

# Recovering from Human Error using Flashback

## Purpose

This lesson describes the Oracle Database 10 g Flashback features that support self-service error correction.

## Topics

This lesson discusses the following:

- [Overview](#)
- [Filling the Recycle Bin](#)
- [Querying Tables in the Recycle Bin](#)
  
- [Recovering Tables from the Recycle Bin](#)
  
- [Emptying Tables from the Recycle Bin](#)
  
- [Using Flashback Table to Recover a Table](#)

## Overview

[Back to List of Topics](#)

In Oracle Database 10 g , flashback functionality has been extended. It is now possible to flash back an entire table and quickly recover a table that has been inadvertently dropped.

### What is the Recycle Bin?

In previous releases of the Oracle server, the `DROP` command permanently removed objects from the database. Now when you drop a table and its dependent objects it is placed in the recycle bin. It is not removed from the database until you empty the recycle bin. The extents allocated to the segment are not deallocated until you purge the object. You can restore these dropped objects from the recycle bin at any time.

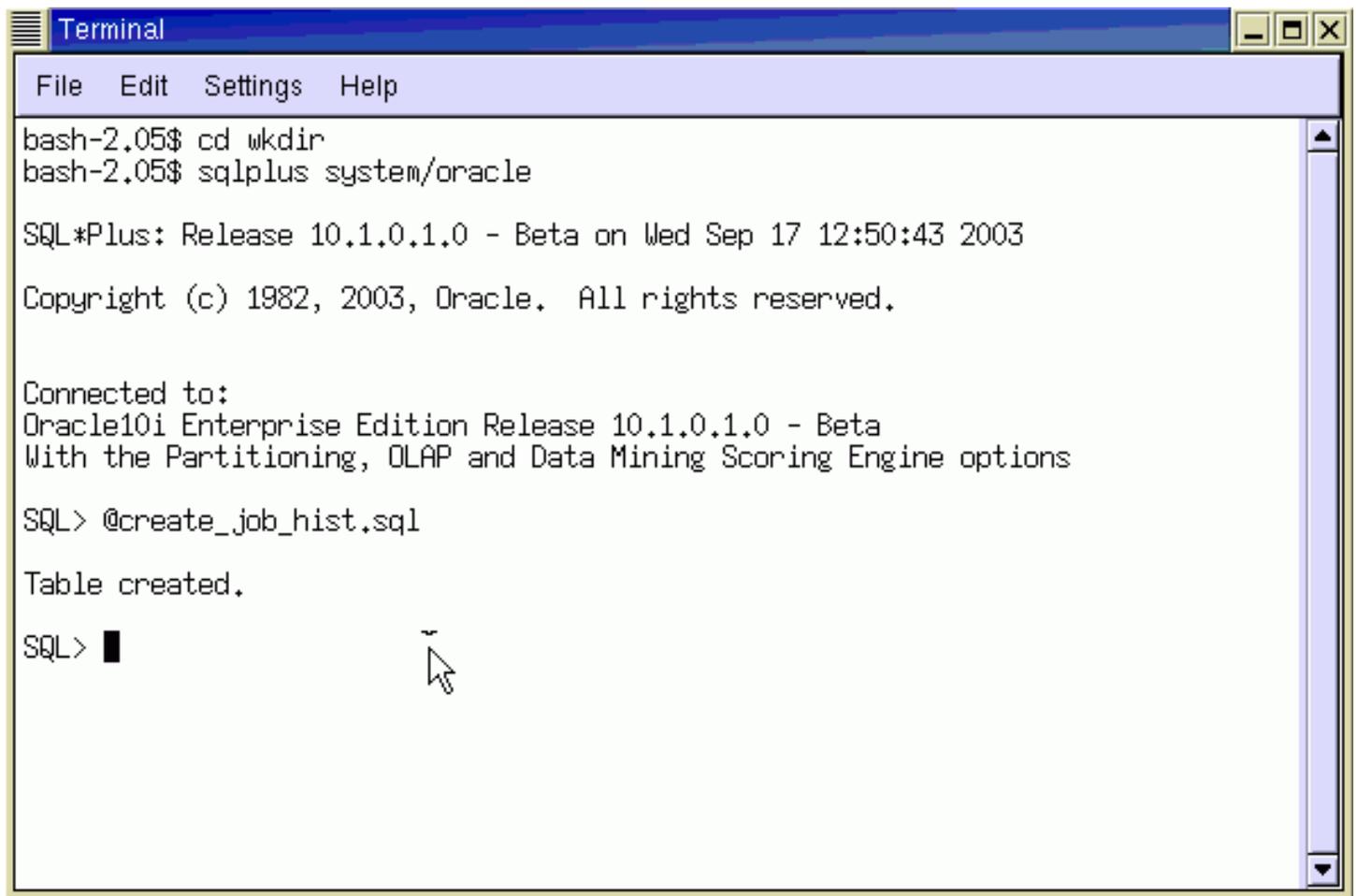
### Filling the Recycle Bin

[Back to List of Topics](#)

First, you will need to add an object to the Recycle Bin. Perform the following steps:

1. Open **SQL\*Plus** and enter the following commands to create a new table:

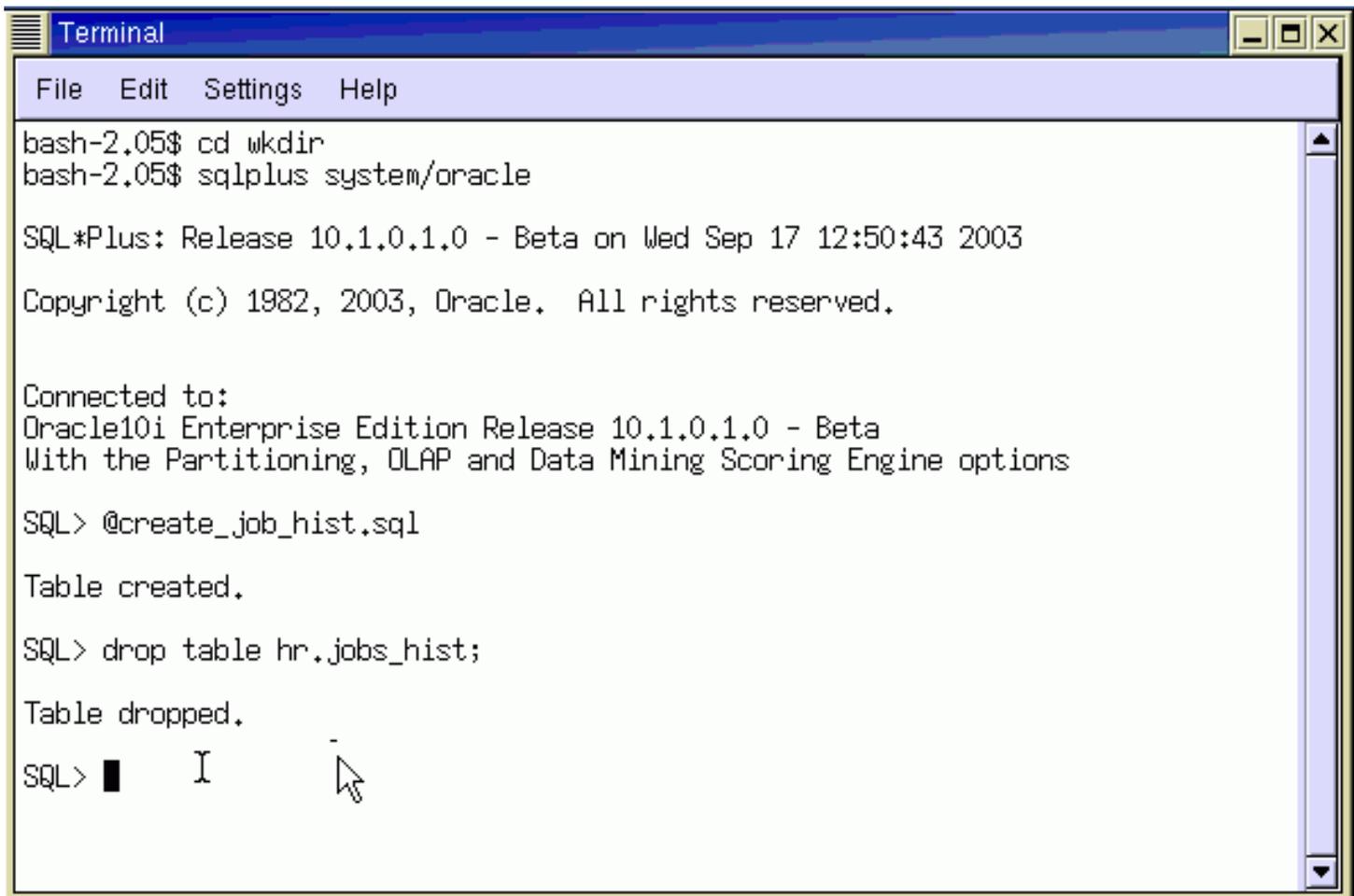
```
connect system/<password>  
@create_job_hist
```

A screenshot of a terminal window titled "Terminal". The window has a menu bar with "File", "Edit", "Settings", and "Help". The terminal content shows a user navigating to a directory and starting SQL\*Plus. The output includes the SQL\*Plus version (10.1.0.1.0 - Beta), the connection details (Oracle10i Enterprise Edition), and the successful execution of the @create\_job\_hist.sql script, resulting in the message "Table created." followed by a prompt "SQL>".

```
Terminal  
File Edit Settings Help  
bash-2.05$ cd wkdir  
bash-2.05$ sqlplus system/oracle  
  
SQL*Plus: Release 10.1.0.1.0 - Beta on Wed Sep 17 12:50:43 2003  
Copyright (c) 1982, 2003, Oracle. All rights reserved.  
  
Connected to:  
Oracle10i Enterprise Edition Release 10.1.0.1.0 - Beta  
With the Partitioning, OLAP and Data Mining Scoring Engine options  
SQL> @create_job_hist.sql  
  
Table created.  
SQL> █
```

2. Now enter the following SQL statement to drop the table you just created.

```
drop table hr.jobs_hist;
```

A screenshot of a terminal window titled "Terminal". The window has a menu bar with "File", "Edit", "Settings", and "Help". The terminal content shows a user navigating to a directory and connecting to an Oracle database. The user then executes a script to create a table, followed by dropping it. The prompt "SQL>" is followed by a cursor and a mouse cursor.

```
bash-2.05$ cd wkdir
bash-2.05$ sqlplus system/oracle

SQL*Plus: Release 10.1.0.1.0 - Beta on Wed Sep 17 12:50:43 2003

Copyright (c) 1982, 2003, Oracle. All rights reserved.

Connected to:
Oracle10i Enterprise Edition Release 10.1.0.1.0 - Beta
With the Partitioning, OLAP and Data Mining Scoring Engine options

SQL> @create_job_hist.sql

Table created.

SQL> drop table hr.jobs_hist;

Table dropped.

SQL> █      I      -      ↗
```

The table has been dropped. You have just added this table to the recycle bin.

## Querying Tables in the Recycle Bin

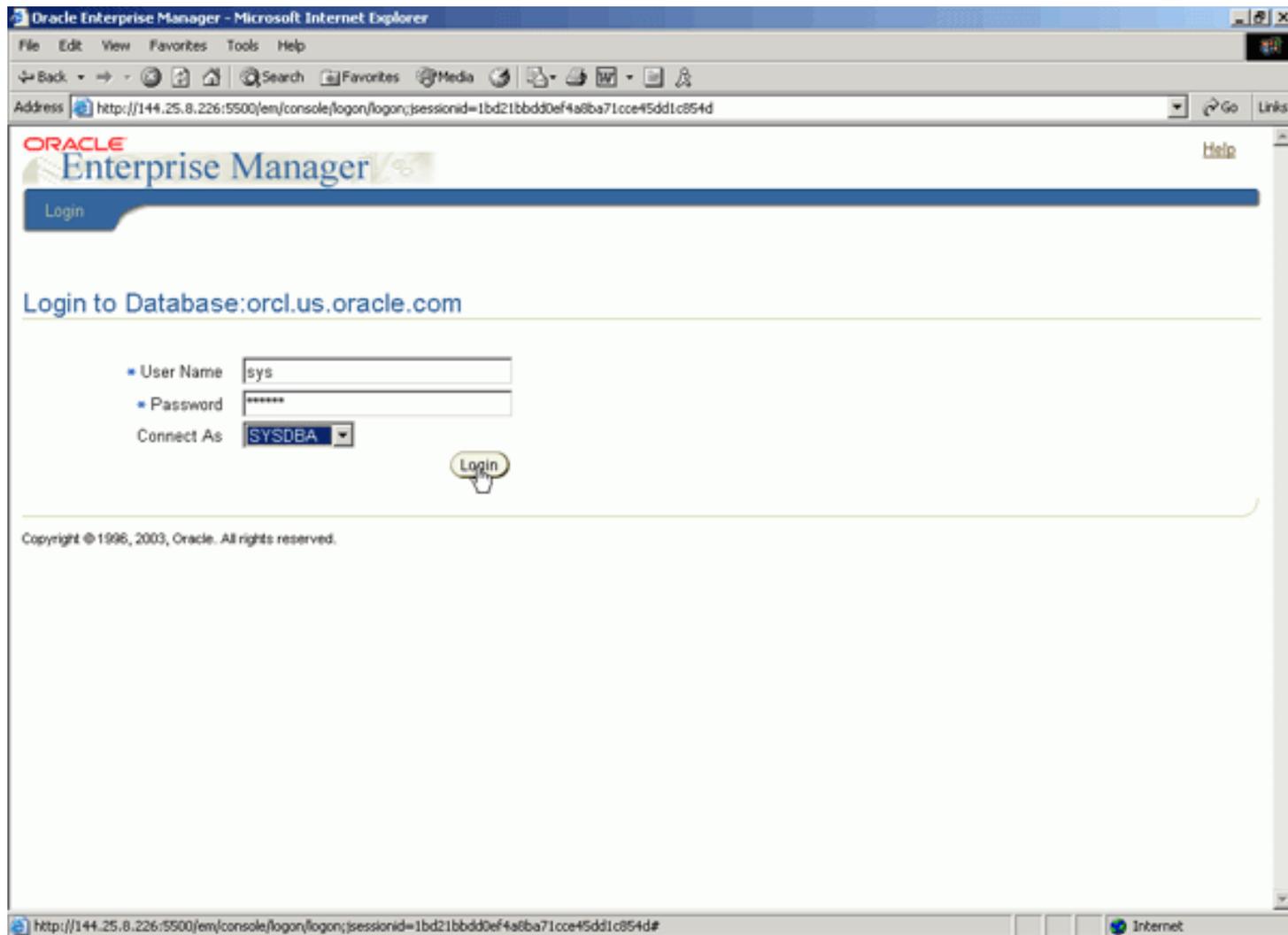
[Back to List of Topics](#)

You can still query tables after you have dropped them. You can issue a `SELECT` statement against the objects in the recycle bin using the name of the object in the recycle bin. You can also issue a Flashback Query against objects in the recycle bin to query past data, as long as the undo information required to satisfy the query is available. You can only issue these queries if you are the original owner of the object. Perform the following

1. At this point, you can query the recycle bin for the table you just dropped. Open another browser window and enter the following URL:

**http://<hostname>:5500/em**

Enter **sys<password>** as **SYSDBA** and click **Login** .



