 3-tier application using Oracle Database. It is a Windows explorer kind of a tool for easy access of information and consists of a switchboard with a tree. Clicking on leaf of the tree can retrieve information. This tool has basic functions to insert, update, delete, query, and export/save data along with some analysis, summary and reporting facilities. Users can customize the application to suite their specific needs / frequently used queries.

Access restrictions were also implemented in HyWaMIS using Oracle Database User Roles by which only authorized users can access the information. It provides two types of access; one is public access and the other is a privileged access. Public requires no authentication whereas for privileged access, one has to provide user name and password to access the information and to modify the data. Based on the privileges, different functions of MIS have been enabled /disabled.
2 Main Features

2.1 Modules

The application consists of 3 modules namely, General Water MIS, HyWaMIS-GIS and Industrial Module via.

- General Water MIS
  - Consistent (offline) database
  - Meta-database
  - Raw Data

- Industrial Module
  - Industrial Report
  - Information on Water
  - Standards
  - Industrial Report

- HyWaMIS – GIS

Sample screen-shot is given below
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"This project is funded by the European Union - Asian Urbs Programme"
2.2 User Authentication and Authorization

Authentication and authorization mechanism is implemented in HyWaMIS to provide advanced functionality as well as confidential data to privileged users. Privileged users can provide their login and password information in login screen, HyWaMIS security mechanism validates the login information. Authorize of users is handled with the help of Oracle user roles.

In case of general public access user need not supply any username and password. User just need to select public radio button and press login button to login to the system.

If the user logins with a username and password then that user is considered as an authorized user and this information is displayed in status bar, ex: Authorized User AsiaUrbs is logged in. A privileged user can customize the application. A privileged user can do the following apart from data administration via select, insert, update and delete:

- Add Table
• Add URL
• Add Custom Query
• Modify Link etc
2.3 Switch Board

Switch Board control of the application helps the user to easily navigate through a tree and select the required option. The application generates the tree based on the user privileges.
2.4 Metadatabase

HyWaMIS provides user interface to manage metadatabase. Metadatabase is the heart of system, which provides all the control information to connect to different data sources and to know the format and availability of data at different data sources.

A sample screen-shot is given below:
3 System Requirements

3.1 Server System Requirements
Please make sure your server system meets the following minimal requirements before installation:

- Windows NT, Windows 2000 Server
- Oracle 8.0.5 or higher
- Intel Pentium II or above
- IIS web server
- Free hard disk space of up to 1 GB
- 256 MB RAM

3.2 Client System Requirements
Please make sure your client system meets the following minimal requirements before installation:

- Windows 2000, Windows XP
- Intel Pentium II 350 MHz or above
- 128 MB RAM
- Free hard disk space of at least 40 MB
- Minimal desktop resolution at 800x600 or 1024x768 recommended
- The following pre requisite software
  - Java enabled Internet Explorer
  - Microsoft Office 2000 or above
  - Adobe acrobat reader
  - Oracle Client
  - Microsoft .NET framework 1.1
  - Crystal Reports for Visual Studio .NET
4 Visual Overview

4.1 Login Screen

Login screen provides two options to users to choose to login to the information system. Namely

- Public
- Authorized

Public users can access certain information, which is public such as General Water MIS, Industrial Module, HyWaMIS-GIS and feedback form, by default **Public** option is selected.

Authorized users must login with their User Name along with Password so that they can access all the information that is public as well as confidential.

An Authorized User must select Authorized option; once this option is selected login and password fields are enabled. Enter the login Name and password and click login to login to system.
4.2 User Interface

A generic User Interface of the system consists of a Navigator to navigate between records, a data control toolbar, and a data grid to display data and a number of tab pages to display related data as shown in the screenshot.

**Navigator:** This allows the user to navigate the records in the DataGrid. It has First, Last, Previous and Next options. Selection of these buttons results in movement of cursor to first record, last record, next record and previous record in the grid.

F: Moves to first record
P: Moves to previous record
N: Moves to next record
L: Moves to last record
S: Displays Current record position and total number of records
Data control toolbar allows the user to insert new records, delete records, save any modified records, find any data based on some criteria and export data.

