

# 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.

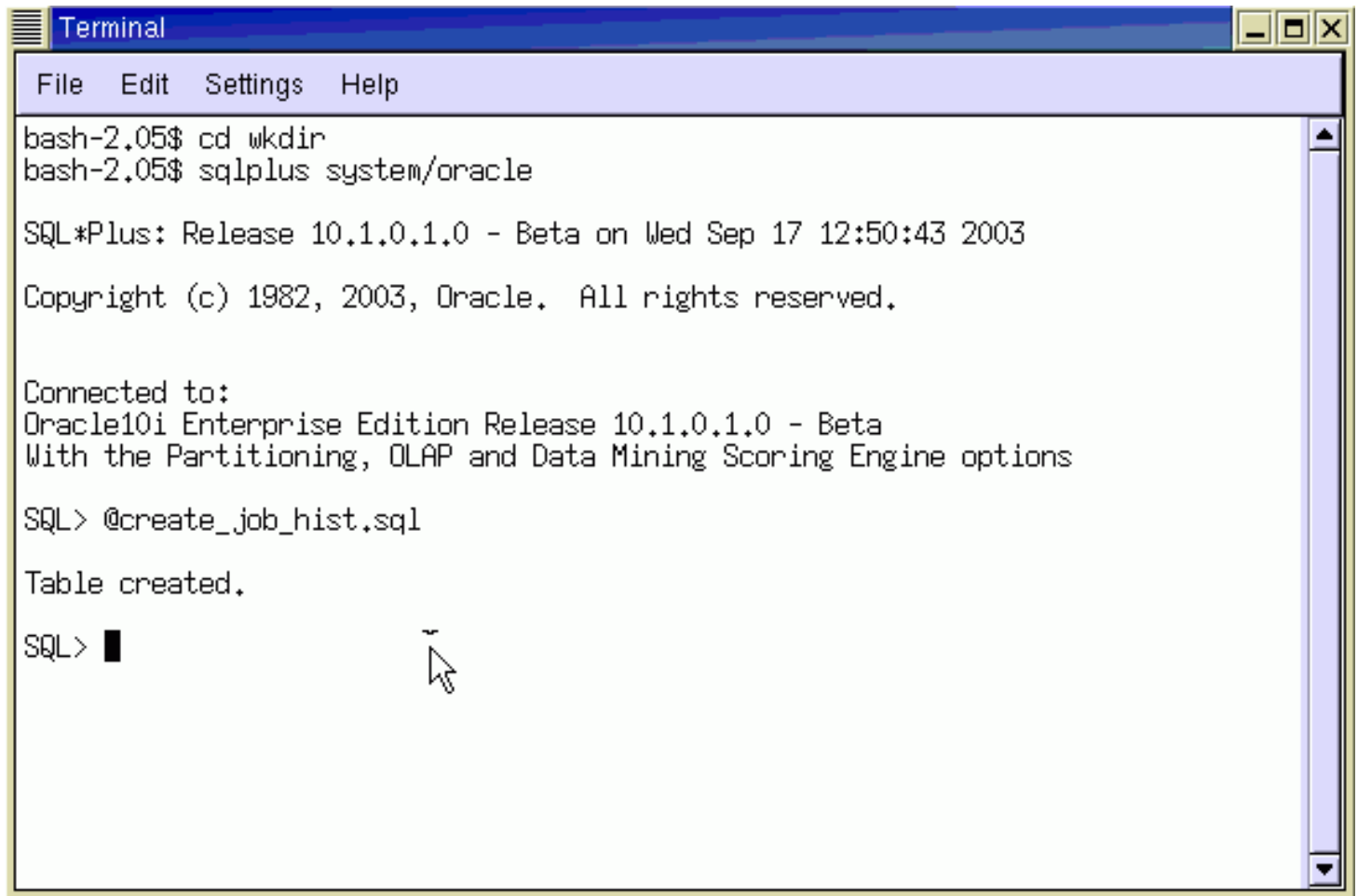
## Filling the Recycle Bin

[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 Windows Terminal window titled "Terminal". The window has a menu bar with "File", "Edit", "Settings", and "Help". The terminal shows a bash shell prompt "bash-2.05\$". The user enters "cd wkdir" and then "sqlplus system/oracle". The terminal displays the SQL\*Plus release information: "SQL\*Plus: Release 10.1.0.1.0 - Beta on Wed Sep 17 12:50:43 2003" and "Copyright (c) 1982, 2003, Oracle. All rights reserved." It then shows the connection status: "Connected to: Oracle10i Enterprise