- Click the **Administration** tab.

The screenshot displays the Oracle Enterprise Manager (EM) console interface for a database instance named 'orcl.us.oracle.com'. The user is logged in as 'SYS'. The 'Administration' tab is selected in the top navigation bar. The main dashboard provides a comprehensive overview of the database's health and performance.

**General Information:**

- Status: **Up** (with a 'Shutdown' button)
- Up Since: **Aug 25, 2003 2:18:56 PM**
- Time Zone: **PDT**
- Availability (%): **100** (Last 24 hours)
- Instance Name: **orcl**
- Version: **10.1.0.1.0**
- Host: **EDCDR26P1**
- Listener: **LISTENER\_EDCDR26P1**
- Oracle Home: **oracle/ora10g**
- Alert Log: **No ORA- errors**

**Host CPU:** A bar chart shows CPU usage for the 'orcl' instance, which is currently at 0%. The legend indicates 'orcl' (blue) and 'Other' (purple).

**Active Sessions:** A pie chart shows session distribution: 100% Using CPU (0.43%), 0% Waiting: I/O (0%), and 0% Waiting: Other (99.6%).

**Performance Metrics:**

- Run Queue: **Unavailable**
- Paging (pages per second): **Unavailable**
- Active Sessions: **3**
- SQL Response Time (%): **110.58** (compared to baseline)

**Space Usage:**

- Problem: **0** (with a green checkmark)
- Tablespaces: **0** (with a green checkmark)
- Fragmentation: **Not Configured**
- Issues: **Not Configured**
- Dump Area Used (%): **75** (with a green checkmark)

**Advice:**

- ADDM Findings: **1**
- Policy Violations: **23**

**High Availability:**

- Instance Recovery Time (seconds): **9**
- Last Backup Archiving: **n/a**
- Archive Area Used (%): **n/a**
- Flashback Logging: **Enabled**

**Job Activity:**

- Scheduled Executions: **0**
- Running Executions: **0**
- Suspended Executions: **0**
- Problem Executions: **0** (Last 7 days)

- Click **Tables**.

The screenshot displays the Oracle Enterprise Manager (SYS) web interface. The browser title is "Oracle Enterprise Manager (SYS) - Database: orcl.us.oracle.com - Microsoft Internet Explorer". The address bar shows the URL: [http://144.25.8.226:5500/em/console/database/instance/sitemap?event=doLoad&target=orcl.us.oracle.com&type=oracle\\_database&pageNum=3](http://144.25.8.226:5500/em/console/database/instance/sitemap?event=doLoad&target=orcl.us.oracle.com&type=oracle_database&pageNum=3). The page header includes the Oracle logo, "Enterprise Manager", and navigation links: "Setup", "Preferences", "Help", "Logout". The user is logged in as "SYS".

The main content area is titled "Database: orcl.us.oracle.com" and features a navigation bar with "Home", "Performance", "Administration", and "Maintenance". The "Administration" menu is expanded, showing several categories:

- Instance**: [Memory Parameters](#), [Undo Management](#), [All Initialization Parameters](#)
- Storage**: [Controlfiles](#), [Tablespaces](#), [Datafiles](#), [Rollback Segments](#), [Redo Log Groups](#), [Archive Logs](#), [Temporary Tablespace Groups](#)
- Security**: [Users](#), [Roles](#), [Profiles](#)
- Resource Manager**: [Resource Monitors](#), [Resource Consumer Group Mappings](#), [Resource Consumer Groups](#), [Resource Plans](#)
- Scheduler**: [Jobs](#), [Schedules](#), [Programs](#), [Job Classes](#), [Windows](#), [Window Groups](#)
- Schema**: [Tables](#), [Indexes](#), [Views](#), [Synonyms](#), [Sequences](#), [Database Links](#)
- Source Types**: [Packages](#), [Package Bodies](#), [Procedures](#), [Functions](#), [Triggers](#), [Java Sources](#), [Java Classes](#)
- User Types**: [Array Types](#), [Object Types](#), [Table Types](#)
- Warehouse**: [OLAP](#) (Cubes, OLAP Dimensions, Measure Folders), [Summary Management](#) (Materialized Views, Materialized View Logs, Refresh Groups)
- Configuration Management**: [Last Collected Configuration](#), [Database Usage Statistics](#)
- Workload**: [Workload Repository](#), [SQL Tuning Sets](#)

The bottom navigation bar includes "Home", "Performance", "Administration", and "Maintenance". The browser address bar at the bottom shows the URL: <http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?event=search&otype=schema&objectType=TABLE&target=orcl.us.or>

4. Enter **HR** for the Schema and click **GO**.

Tables - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address [http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?event=search&otype=schema&objectType=TABLE&target=ord.us.oracle.com&type=oracle\\_database](http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?event=search&otype=schema&objectType=TABLE&target=ord.us.oracle.com&type=oracle_database)

**ORACLE** Enterprise Manager Setup Preferences Help Logout

Database

Database: [ord.us.oracle.com](#) > Tables Logged in As SYS

### Tables

**Search**

Select an object type and optionally enter a schema name and an object name to filter the data that is displayed in your results set.

Object Type:  Schema:  Object Name:

Example: Entering Test will return all items beginning with upper case TEST, i.e. TEST\_A, except for Java Source and Java Class which do case sensitive searches. Use double quotes to preserve case and embed wildcards(%).

**Results**

Actions

Previous 1-25 of 1035 Next 25

Select	Schema	Table Name	Tablespace	Partition Type	Partitions	Subpartitions	IOT	Clustered
<input checked="" type="radio"/>	SYS	ACCESS\$	SYSTEM		0	0		NO
<input type="radio"/>	SYS	ALERT_QT	SYSAUX		0	0		NO
<input type="radio"/>	SYS	APPLY\$ CONF_HDLR_COLUMNS	SYSTEM		0	0		NO
<input type="radio"/>	SYS	APPLY\$ CONSTRAINT_COLUMNS	SYSTEM		0	0		NO
<input type="radio"/>	SYS	APPLY\$ DEST_OBJ	SYSTEM		0	0		NO
<input type="radio"/>	SYS	APPLY\$ DEST_OBJ_CMAP	SYSTEM		0	0		NO
<input type="radio"/>	SYS	APPLY\$ DEST_OBJ_OPS	SYSTEM		0	0		NO
<input type="radio"/>	SYS	APPLY\$ ERROR	SYSAUX		0	0		NO
<input type="radio"/>	SYS	APPLY\$ ERROR_HANDLER	SYSTEM		0	0		NO
<input type="radio"/>	SYS	APPLY\$ SOURCE_OBJ	SYSTEM		0	0		NO
<input type="radio"/>	SYS	APPLY\$ SOURCE_SCHEMA	SYSTEM		0	0		NO

<http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?event=search&otype=schema&objectType=TABLE&target=ord.us.or> Internet

- Click the **Recycle Bin** link.

The screenshot shows the Oracle Enterprise Manager interface in Microsoft Internet Explorer. The page title is "Tables - Microsoft Internet Explorer". The address bar shows the URL: [http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?target=orcl.us.oracle.com&type=oracle\\_database](http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?target=orcl.us.oracle.com&type=oracle_database). The page header includes the Oracle logo and "Enterprise Manager" with navigation links for "Setup", "Preferences", "Help", and "Logout". The current database is "orcl.us.oracle.com" and the user is logged in as "As SYS".

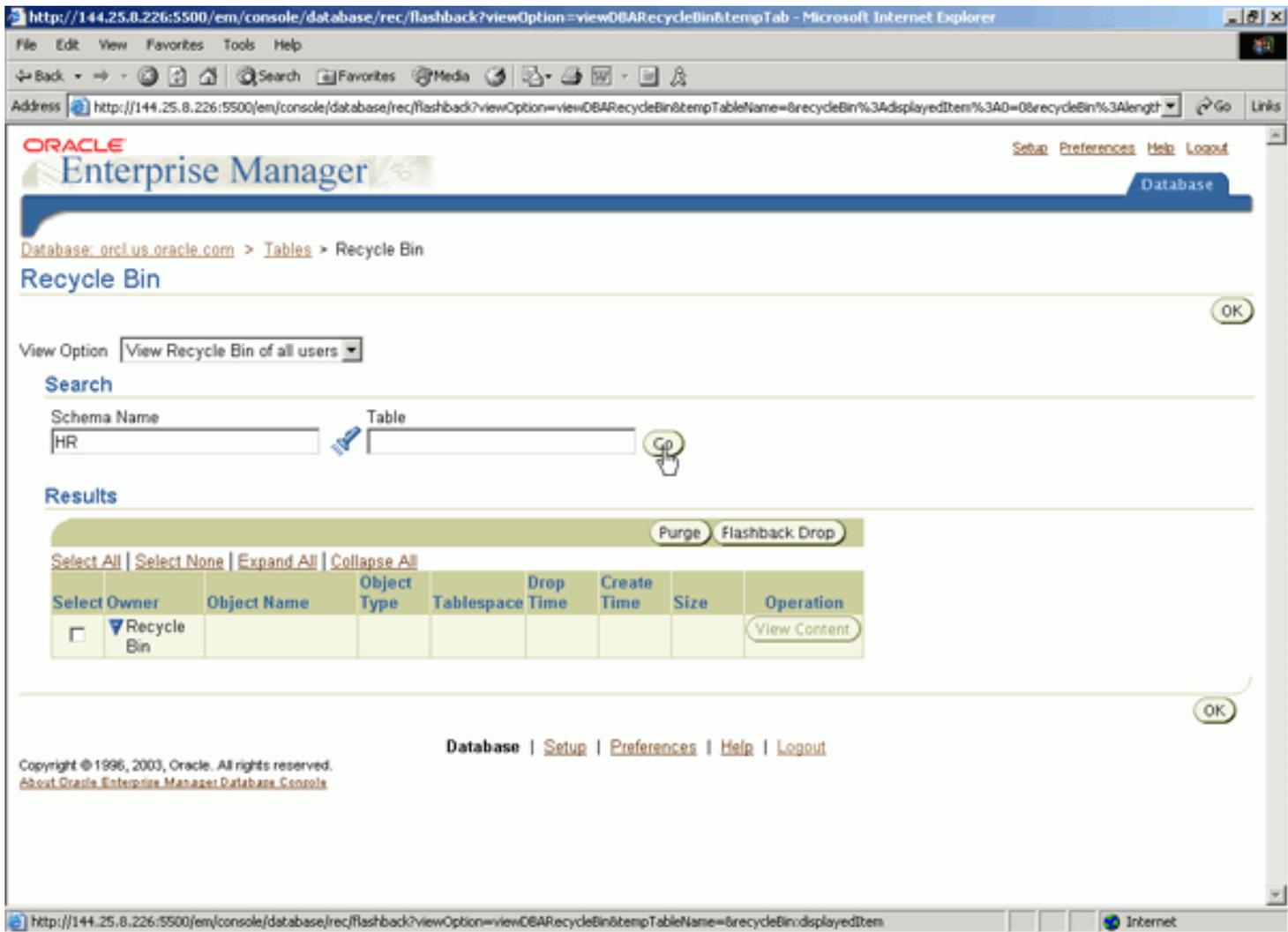
The "Tables" section is active, showing a search interface. The "Object Type" is set to "Table", the "Schema" is "HR", and the "Object Name" field is empty. A "Go" button is next to the Object Name field. Below the search fields, there is an example: "Example: Entering Test will return all items beginning with upper case TEST, i.e. TEST\_A, except for Java Source and Java Class which use case sensitive searches. Use double quotes to preserve case and embed wildcards(%)."

The "Results" section displays a table of tables in the HR schema. The table has columns: Select, Schema, Table Name, Tablespace, Partition Type, Partitions, Subpartitions, IOT, and Clustered. The "Create Like" button is visible in the top right of the results area.

Select	Schema	Table Name	Tablespace	Partition Type	Partitions	Subpartitions	IOT	Clustered
<input checked="" type="radio"/>	HR	<a href="#">COUNTRIES</a>	EXAMPLE		0	0	IOT	NO
<input type="radio"/>	HR	<a href="#">DEPARTMENTS</a>	EXAMPLE		0	0		NO
<input type="radio"/>	HR	<a href="#">EMPLOYEES</a>	EXAMPLE		0	0		NO
<input type="radio"/>	HR	<a href="#">JOBS</a>	EXAMPLE		0	0		NO
<input type="radio"/>	HR	<a href="#">JOB_HISTORY</a>	EXAMPLE		0	0		NO
<input type="radio"/>	HR	<a href="#">LOCATIONS</a>	EXAMPLE		0	0		NO
<input type="radio"/>	HR	<a href="#">RB\$50944\$TABLE\$0</a>	EXAMPLE		0	0		NO
<input type="radio"/>	HR	<a href="#">REGIONS</a>	EXAMPLE		0	0		NO

At the bottom of the page, there is a "Recycle Bin" link and a "Database | Setup | Preferences | Help | Logout" navigation bar. The footer shows the copyright information: "Copyright © 1996-2003 Oracle. All rights reserved." and the URL: [http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?target=orcl.us.oracle.com&type=oracle\\_database#](http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?target=orcl.us.oracle.com&type=oracle_database#).