A: New Record
B: Delete
C: Save
D: Cancel
E: Find
F: Save As

New Record: This option allows the user to insert new record

Steps:

- Select the New Record Option in DataControl
- A new record is added to the DataGrid.
- Enter the new data into the appropriate Textboxes not in DataGrid
- Select the grid and Navigate the records by using Navigator Control
- This data is saved and displayed when the data is reloaded. (To reload select Reload Option in Context Menu).
<table>
<thead>
<tr>
<th>Borewell Id</th>
<th>Method Of Test</th>
<th>Pollutant Id</th>
<th>Sample1 Value</th>
<th>Sample2 Value</th>
<th>Sample3 Value</th>
<th>Sample4 Value</th>
<th>Sample5 Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>CL2000 B</td>
<td>BICARBONAT</td>
<td>405</td>
<td>429</td>
<td>411</td>
<td>444</td>
<td>79.1</td>
</tr>
<tr>
<td>13</td>
<td>CL2000 D</td>
<td>CHEMICAL OXY</td>
<td>14</td>
<td>10</td>
<td>15</td>
<td>12</td>
<td>52</td>
</tr>
<tr>
<td>14</td>
<td>CL2000 J3114-C</td>
<td>ARSENIC</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
</tr>
<tr>
<td>15</td>
<td>CL2000 J3114-A</td>
<td>CHROMIUM</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
</tr>
<tr>
<td>16</td>
<td>CL2000 J3115-S</td>
<td>LEAD</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
</tr>
<tr>
<td>17</td>
<td>CL2000 J3111-N</td>
<td>NICKEL</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
</tr>
<tr>
<td>18</td>
<td>CL2000 J3111-C</td>
<td>COPPER</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
</tr>
<tr>
<td>19</td>
<td>CL2000 J3113-G</td>
<td>GRANULUM</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
</tr>
</tbody>
</table>

New Record

Fields

- Borewell Id
- Method Of Test
- Pollutant Id
- Sample1 Value
- Sample2 Value
- Sample3 Value
- Sample4 Value
- Sample5 Value
Delete Record: This option allows the user to delete selected row.

Steps involved:
- Select Data to be deleted and then select Delete option.
- Reload the data by selecting Reload option in Context Menu.

Save and Cancel: This option allows the user to Save and Cancel the Edit Operations

Find: This option allows finding information based on some criteria.

Steps involved:
- Select **Find** option, a window is displayed which has to option
  - Master Table
  - Detailed Table

In the user interface first tab is the **Master Tab**, when this is selected only Master Table option in the find window is enabled, when Find option is selected in detail tabs is selected both options are enabled. Select any one of the options.

If Master Table option is selected, search is performed against the Master Table based on given criteria. If Detailed Table option is selected, search is performed against the Detail Table.
After Selecting Master Table option or Detail Table option, enter the search criteria in grid and then select **Find Button**, the result is displayed in appropriate grid i.e., in Master Grid or in Detailed Grid.

Another Option is **Advanced Button**, by selecting this the query is displayed below the Criteria grid.

**Save As:** This option allows the user to save the data as Excel File, Word Format or any other file format.
**DataGrid:** This displays the actual data.

**Tabs:** Master and Detail Information are displayed based on Selection of this **Tabs.** First Tab is the **Master Tab** Next to This tab is **detail Tabs.**

**Master Tab:** When this tab is selected, current record from DataGrid is displayed as a form, user can Insert, Update and Delete records.

**Detail Tab:** numbers of tab pages are displayed based on the number of detailed data sets available to the specific master table.
Authorised Users have rights to manipulate data based on the privileges assigned to that user as well as have rights to perform the following:

- Add table
- Add URL
- Modify Link
- Add Custom Query
These options are available in context menu, which is displayed when authorized user right clicks on particular module. The Options are
4.3 Add a new table to metadatabase

Add new table:
This option allows the authorized user to add new table information to metadatabase

Procedure for adding a new table to database:

1) First select the required module on tree view and by right clicking a context menu opens and select Add Table option in it.

2) A window will open in that username, password, host strings are to be provided by the user.

3) Clicking Next Button the list of tables will be displayed based on the username, password, host string provided by the user.
4) Clicking Next Button will display respective columns for each selected table.

5) To display the columns on the user interface select those columns.
6) Clicking Next Button those columns are displayed with add relation button beside each row.

7) Clicking Add Relation Button the window consists of tables with fields.

8) Select the fields to relate the tables and click OK Button.
9) Click O.K.
4.4 Add a URL to metadata

Procedure for the Addition of new URL:

1) First select the required module on tree view and by right clicking a Context menu opens and select Add URL option in it.