6. Select **View Recycle Bin of all users** from the View Options list box and enter the **HR** schema and click **GO**.



7. You notice that the table you dropped is listed. Click **View Content** .

Oracle Enterprise Manager Database Console

Database: orcl.us.oracle.com > Tables > Recycle Bin

Recycle Bin

View Option: View Recycle Bin of all users

Search

Schema Name: HR Table:  Go

Results

Purge Flashback Drop

Select All | Select None | Expand All | Collapse All

Select	Owner	Object Name	Object Type	Tablespace	Drop Time	Create Time	Size	Operation
<input type="checkbox"/>	Recycle Bin							View Content
<input type="checkbox"/>	HR	JOBS_HIST	TABLE	EXAMPLE	2003-08-26:12:50:27	2003-08-26:12:49:07	8	View Content

Database | Setup | Preferences | Help | Logout

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[About Oracle Enterprise Manager Database Console](#)

8. You see the contents of the table you dropped. Click **OK**.

The screenshot shows the Oracle Enterprise Manager interface in a Microsoft Internet Explorer browser. The page title is "View Data for Table: HR.RB\$\$50944\$TABLE\$0". The query entered is:

```
SELECT "JOB_ID", "JOB_TITLE", "MIN_SALARY", "MAX_SALARY"
FROM "HR"."RB$$50944$TABLE$0"
```

The results are displayed in a table with the following columns: JOB\_ID, JOB\_TITLE, MIN\_SALARY, and MAX\_SALARY. The data is as follows:

JOB_ID	JOB_TITLE	MIN_SALARY	MAX_SALARY
AD_PRES	President	20000	40000
AD_VP	Administration Vice President	15000	30000
AD_ASST	Administration Assistant	3000	6000
FI_MGR	Finance Manager	8200	16000
FI_ACCOUNT	Accountant	4200	9000
AC_MGR	Accounting Manager	8200	16000
AC_ACCOUNT	Public Accountant	4200	9000
SA_MAN	Sales Manager	10000	20000
SA_REP	Sales Representative	6000	12000
PU_MAN	Purchasing Manager	8000	15000
PU_CLERK	Purchasing Clerk	2500	5500
ST_MAN	Stock Manager	5500	8500
ST_CLERK	Stock Clerk	2000	5000
SH_CLERK	Shipping Clerk	2500	5500
IT_PROG	Programmer	4000	10000
MK_MAN	Marketing Manager	9000	15000
MK_REP	Marketing Representative	4000	9000
HR_REP	Human Resources Representative	4000	9000

## Recovering Tables From the Recycle Bin

[Back to List of Topics](#)

You can recover the table from the recycle bin by performing the following:

1. In the recycle bin, select the checkbox next to the JOBS\_HIST object and click **Flashback Drop**.

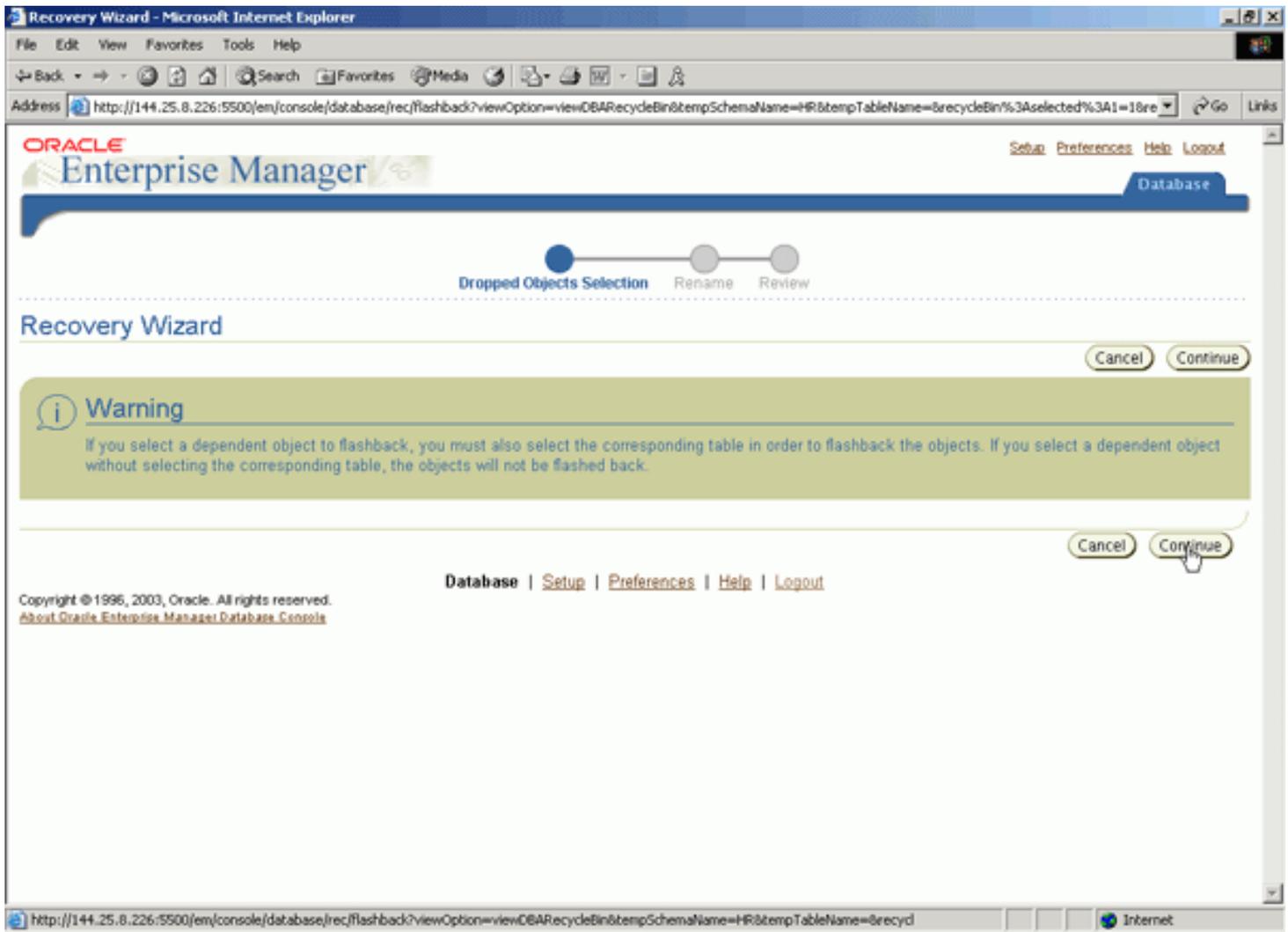
The screenshot shows the Oracle Enterprise Manager interface for the Recycle Bin. The browser address bar indicates the URL: `http://144.25.8.226:5500/em/console/database/rec/flashback?event=redisplayRecycleBin&target=orc - Microsoft Internet Explorer`. The page title is "Recycle Bin" and the breadcrumb is "Database: orcl.us.oracle.com > Tables > Recycle Bin".

Under "View Option", it says "View Recycle Bin of all users". There is a search section with "Schema Name" set to "HR" and "Table" empty. The "Results" section shows a table with the following data:

Select	Owner	Object Name	Object Type	Tablespace	Drop Time	Create Time	Size	Operation
<input type="checkbox"/>	▼ Recycle Bin							<a href="#">View Content</a>
<input checked="" type="checkbox"/>	HR	JOBS_HIST	TABLE	EXAMPLE	2003-08-26:12:50:27	2003-08-26:12:49:07	8	<a href="#">View Content</a>

Buttons for "Purge" and "Flashback Drop" are visible above the table. The "Flashback Drop" button is highlighted with a mouse cursor. At the bottom, there is a "Database" section with links for "Setup", "Preferences", "Help", and "Logout".

2. To recover a table from the recycle bin, you are required to recover all dependent objects as well. In this case there are no dependencies. Click **Continue**.



3. Click **Next** .

The screenshot shows the Oracle Enterprise Manager Database Console interface. The browser address bar displays the URL: `http://144.25.8.226:5500/em/console/database/rec/flashback?source=&value=&pageSeq=1&type=oracle`. The page title is "Oracle Enterprise Manager Database Console". The main content area is titled "Recovery: Rename" and shows the "Object Type" as "Tables" and "Operation Type" as "Flashback dropped tables". A table lists the table to be renamed:

Table Owner	Table Name	New Name
HR	JOBS_HIST	JOBS_HIST

Navigation buttons include "Cancel", "Back", "Step 2 of 3", and "Next". The "Next" button is highlighted, indicating the user is about to proceed to the next step.

4. Before you submit the job to recover the table, click **Show SQL...** to see what will be executed.

The screenshot shows the Oracle Enterprise Manager console interface. At the top, the browser address bar displays the URL: `http://144.25.8.226:5500/em/console/database/rec/flashback?source=tableNav&value=3&pageSeq=2&undropRenameUIDataSource%3A2%3A0=JOBS_HIST&undropRenameUI`. The page title is "Oracle Enterprise Manager" and the current page is "Database".

The main content area is titled "Perform Recovery: Review". It shows a progress bar with three steps: "Dropped Objects Selection", "Rename", and "Review" (which is the current step). Below the progress bar, there are buttons for "Cancel", "Back", "Step 3 of 3", and "Submit".

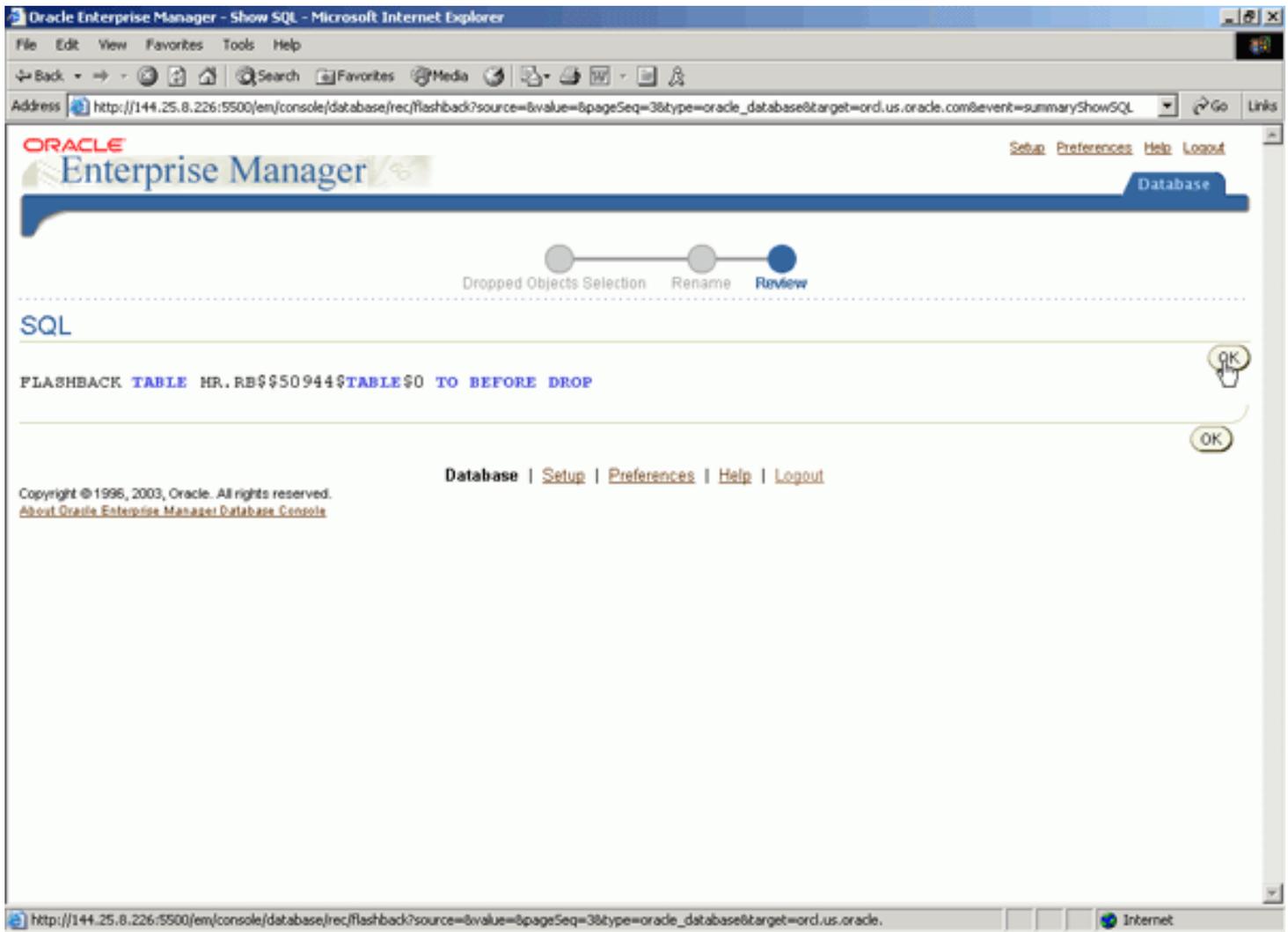
The "Object Type" is "Tables" and the "Operation Type" is "Flashback dropped tables". A message states: "Following tables will be flashed back. All the dependent objects of the tables will be flashed back if they could be flashed back."

The "Impact Analysis" section shows a list of tables to be flashed back:

- 1. Table Name: HR.JOBS\_HIST  
New Name: JOBS\_HIST

Below the list is a "Show SQL..." button. At the bottom of the page, there are buttons for "Return to Recovery Type Selection", "Cancel", "Back", "Step 3 of 3", and "Submit".