2) A window will open in that provide file name and path of the file by Clicking browse button to select which file or URL you want to add.

3) Click OK Button.
4.5 Modify metadatabase

Modify Link:

Procedure for the Modify Link:

1) First select the Link on tree view and by right clicking a context menu opens and select Modify Link option in it.

2) A Window will be displayed, apply the required changes.
3) Click OK Button.
4.6 Add a customized query to metadatabase

Add Custom Query:
This provides a wizard to create a query

Procedure for the Addition of new Custom Query:

1) First select the Module on tree view and by right clicking a context menu opens and select Add Custom Query option in it.

2) A window will open in that it displays available tables. Select the table and it displays corresponding columns. Select the columns and add by clicking (>) then click next.

3) A window is displayed which contains selected fields and relational operators for example equal, less than etc and enter the criteria in compare string field and the click next.
4) Next window displays query, modify the query if necessary and click ok.
4.7 Industrial Module

Industrial module provides comprehensive information on industries. It gives following information of each industry:

- Industry Name, Type
- Address
- Latitude and Longitude
- Water Source
- Water Consumption
- Product Details
- Raw Material Details
- Effluent Waste Details
- Effluent Discharge
- Fact Finding Committee Report related info
- And many more as sown in the screen-shot
The region combo box provides a filter to display industries from a particular industrial region namely Patancheru, Bollarum or situated in a village.

The check box All displays only industries, which have all related information, like pollutants, discharge, raw materials etc.
The following screen gives a report cumulative report on type of industries, type of water discharge, water sources and pollutants, for each type the corresponding details can be retrieved.

This screen consists 4 main tabs to display industry types, water discharge types, water source types and pollutant types which displays consolidate information, and each tab consists two detailed tabs which display detailed information in pictorial/graphical as well as tabular form.
The following screens provide cumulative as well as detailed information on water related parameters, namely consumption, discharge, source and water supply.

For each type of water source/discharge/consumption/supply the list of industries related to that type of parameter are displayed in tabular format. And each screen consists a button namely “Industry Information” that provides complete information on selected industry.
The following screen provides legal standard values for each pollutant and different other parameters. It also
displays all the industries that violate these parameter standard values.

The following screen generates a comprehensive report on industries, and this report is a printer friendly report
and also can be exported to .PDF format.
### Industry Name

<table>
<thead>
<tr>
<th>Industry Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Century Fibre Plates Pvt Ltd.</td>
<td>IDA, Bollaram, Jinnaram Mandal</td>
</tr>
<tr>
<td>Challa Chlorides Pvt Ltd.</td>
<td>Goddapetharam Village, Jinnaram Mandal</td>
</tr>
</tbody>
</table>

### Raw Material Name

<table>
<thead>
<tr>
<th>Raw Material Name</th>
<th>Consumption</th>
<th>Product Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>B K K MONO</td>
<td>7,200.00 KG/DAY</td>
<td>Rubberised</td>
</tr>
<tr>
<td>AMINO METHYL PYRIDINE</td>
<td>750.00 KG/DAY</td>
<td>Rubberised</td>
</tr>
<tr>
<td>Rubber</td>
<td>2,400.00 KG/DAY</td>
<td>Rubberised</td>
</tr>
</tbody>
</table>
4.8 HyWaMIS GIS

HyWaMIS GIS module provides information on industrial pollution with the help of GIS layers. HyWaMIS uses open source java based Alov map software to display GIS layers developed using Arc GIS/Arc info software. Some self-explanatory screen-shots.
4.9 Feedback Form

HyWaMIS provides a feedback form to collect end-user opinion about the software and also to evaluate the software and collect ratings on Ease of Use, Design, Comprehensiveness, functionality and overall system.
5 Getting Started

The connecting string to connect to metadatabase should be set before using HyWaMIS for first time, this should be provided in xml format, and file name should be ConnectionString.xml as given below, this consists keywords to set the user interface language, namely English or Telugu and the corresponding connect strings to connect to the database:

```xml
<applicationSettings>
  <user>english</user>
  <english>provider=msdaora;user id=hywamis;password=hywamis;data source=hywamis</english>
  <telugu>provider=msdaora;user id=telugu;password=telugu;data source=hywamis</telugu>
</applicationSettings>
```