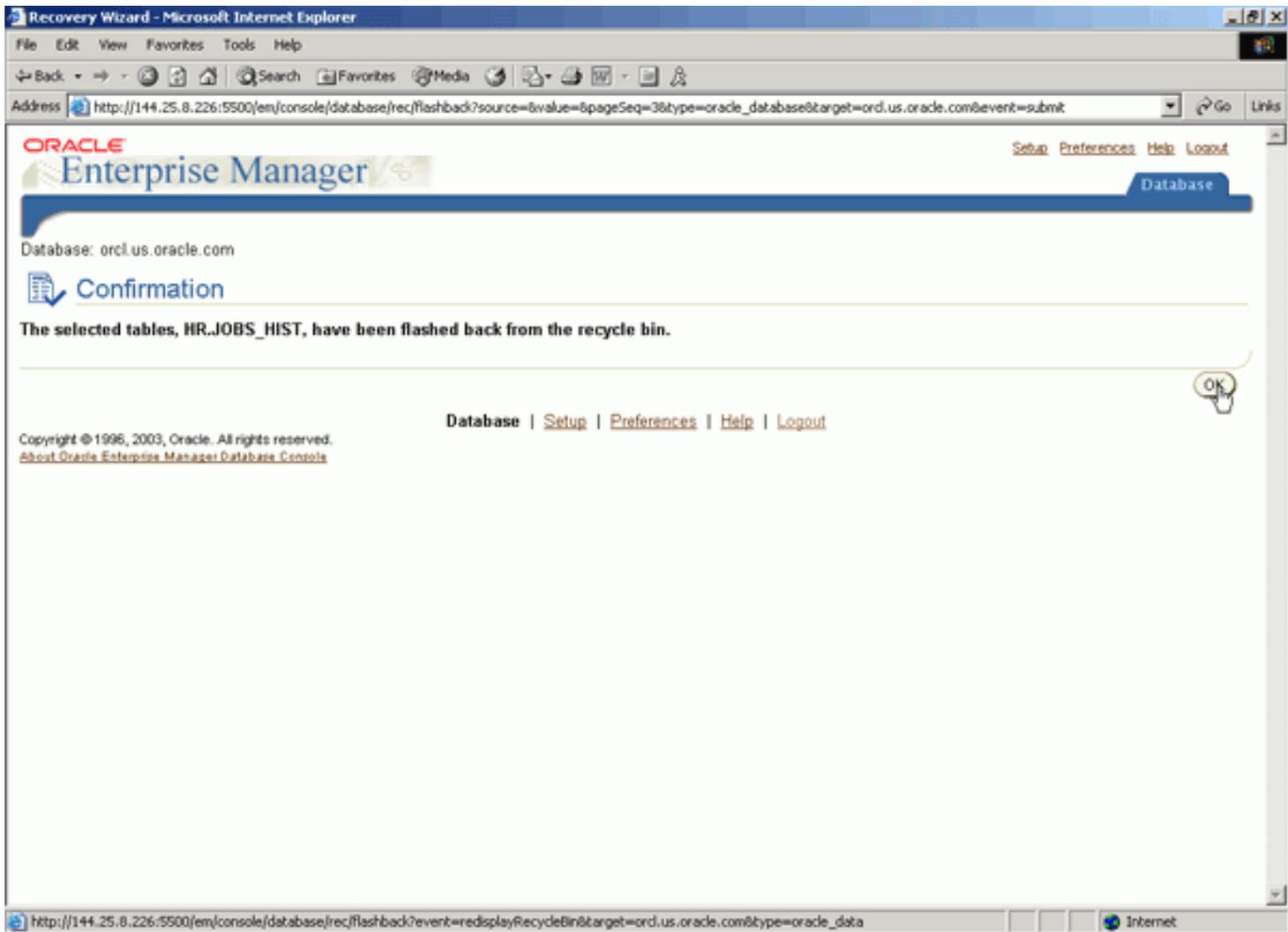
5. Review the SQL statement that will run. When done, click **OK**.



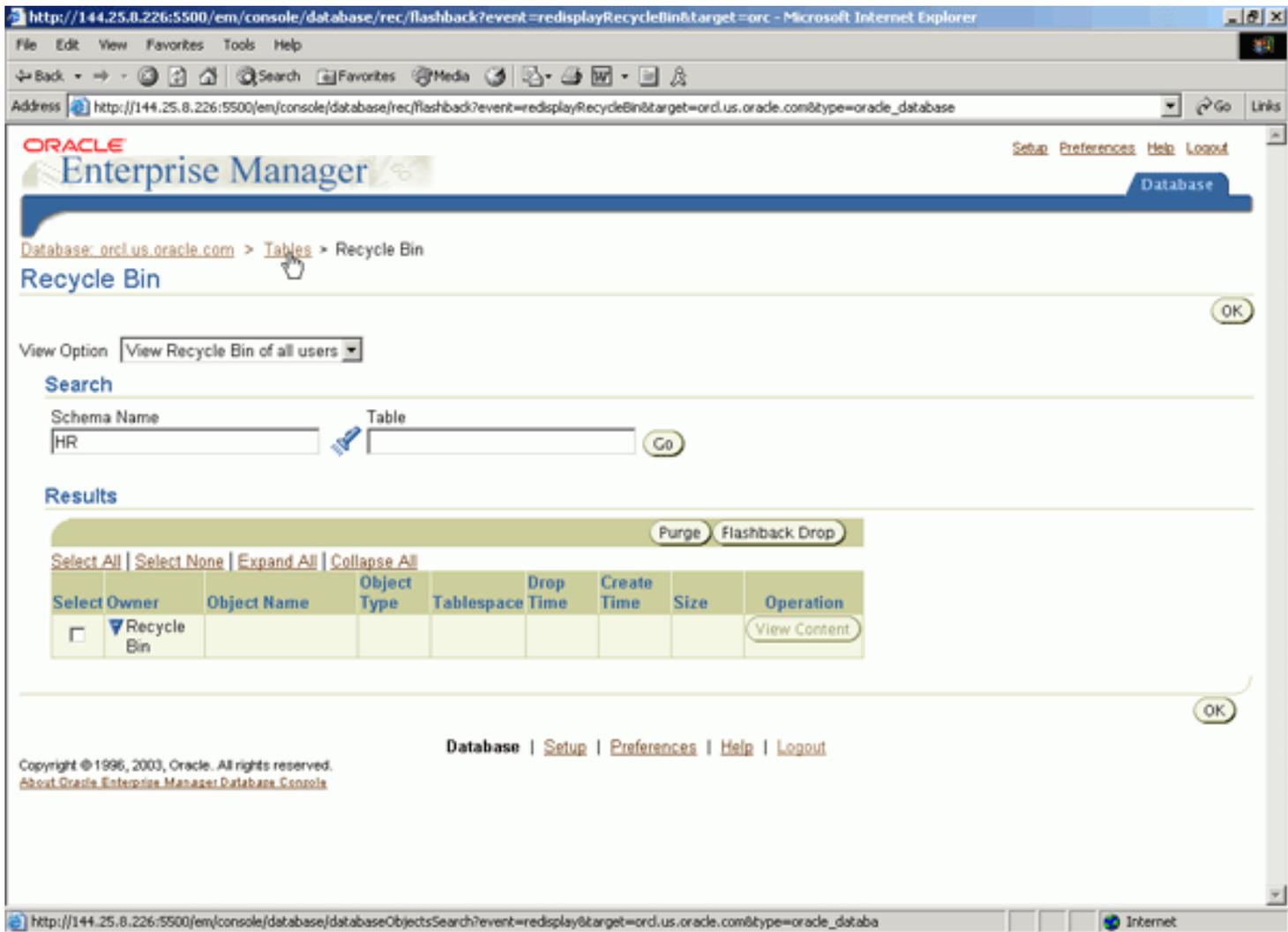
6. Click **Submit** .

The screenshot shows the Oracle Enterprise Manager console interface. At the top, the browser address bar displays the URL: `http://144.25.8.226:5500/em/console/database/rec/flashback?event=backToPrevPage&target=orcl.us.Oracle.com&type=oracle_database`. The page title is "ORACLE Enterprise Manager" with a "Database" tab selected. A progress bar indicates the current step is "Review" (Step 3 of 3), with "Dropped Objects Selection" and "Rename" as previous steps. The main heading is "Perform Recovery: Review". Below this, there are navigation buttons: "Cancel", "Back", "Step 3 of 3", and "Submit". The "Object Type" is "Tables" and the "Operation Type" is "Flashback dropped tables". A message states: "Following tables will be flashed back. All the dependent objects of the tables will be flashed back if they could be flashed back." Under the heading "Impact Analysis", a text box lists: "1. Table Name: HR.JOBS\_HIST" and "New Name: JOBS\_HIST". A "Show SQL..." button is located below the text box. At the bottom of the page, there is a "Return to Recovery Type Selection" link and another set of navigation buttons: "Cancel", "Back", "Step 3 of 3", and "Submit". The footer of the page includes "Database | Setup | Preferences | Help | Logout" and the browser address bar.

7. You receive a message saying the flashback drop was successful. Click **OK**.



8. The JOBS\_HIST table no longer appears in the Recycle Bin. You want to make sure that the table now appears in the list. Click the **Tables** breadcrumb.



- You now see the JOBS\_HIST back in the list.

The screenshot shows the Oracle Enterprise Manager interface in Microsoft Internet Explorer. The browser address bar shows the URL: `http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?event=redisplay&target=orcl.us.oracle.com&type=oracle_database`. The page title is "Tables - Microsoft Internet Explorer". The Oracle logo and "Enterprise Manager" are visible at the top. The page is titled "Database: orcl.us.oracle.com > Tables" and shows "Logged in As SYS".

The "Search" section includes a search form with the following fields:

- Object Type: Table
- Schema: HR
- Object Name: (empty)

The "Results" section displays a table with the following columns: Select, Schema, Table Name, Tablespace, Partition Type, Partitions, Subpartitions, IOT, and Clustered. The table contains the following data:

Select	Schema	Table Name	Tablespace	Partition Type	Partitions	Subpartitions	IOT	Clustered
<input checked="" type="radio"/>	HR	COUNTRIES	EXAMPLE		0	0	IOT	NO
<input type="radio"/>	HR	DEPARTMENTS	EXAMPLE		0	0		NO
<input type="radio"/>	HR	EMPLOYEES	EXAMPLE		0	0		NO
<input type="radio"/>	HR	JOBS	EXAMPLE		0	0		NO
<input type="radio"/>	HR	JOBS_HIST	EXAMPLE		0	0		NO
<input type="radio"/>	HR	JOB_HISTORY	EXAMPLE		0	0		NO
<input type="radio"/>	HR	LOCATIONS	EXAMPLE		0	0		NO
<input type="radio"/>	HR	REGIONS	EXAMPLE		0	0		NO

The page footer includes "Copyright © 1996-2003 Oracle. All rights reserved." and "Database | Setup | Preferences | Help | Logout".

## Emptying the Recycle Bin

[Back to List of Topics](#)

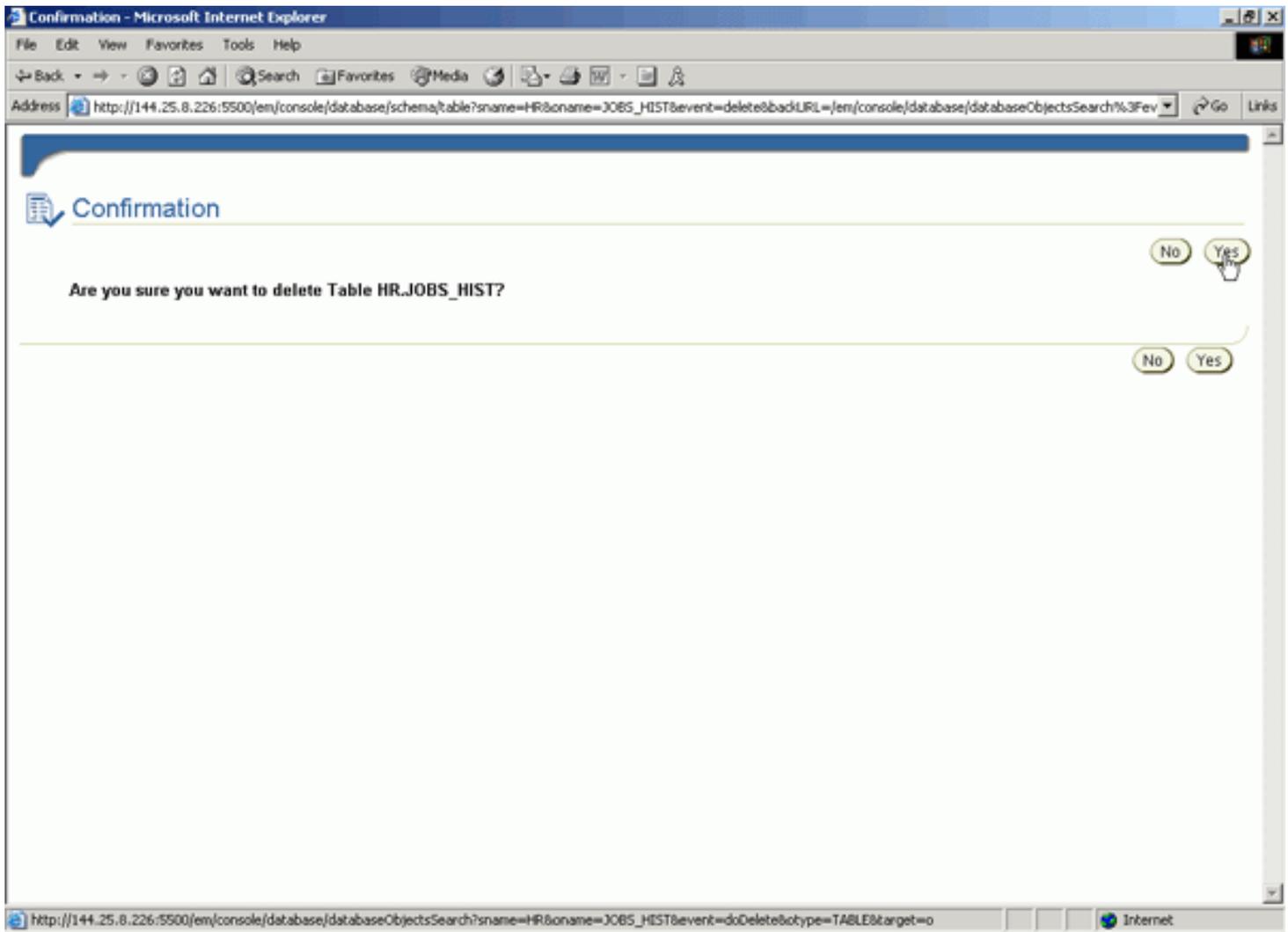
At some point, you may want to permanently remove the object from the database and release the space allocated to it after you have dropped the object. To remove an object from the recycle bin, perform the following:

1. Select the radio button in front of the **JOBS\_HIST** table and click **Delete**.

The screenshot shows the Oracle Enterprise Manager interface. The 'Tables' page is displayed for the HR schema. The search criteria are set to 'Table' in the HR schema. The results table lists several tables, with 'JOBS\_HIST' selected. The 'Delete' button in the 'Actions' column is highlighted.

Select	Schema	Table Name	Tablespace	Partition Type	Partitions	Subpartitions	IOT	Clustered
<input type="radio"/>	HR	COUNTRIES	EXAMPLE		0		0 IOT	NO
<input type="radio"/>	HR	DEPARTMENTS	EXAMPLE		0		0	NO
<input type="radio"/>	HR	EMPLOYEES	EXAMPLE		0		0	NO
<input type="radio"/>	HR	JOBS	EXAMPLE		0		0	NO
<input checked="" type="radio"/>	HR	JOBS_HIST	EXAMPLE		0		0	NO
<input type="radio"/>	HR	JOB_HISTORY	EXAMPLE		0		0	NO
<input type="radio"/>	HR	LOCATIONS	EXAMPLE		0		0	NO
<input type="radio"/>	HR	REGIONS	EXAMPLE		0		0	NO

2. Click **Yes** to confirm deletion.



3. Click the **Recycle Bin** link.

Tables - Microsoft Internet Explorer

Address: http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?sname=HR&oname=JOBS\_HIST&event=doDelete&otype=TABLE&target=orcl.us.oracle.com&type=or

Database: orcl.us.oracle.com > Tables Logged in As SYS

**Update Message**  
Table HR.JOBS\_HIST has been deleted successfully

### Tables

**Search**

Select an object type and optionally enter a schema name and an object name to filter the data that is displayed in your results set.

Object Type:  Schema:  Object Name:

Example: Entering Test will return all items beginning with upper case TEST, i.e. TEST\_A, except for Java Source and Java Class which use case sensitive searches. Use double quotes to preserve case and embed wildcards(%).

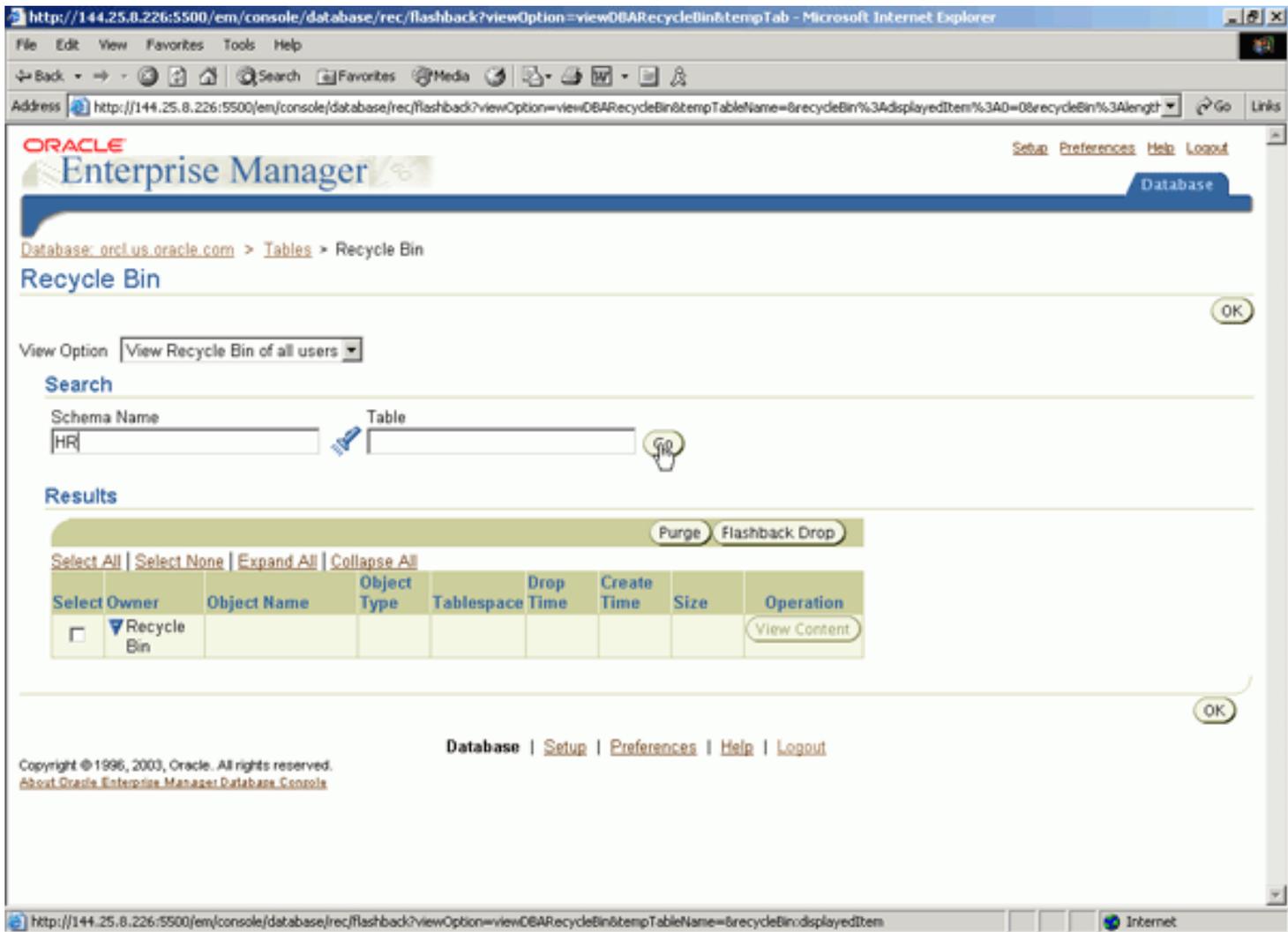
**Results**

Select	Schema	Table Name	Tablespace	Partition Type	Partitions	Subpartitions	IOT	Clustered
<input checked="" type="radio"/>	HR	<a href="#">COUNTRIES</a>	EXAMPLE		0	0	IOT	NO
<input type="radio"/>	HR	<a href="#">DEPARTMENTS</a>	EXAMPLE		0	0		NO
<input type="radio"/>	HR	<a href="#">EMPLOYEES</a>	EXAMPLE		0	0		NO
<input type="radio"/>	HR	<a href="#">JOBS</a>	EXAMPLE		0	0		NO
<input type="radio"/>	HR	<a href="#">JOB_HISTORY</a>	EXAMPLE		0	0		NO
<input type="radio"/>	HR	<a href="#">LOCATIONS</a>	EXAMPLE		0	0		NO
<input type="radio"/>	HR	<a href="#">RBS\$50944\$TABLE\$0</a>	EXAMPLE		0	0		NO
<input type="radio"/>	HR	<a href="#">REGIONS</a>	EXAMPLE		0	0		NO

[Recycle Bin](#)

Address: http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?sname=HR&oname=JOBS\_HIST&event=doDelete&otype=TABLE&target=orcl.us.oracle.com

- Select **View Recycle Bin of all users** from the View Options list box and enter the **HR** schema and click **GO**.



The screenshot shows the Oracle Enterprise Manager interface for the Recycle Bin. The browser address bar indicates the URL: `http://144.25.8.226:5500/em/console/database/rec/flashback?viewOption=viewDBARecycleBin&tempTab=`. The page title is "Oracle Enterprise Manager" and the current view is "Database".

The breadcrumb navigation shows: `Database: orcl.us.oracle.com > Tables > Recycle Bin`. The main heading is "Recycle Bin".

The "View Option" is set to "View Recycle Bin of all users".

The "Search" section has two input fields: "Schema Name" (containing "HR") and "Table".

The "Results" section shows a table with the following columns: Select, Owner, Object Name, Object Type, Tablespace, Drop Time, Create Time, Size, and Operation. The table contains one entry: "Recycle Bin" under the "Owner" column. The "Operation" column for this entry has a "View Content" button.

At the top of the results table, there are buttons for "Purge" and "Flashback Drop".

At the bottom of the results table, there are links for "Select All", "Select None", "Expand All", and "Collapse All".

The footer of the page includes the text: "Copyright © 1996, 2003, Oracle. All rights reserved. About Oracle Enterprise Manager Database Controls".

5. In the recycle bin, select the checkbox next to the JOBS\_HIST object and click **Purge**.

The screenshot shows the Oracle Enterprise Manager console interface. The browser address bar displays the URL: `http://144.25.8.226:5500/em/console/database/rec/flashback?viewOption=viewDBARecycleBin&tempSch=`. The page title is "Oracle Enterprise Manager" and the current view is "Database".

The breadcrumb navigation shows: `Database: orcl.us.oracle.com > Tables > Recycle Bin`. The main heading is "Recycle Bin".

The "View Option" is set to "View Recycle Bin of all users".

The "Search" section includes input fields for "Schema Name" (containing "HR") and "Table", with a "Go" button.

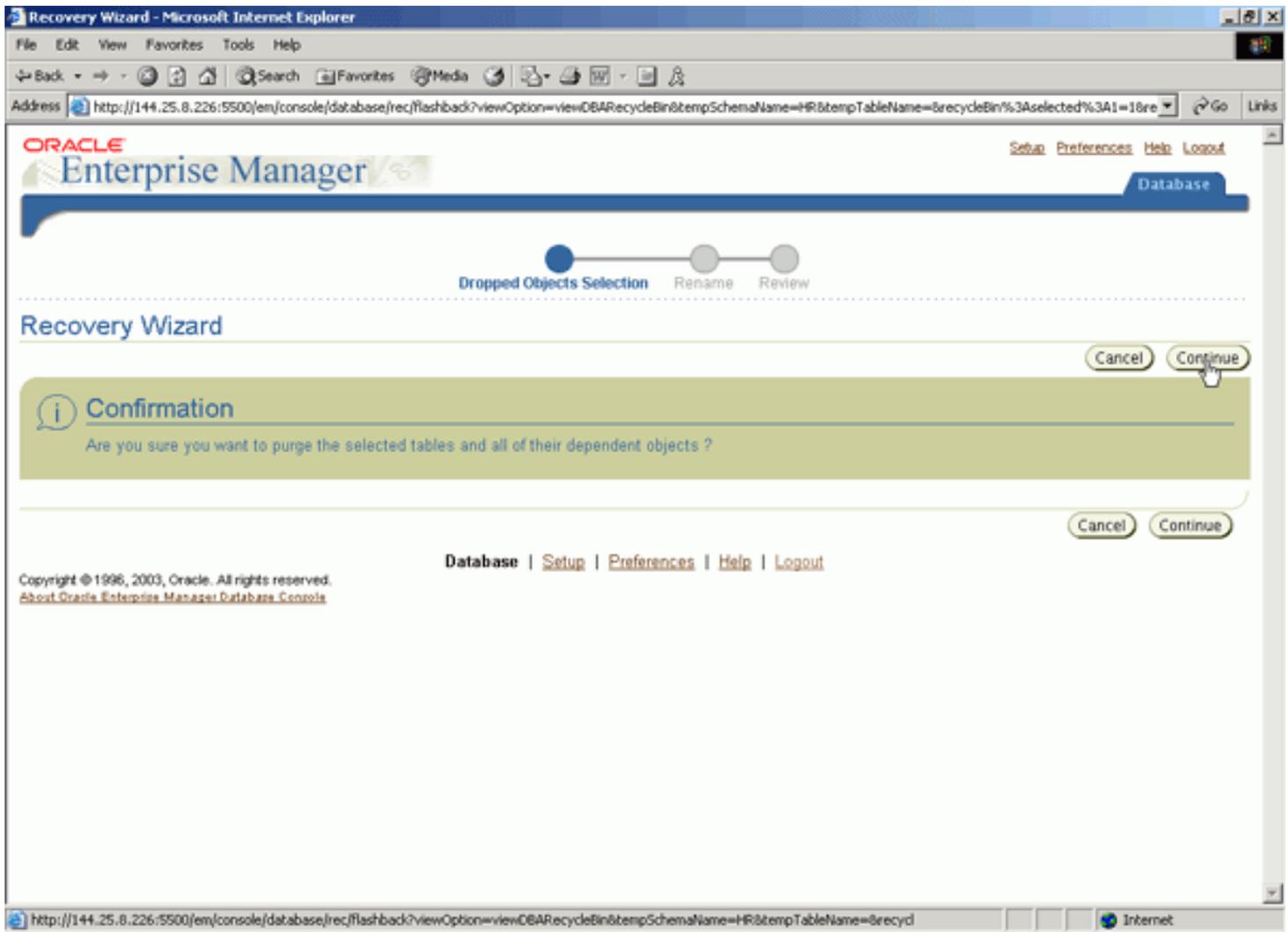
The "Results" section shows a table with the following data:

Select	Owner	Object Name	Object Type	Tablespace	Drop Time	Create Time	Size	Operation
<input type="checkbox"/>	Recycle Bin							View Content
<input checked="" type="checkbox"/>	HR	JOBS_HIST	TABLE	EXAMPLE	2003-08-26:13:14:46	2003-08-26:12:49:07	8	View Content

Buttons for "Purge" and "Flashback Drop" are visible above the table. The "Purge" button is highlighted with a mouse cursor.

At the bottom of the page, there is a footer with copyright information: "Copyright © 1996, 2003, Oracle. All rights reserved. About Oracle Enterprise Manager Database Controls".

- Click **Continue** to confirm deletion.



7. The table has been purged from the recycle bin. Click your **Tables** breadcrumb . .

The screenshot shows the Oracle Enterprise Manager Database Console interface. At the top, the browser address bar displays the URL: `http://144.25.8.226:5500/em/console/database/rec/flashback?source=&value=&pageSeq=1&type=oracle`. The page title is "Oracle Enterprise Manager Database Console". The breadcrumb navigation shows "Database: orcl.us.oracle.com > Tables > Recycle Bin". A confirmation message states: "Confirmation: The selected tables have been purged." Below this, there is a search section with "Schema Name" set to "HR" and "Table" empty. The "Results" section shows a table with one row: "Recycle Bin". The table has columns for "Select", "Owner", "Object Name", "Object Type", "Tablespace", "Drop Time", "Create Time", "Size", and "Operation". The "Operation" column contains a "View Content" button. At the bottom, there are navigation links for "Database", "Setup", "Preferences", "Help", and "Logout".

## Using Flashback Versions Query to Recover a Table to a Point in Time

[Back to List of Topics](#)

In Oracle9 *i*, Flashback Query was introduced. This feature provides a way for you to view and repair historical data. You can perform queries on the database as of a certain wall clock time or user-specified system change number (SCN).

In Oracle Database 10 *G*, Flashback functionality has been expanded. You can use the `VERSIONS BETWEEN` clause to retrieve all of the versions of the rows that exist or ever existed between the time the query was issued and a point back in time. This type of query is referred to as a Flashback Versions Query.

The rows returned by the Flashback Versions Query are a history of changes of the rows across transactions.

The Flashback Versions Query retrieves all committed occurrences of the rows. Changes made by the current active transaction are not returned. In other words, uncommitted row versions within a transaction will not be shown.

You can use Flashback Versions Query to retrieve row history. It provides you with a way to audit the rows of a table and

retrieve information about the transactions that changed the rows. You can use the transaction ID obtained from Flashback Versions Query to perform transaction mining using LogMiner or Flashback Transaction Query to obtain additional information about the transaction.

You will perform the following tasks:

- [Update the JOBS Table](#)
- [Enable Row Movement on the JOBS Table](#)
- [Recover the JOBS Table to a Particular Point in Time](#)

## Update the JOBS Table

[Back to List](#)

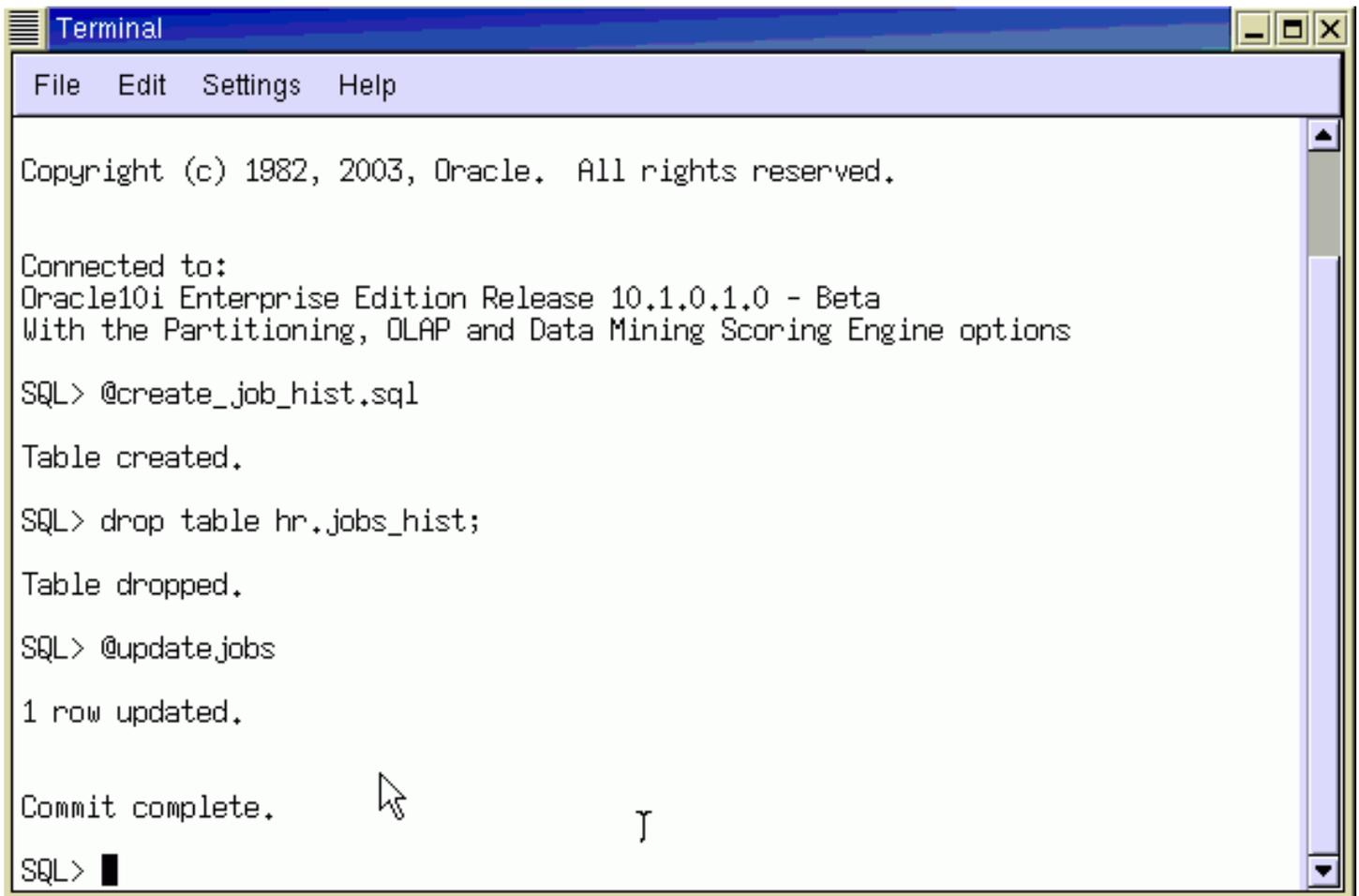
To show how flashback works, you need to make a change to a table. Perform the following:

1. From your **SQL\*Plus** session, execute the following script logged on as **system** .

```
updatejobs.sql
```

The updatejobs.sql contains the following:

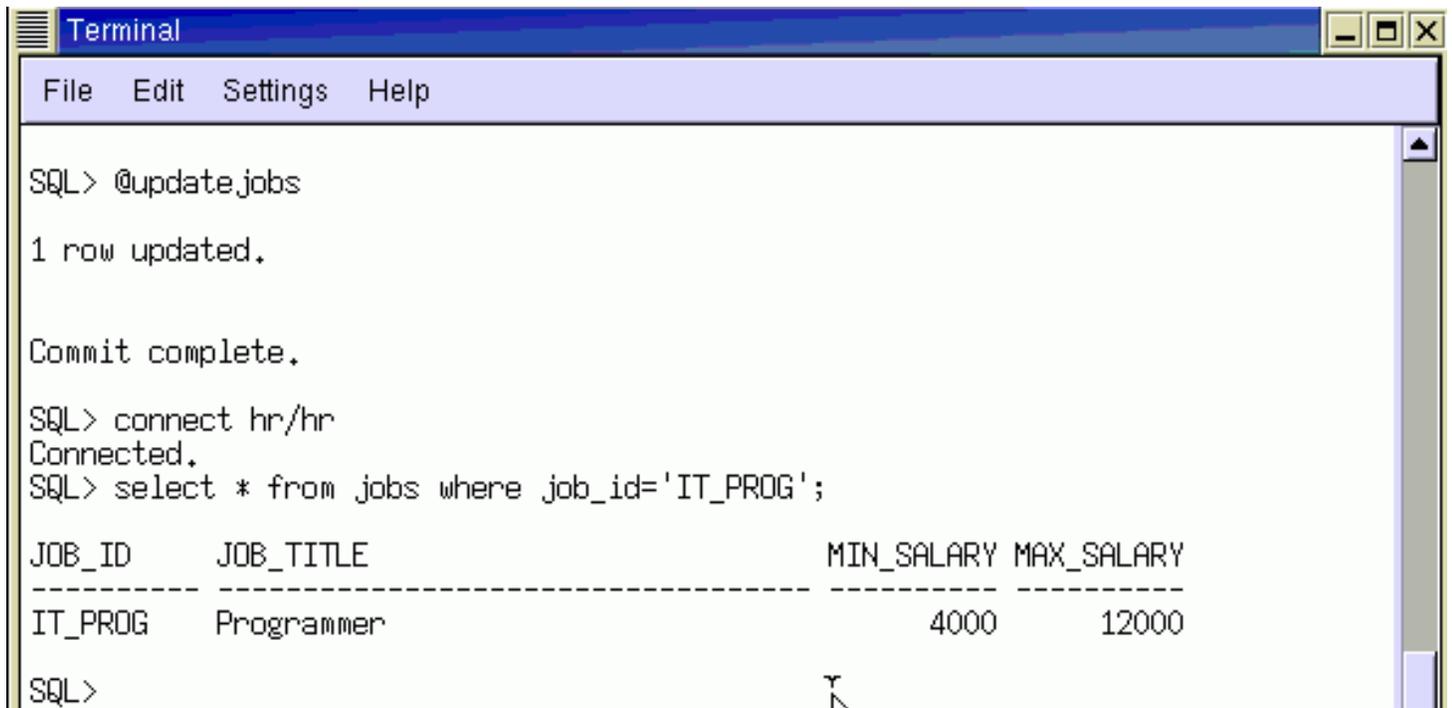
```
UPDATE hr.jobs  
  
SET max_salary = max_salary + 2000  
  
WHERE job_id = 'IT_PROG'  
  
/  
  
COMMIT  
  
/
```

A screenshot of a terminal window titled "Terminal". The window has a menu bar with "File", "Edit", "Settings", and "Help". The terminal content shows the following sequence of commands and outputs:

```
Copyright (c) 1982, 2003, Oracle. All rights reserved.  
  
Connected to:  
Oracle10i Enterprise Edition Release 10.1.0.1.0 - Beta  
With the Partitioning, OLAP and Data Mining Scoring Engine options  
  
SQL> @create_job_hist.sql  
  
Table created.  
  
SQL> drop table hr.jobs_hist;  
  
Table dropped.  
  
SQL> @update.jobs  
  
1 row updated.  
  
Commit complete.  
  
SQL> █
```

2. To see the current value, enter the following SQL statements:

```
connect hr/hr  
select * from jobs where job_id='IT_PROG';
```



```
Terminal
File Edit Settings Help

SQL> @update.jobs
1 row updated.

Commit complete.

SQL> connect hr/hr
Connected.
SQL> select * from jobs where job_id='IT_PROG';

JOB_ID      JOB_TITLE      MIN_SALARY  MAX_SALARY
-----
IT_PROG     Programmer      4000        12000

SQL>
```

You see the current value after your update is 12000.

## Enable Row Movement on the JOBS Table

[Back to List](#)

You must first enable row movement on the table you want to perform flashback table on. Enabling row movement lets you specify whether Oracle can move a table row. It is possible for a row to move, for example, during table compression or an update operation on partitioned data. Perform the following:

1. Switch to your Enterprise Manager browser session, click on the **JOBS** table.

Tables - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address [http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?event=redisplay&target=orcl.us.oracle.com&type=oracle\\_database](http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?event=redisplay&target=orcl.us.oracle.com&type=oracle_database)

**ORACLE**  
Enterprise Manager

Setup Preferences Help Logout

Database

Database: orcl.us.oracle.com > Tables

Logged in As SYS

### Tables

**Search**

Select an object type and optionally enter a schema name and an object name to filter the data that is displayed in your results set.

Object Type:  Schema:  Object Name:

Example: Entering Test will return all items beginning with upper case TEST, i.e. TEST\_A, except for Java Source and Java Class which use case sensitive searches. Use double quotes to preserve case and embed wildcards(%).

**Results**

Actions

Select	Schema	Table Name	Tablespace	Partition Type	Partitions	Subpartitions	IOT	Clustered
<input checked="" type="radio"/>	HR	<a href="#">COUNTRIES</a>	EXAMPLE		0	0	IOT	NO
<input type="radio"/>	HR	<a href="#">DEPARTMENTS</a>	EXAMPLE		0	0		NO
<input type="radio"/>	HR	<a href="#">EMPLOYEES</a>	EXAMPLE		0	0		NO
<input type="radio"/>	HR	<a href="#">JOBS</a>	EXAMPLE		0	0		NO
<input type="radio"/>	HR	<a href="#">JOB_HISTORY</a>	EXAMPLE		0	0		NO
<input type="radio"/>	HR	<a href="#">LOCATIONS</a>	EXAMPLE		0	0		NO
<input type="radio"/>	HR	<a href="#">REGIONS</a>	EXAMPLE		0	0		NO

[Recycle Bin](#)

Database | [Setup](#) | [Preferences](#) | [Help](#) | [Logout](#)

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<http://144.25.8.226:5500/em/console/database/schema/table?sname=HR&oname=JOBS&event=edit&cancelURL=/em/console/database/databas> Internet

2. Select the **Options** tab.

Oracle Enterprise Manager - Table General - Microsoft Internet Explorer

Database: orcl.us.oracle.com > Tables > Edit Table: HR.JOBS

### Edit Table: HR.JOBS

General Constraints Segments Storage Options

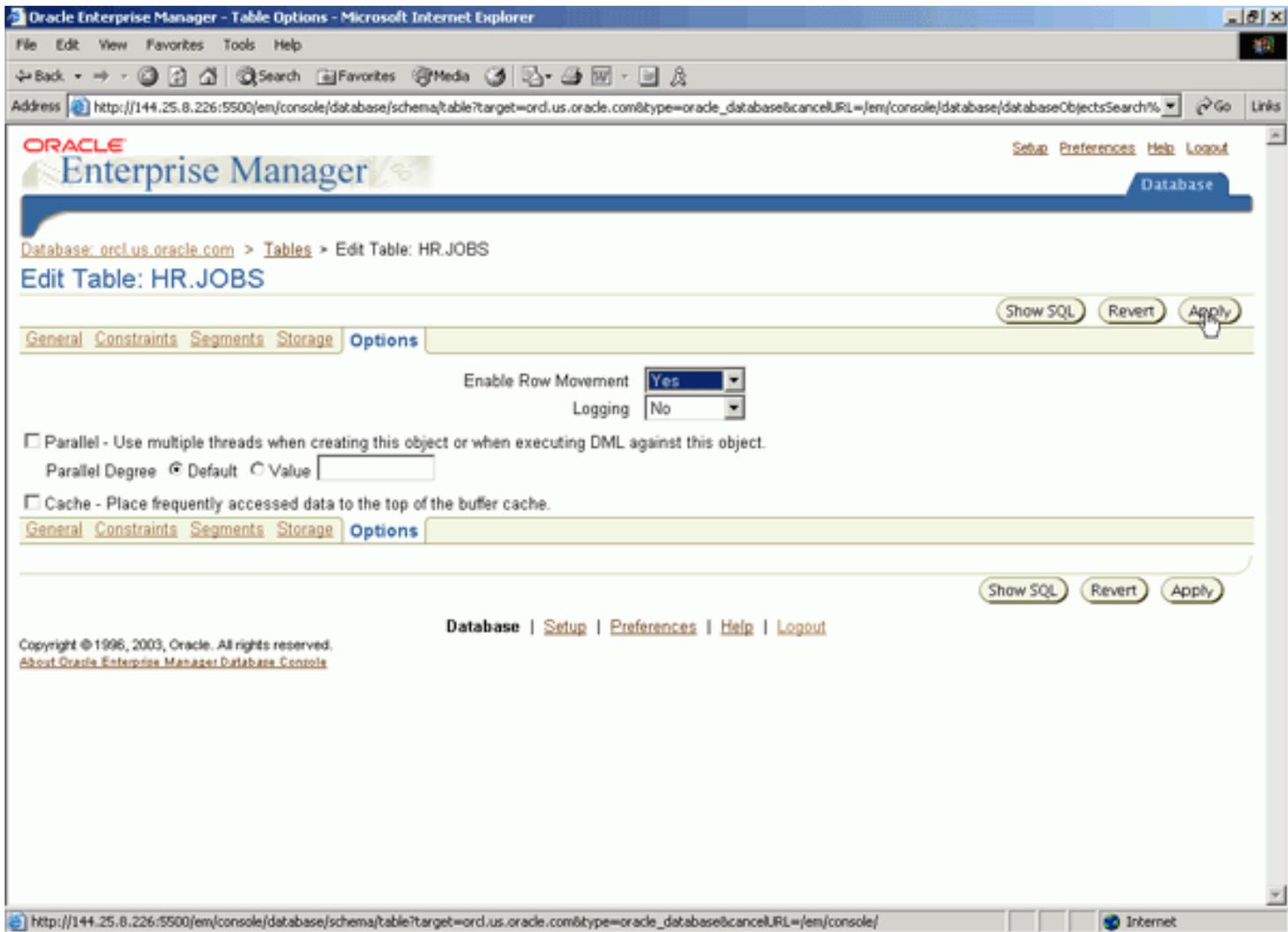
Name: JOBS  
 Schema: HR  
 Tablespace: EXAMPLE  
 Organization: Standard, Heap Organized

Columns

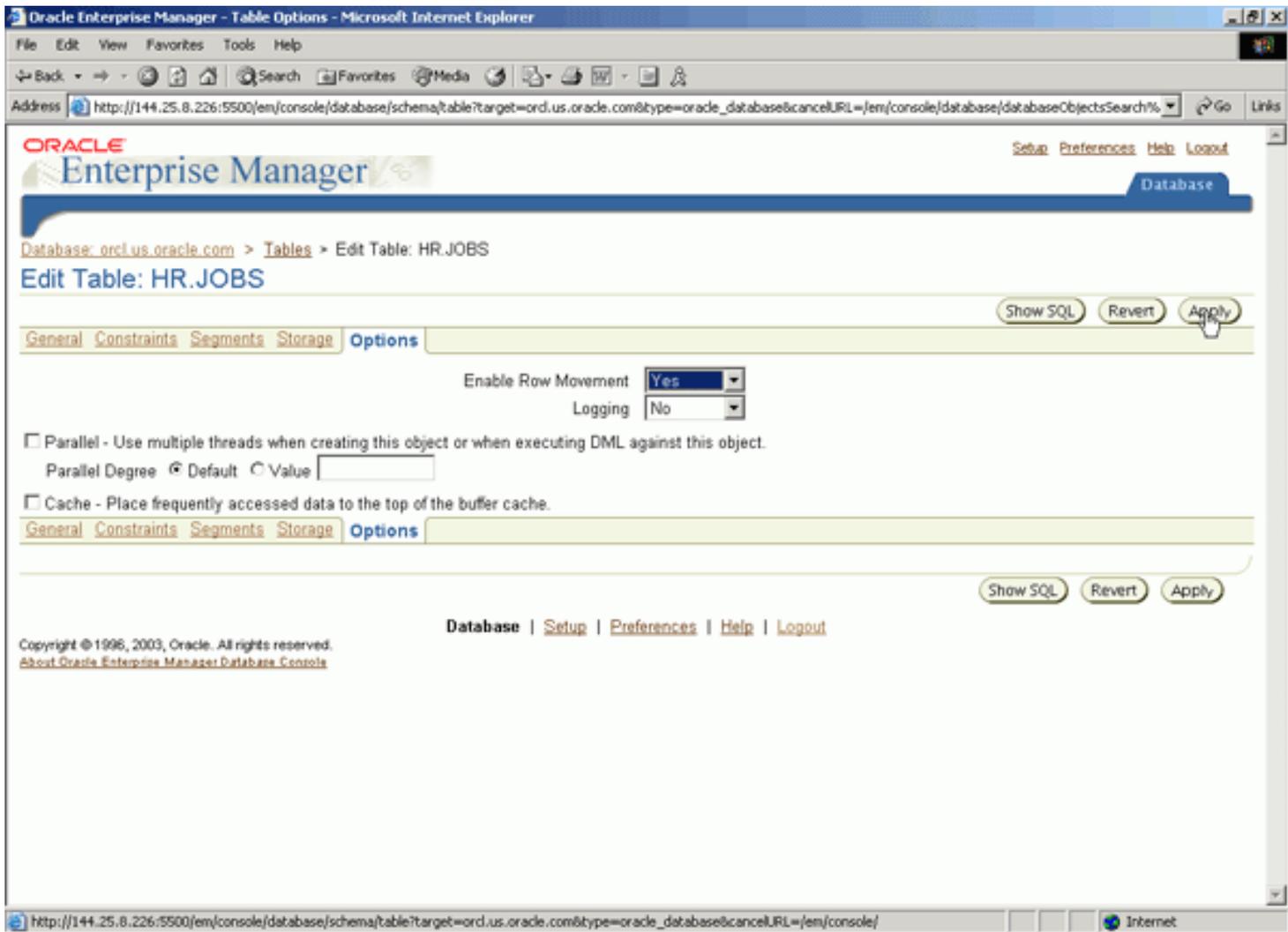
Select	Name	Data Type	Size	Scale	Not NULL	Default Value
<input checked="" type="radio"/>	JOB_ID	VARCHAR2	10		<input checked="" type="checkbox"/>	
<input type="radio"/>	JOB_TITLE	VARCHAR2	35		<input checked="" type="checkbox"/>	
<input type="radio"/>	MIN_SALARY	NUMBER	6		<input type="checkbox"/>	
<input type="radio"/>	MAX_SALARY	NUMBER	6		<input type="checkbox"/>	

Apply

3. Select **Yes** for Enable Row Movement and click **Apply**.



4. Now you can perform a flashback table. Click the **Tables** breadcrumb.



## Recover the JOBS Table to a Particular Point in Time

[Back to List](#)

Now you are ready to recover the JOBS table to a particular point in time. Perform the following:

1. From your Enterprise Manager browser session, click the **Tables** link.

The screenshot shows the Oracle Enterprise Manager Administration page for the database 'orcl.us.oracle.com'. The page is viewed in a Microsoft Internet Explorer browser. The top navigation bar includes 'Home', 'Performance', 'Administration', and 'Maintenance'. The 'Administration' tab is selected. The main content area is divided into several sections:

- Instance**: Memory Parameters, Undo Management, All Initialization Parameters
- Storage**: Controlfiles, Tablespaces, Datafiles, Rollback Segments, Redo Log Groups, Archive Logs, Temporary Tablespace Groups
- Security**: Users, Roles, Profiles
- Resource Manager**: Resource Monitors, Resource Consumer Group Mappings, Resource Consumer Groups, Resource Plans
- Scheduler**: Jobs, Schedules, Programs, Job Classes, Windows, Window Groups
- Schema**: **Tables** (highlighted), Indexes, Views, Synonyms, Sequences, Database Links
- Source Types**: Packages, Package Bodies, Procedures, Functions, Triggers, Java Sources, Java Classes
- User Types**: Array Types, Object Types, Table Types
- Warehouse**: OLAP (Cubes, OLAP Dimensions, Measure Folders), Summary Management (Materialized Views, Materialized View Logs, Refresh Groups)
- Configuration Management**: Last Collected Configuration, Database Usage Statistics
- Workload**: Workload Repository, SQL Tuning Sets

The bottom navigation bar also includes 'Home', 'Performance', 'Administration', and 'Maintenance'. The browser address bar shows the URL: [http://144.25.8.226:5500/em/console/database/instance/sitemap?event=doLoad&target=orcl.us.oracle.com&type=oracle\\_database&pageNum=3](http://144.25.8.226:5500/em/console/database/instance/sitemap?event=doLoad&target=orcl.us.oracle.com&type=oracle_database&pageNum=3). The status bar at the bottom indicates the browser is on the Internet.

2. Enter **HR** as the Schema and click **GO**.

Oracle Enterprise Manager interface showing search results for tables. The search criteria are Object Type: Table, Schema: HR, and Object Name: (empty). The results table lists various tables in the SYS schema.

Select	Schema	Table Name	Tablespace	Partition Type	Partitions	Subpartitions	IOT	Clustered
<input checked="" type="radio"/>	SYS	ACCESS\$	SYSTEM		0	0	0	NO
<input type="radio"/>	SYS	ALERT_QT	SYSAUX		0	0	0	NO
<input type="radio"/>	SYS	APPLYS_CONF_HDLR_COLUMNS	SYSTEM		0	0	0	NO
<input type="radio"/>	SYS	APPLYS_CONSTRAINT_COLUMNS	SYSTEM		0	0	0	NO
<input type="radio"/>	SYS	APPLYS_DEST_OBJ	SYSTEM		0	0	0	NO
<input type="radio"/>	SYS	APPLYS_DEST_OBJ_CMAP	SYSTEM		0	0	0	NO
<input type="radio"/>	SYS	APPLYS_DEST_OBJ_OPS	SYSTEM		0	0	0	NO
<input type="radio"/>	SYS	APPLYS_ERROR	SYSAUX		0	0	0	NO
<input type="radio"/>	SYS	APPLYS_ERROR_HANDLER	SYSTEM		0	0	0	NO
<input type="radio"/>	SYS	APPLYS_SOURCE_OBJ	SYSTEM		0	0	0	NO
<input type="radio"/>	SYS	APPLYS_SOURCE_SCHEMA	SYSTEM		0	0	0	NO

- Select the radio button in front of the **JOBS** table and select **Flashback Row History** from the Actions list box and click **GO**.

Oracle Enterprise Manager Database

Database: orcl.us.oracle.com > Tables Logged in As SYS

**Search**

Select an object type and optionally enter a schema name and an object name to filter the data that is displayed in your results set.

Object Type:  Schema:  Object Name:

Example: Entering Test will return all items beginning with upper case TEST, i.e. TEST\_A, except for Java Source and Java Class which use case sensitive searches. Use double quotes to preserve case and embed wildcards(%).

**Results**

Actions:

Select	Schema	Table Name	Tablespace	Partition Type	Partitions	Subpartitions	IOT	Clustered
<input type="radio"/>	HR	COUNTRIES	EXAMPLE		0	0	IOT	NO
<input type="radio"/>	HR	DEPARTMENTS	EXAMPLE		0	0		NO
<input type="radio"/>	HR	EMPLOYEES	EXAMPLE		0	0		NO
<input checked="" type="radio"/>	HR	JOBS	EXAMPLE		0	0		NO
<input type="radio"/>	HR	JOB_HISTORY	EXAMPLE		0	0		NO
<input type="radio"/>	HR	LOCATIONS	EXAMPLE		0	0		NO
<input type="radio"/>	HR	REGIONS	EXAMPLE		0	0		NO

Database | Setup | Preferences | Help | Logout

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About Oracle Enterprise Manager Database Controls

- Select **JOB\_TITLE** and **MIN\_SALARY** and click **Remove** . Then enter **WHERE job\_id = 'IT\_PROG'** in the Where Clause to Filter Rows field and click **Next** .

The screenshot shows the Oracle Enterprise Manager interface in Microsoft Internet Explorer. The browser title is "Recovery Wizard - Microsoft Internet Explorer". The address bar shows the URL: `http://144.25.8.226:5500/em/console/database/rec/flashback?source=tableNav&value=28pageSeq=38type=oracle_database&target=ord.us.oracle.com&event=goto&state=`. The Oracle Enterprise Manager logo is at the top left, and navigation links (Setup, Preferences, Help, Logout) are at the top right. A progress bar at the top indicates the current step: "Row History Filter" (highlighted in blue), with other steps being "SCN/Timestamp Options", "Choose SCN", "Flashback Tables", "Dependency Options", "Dependencies", and "More".

The main content area is titled "Recovery: Row History Filter". It includes navigation buttons: "Cancel", "Back", "Step 2 of 7", and "Next" (with a mouse cursor over it). The "Object Type" is "Tables" and the "Operation Type" is "Flashback existing tables". The "Table Name" is "HR.JOBS".

Under "Filter Rows and Columns", there is a section "Specify filter conditions to get a set of rows that best indicate the changes you have made to the table." Below this is the "Filter Columns" section, which has two columns: "Available Columns" and "Selected Columns".

Available Columns	Selected Columns
JOB_TITLE	JOB_ID
MIN_SALARY	MAX_SALARY

Between the columns are buttons: "Move" (right arrow), "Move All" (right double arrow), "Remove" (left arrow), and "Remove All" (left double arrow). The "Selected Columns" column has "X" and "A" icons next to each column name.

At the bottom, the "Where Clause to Filter Rows" section contains a text box with the SQL: `WHERE job_id = IT_PROG`.

The browser status bar at the bottom shows the URL: `http://144.25.8.226:5500/em/console/database/rec/flashback?source=tableNav&value=28pageSeq=38type=oracle_database&target=ord.u` and the "Internet" icon.

5. The update you made previously is in the list. Click **Next**.

Oracle Enterprise Manager Database

SCN Timestamp Options Row History Filter **Choose SCN** Flashback Tables Dependency Options Dependencies More

### Recovery: Choose SCN

Object Type **Tables**  
Operation Type **Flashback existing tables**

Table Name **HR.JOBS**  
Following is the history of the row. Select the version you wish to remove. All versions later than this version will be removed as well.

#### Row History Result

Select Flashback SCN	Flashback Timestamp	Transaction ID	Operation	JOB_ID	MAX_SALARY
1105098	27-AUG-03 07:27:08 AM	0200290050050000	UPDATE	IT_PROG	12000

Return to Recovery Type Selection

Database | Setup | Preferences | Help | Logout

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About Oracle Enterprise Manager Database Console

6. Click **Next** .

The screenshot shows the Oracle Enterprise Manager console interface. At the top, the browser address bar displays the URL: `http://144.25.8.226:5500/em/console/database/rec/flashback?source=tableNav&value=4&pageSeq=3&rowVersionsUIDataSource%3Aselected=0&rowVersionsUIDataSource%3Aselected=0`. The Oracle logo and "Enterprise Manager" text are visible in the top left. A navigation bar at the top right includes links for "Setup", "Preferences", "Help", and "Logout". Below this is a "Database" tab and a progress indicator with steps: "SCN timestamp Options", "Row History Filter", "Choose SCN", "Flashback Tables" (the current step), "Dependency Options", "Dependencies", and "More".

The main content area is titled "Recovery: Flashback Tables". It contains the following information:

- Object Type: **Tables**
- Operation Type: **Flashback existing tables**

Below this, a message states: "Your application may have tables that are logically related to this table. Specify all such tables that need to be flashed back to the SCN you selected." The selected table is "HR.JOBS". The flashback time is "Aug 27, 2003 07:27 AM" and the flashback SCN is "1105090".

A list of tables is shown in a scrollable box, containing "HR.JOBS". Below the list is an "Add Tables..." button. At the bottom of the page, there is a "Return to Recovery Type Selection" link and another set of navigation buttons: "Cancel", "Back", "Step 4 of 7", and "Next". The footer includes copyright information: "Copyright © 1996, 2003, Oracle. All rights reserved." and a link to "About Oracle Enterprise Manager Database Controls".

7. You may want to see what will change. Click **Show Row Changes** .

The screenshot shows the Oracle Enterprise Manager console interface. At the top, the browser address bar displays the URL: `http://144.25.8.226:5500/em/console/database/rec/flashback?source=tableNav&value=5&pageSeq=4&flashbackTablesStr=HR.JOBS&type=oracle_database&target=orcl.us.o`. The page title is "Oracle Enterprise Manager" with a "Database" tab selected. A progress bar at the top indicates the current step is "Review", with previous steps being "Previous", "Dependency Options", and "Dependencies".

The main heading is "Perform Recovery: Review". Below this, there are navigation buttons: "Cancel", "Back", "Step 7 of 7", and "Submit". The "Object Type" is "Tables" and the "Operation Type" is "Flashback existing tables". A note states: "Following tables will be flashed back. All these tables will be locked while flashback is in progress."

The "Impact Analysis" section shows a scrollable text box with the following content:  
SCN:1105098  
Timestamp: Aug 27, 2003 07:27 AM  
Following tables will be flashed back.  
HR.JOBS

Below the text box are two buttons: "Show Row Changes..." and "Show SQL...". At the bottom of the page, there is a "Return to Recovery Type Selection" link and another set of navigation buttons: "Cancel", "Back", "Step 7 of 7", and "Submit". The footer of the page includes "Database | Setup | Preferences | Help | Logout" and the browser address bar.

8. Click **Continue** .

The screenshot shows the Oracle Enterprise Manager console interface. At the top, the browser address bar displays the URL: `http://144.25.8.226:5500/em/console/database/rec/flashback?source=tableNav&value=4&pageSeq=3&row=0&rowVersionsUIDataSource%3Aselected=0&rowVersionsUIDataSource%3Aselected=0`. The Oracle logo and "Enterprise Manager" text are visible in the top left. A navigation bar at the top right includes links for "Setup", "Preferences", "Help", and "Logout". Below this, a "Database" tab is active. A progress bar shows seven steps: "SCN timestamp Options", "Row History Filter", "Choose SCN", "Flashback Tables" (the current step, highlighted in blue), "Dependency Options", "Dependencies", and "More".

The main content area is titled "Recovery: Flashback Tables". It includes a "Cancel" button, a "Back" button, and a "Next" button. The "Next" button is highlighted with a mouse cursor. The text indicates the current step is "Step 4 of 7".

Object Type: **Tables**  
Operation Type: **Flashback existing tables**

Your application may have tables that are logically related to this table. Specify all such tables that need to be flashed back to the SCN you selected.

Table Name: **HR.JOBS**  
Flashback Time: **Aug 27, 2003 07:27 AM**  
Flashback SCN: **1105090**

Tables: 

HR.JOBS
---------

Example: `scott.emp`, one table name per row

Buttons: "Add Tables..."

Bottom navigation: "Return to Recovery Type Selection" (with "Cancel" and "Back" buttons), "Database | Setup | Preferences | Help | Logout", and "Copyright © 1996, 2003, Oracle. All rights reserved. About Oracle Enterprise Manager Database Controls".

9. You will see the objects that will change as a result of the flashback operation. Click **OK**.

The screenshot shows the Oracle Enterprise Manager Database Control interface. The browser address bar displays the URL: <http://144.25.8.226:5500/em/console/database/rec/flashback?source=tableNav&value=4&pageSeq=3&rowVersionsUIDataSource%3Aselected=0&rowVersionsUIDataSource%3Aselected=0>. The page title is "Recovery: Flashback Tables". The navigation bar includes "Setup", "Preferences", "Help", and "Logout". The main content area shows the "Flashback Tables" step, which is the fourth of seven steps. The "Object Type" is "Tables" and the "Operation Type" is "Flashback existing tables". The text indicates that the application may have tables logically related to the selected table and that all such tables need to be flashed back to the selected SCN. The "Table Name" is "HR.JOBS", the "Flashback Time" is "Aug 27, 2003 07:27 AM", and the "Flashback SCN" is "1105090". A list of tables to be flashed back is shown, containing "HR.JOBS". Below the list is an "Add Tables..." button. The page also includes a "Return to Recovery Type Selection" link and a "Database | Setup | Preferences | Help | Logout" navigation bar. The footer contains copyright information: "Copyright © 1996, 2003, Oracle. All rights reserved. About Oracle Enterprise Manager Database Controls".

You are now ready to perform the flashback operation. Click **Submit** .

10.

The screenshot shows the Oracle Enterprise Manager Database console interface. The browser address bar displays the URL: `http://144.25.8.226:5500/em/console/database/rec/flashback?source=tableNav&value=4&pageSeq=3&rowVersionsUIDataSource%3Aselected=0&rowVersionsUIDataSource%3Aselected=0`. The page title is "Recovery: Flashback Tables".

The navigation bar includes the following steps: SCN timestamp Options, Row History Filter, Choose SCN, **Flashback Tables** (current step), Dependency Options, Dependencies, and More. The "Flashback Tables" step is highlighted with a blue circle and a blue arrow pointing to the right.

The main content area displays the following information:

- Object Type: **Tables**
- Operation Type: **Flashback existing tables**

Below this information, there is a text prompt: "Your application may have tables that are logically related to this table. Specify all such tables that need to be flashed back to the SCN you selected."

The table details are:

- Table Name: **HR.JOBS**
- Flashback Time: **Aug 27, 2003 07:27 AM**
- Flashback SCN: **1105090**

A table list is shown with the following content:

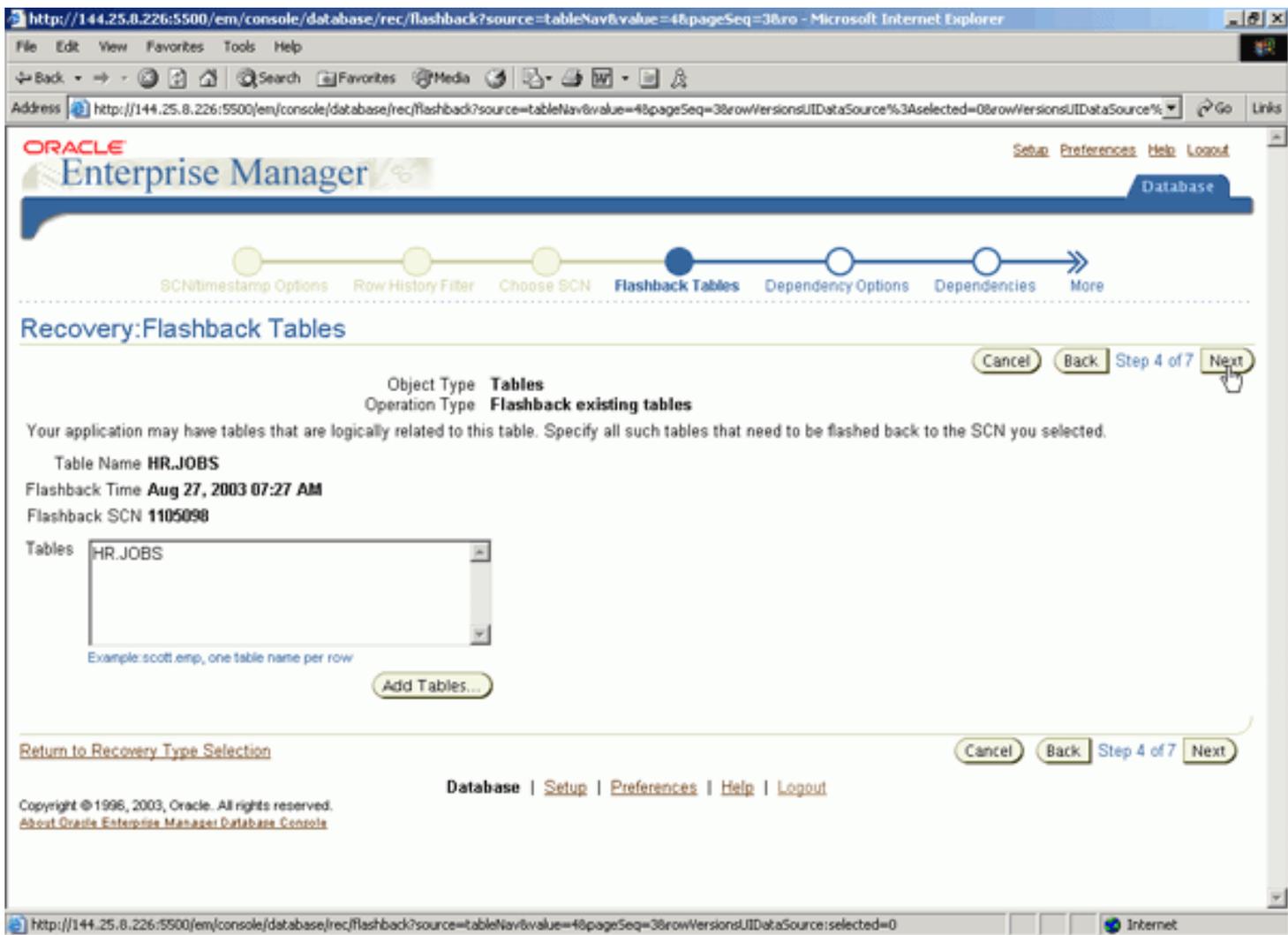
Tables
HR.JOBS

Below the table list, there is an "Add Tables..." button and a note: "Example: scott.emp, one table name per row".

At the bottom of the page, there is a "Return to Recovery Type Selection" link and a "Database | Setup | Preferences | Help | Logout" menu. The footer contains the copyright information: "Copyright © 1996, 2003, Oracle. All rights reserved. About Oracle Enterprise Manager Database Controls".

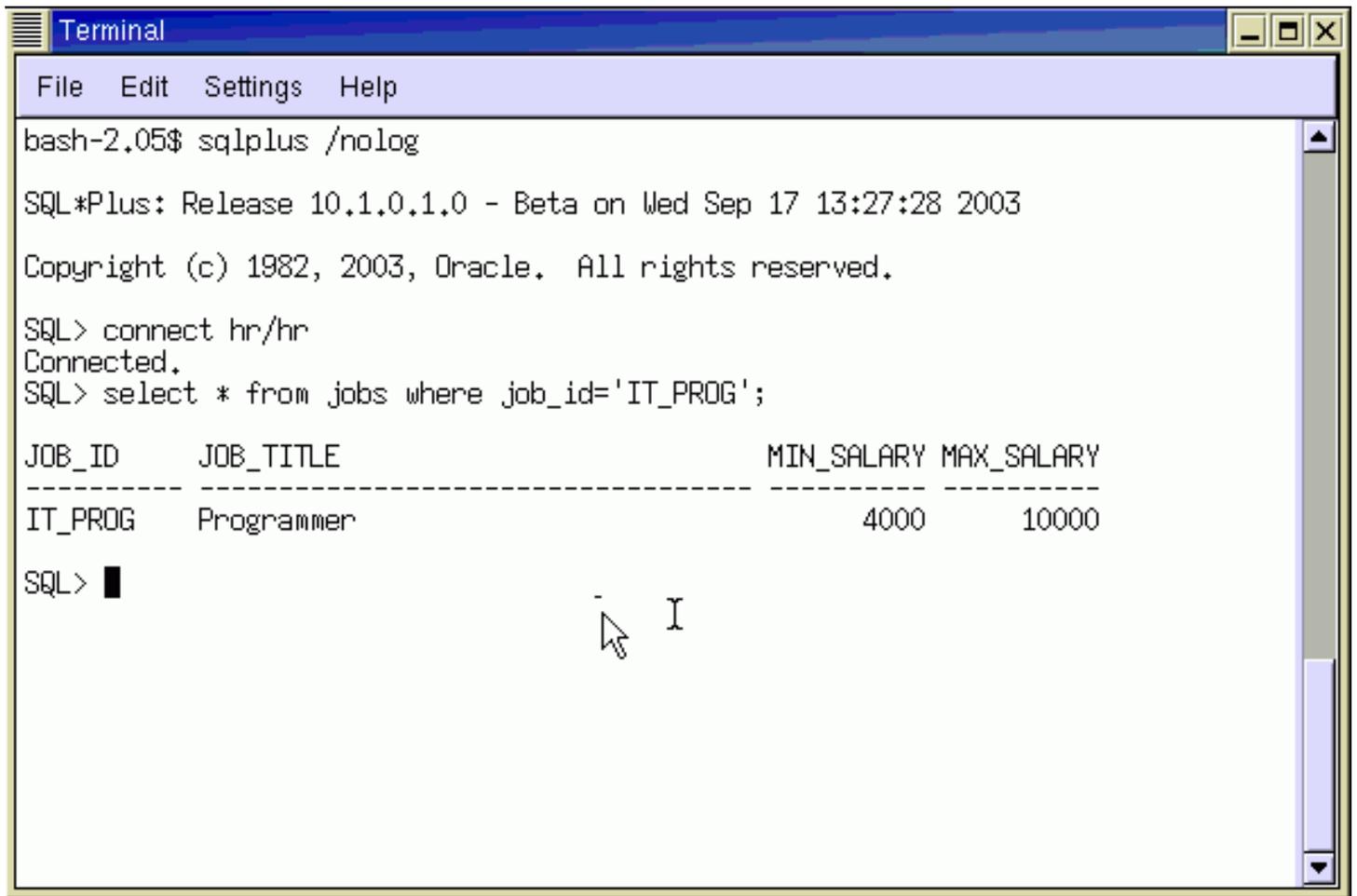
The flashback operation has completed successfully. Click **OK**.

11.



12. Switch to your SQL\*Plus session again and perform the following SQL Statement to check to see that the salary value has changed back.

```
select * from jobs where job_id='IT_PROG';
```



```
Terminal
File Edit Settings Help
bash-2.05$ sqlplus /nolog
SQL*Plus: Release 10.1.0.1.0 - Beta on Wed Sep 17 13:27:28 2003
Copyright (c) 1982, 2003, Oracle. All rights reserved.
SQL> connect hr/hr
Connected.
SQL> select * from jobs where job_id='IT_PROG';
JOB_ID      JOB_TITLE      MIN_SALARY  MAX_SALARY
-----
IT_PROG     Programmer      4000        10000
SQL> █
```

You see that the value has been changed back to 10000.