Edition Release 10.1.0.1.0 - Beta With the Partitioning, OLAP and Data Mining Scoring Engine options". The user enters the command "SQL> @create\_job\_hist.sql" and the terminal responds with "Table created." followed by a new SQL prompt "SQL>". A mouse cursor is visible over the prompt.

```
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

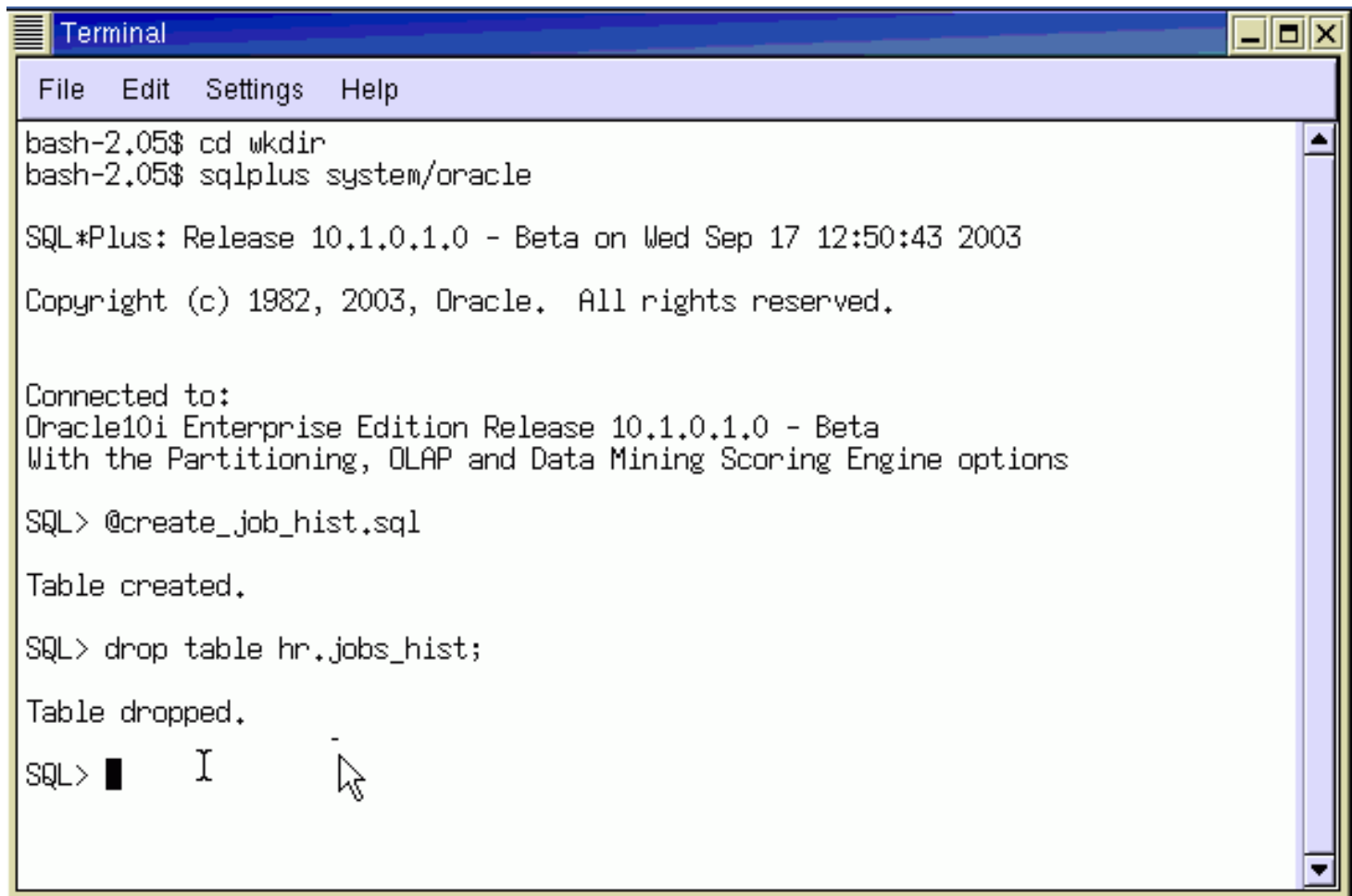
SQL> @create_job_hist.sql

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 shows a bash shell session where the user navigates to a directory and starts SQL\*Plus. SQL\*Plus displays its release information and copyright notice. The user connects to an Oracle database. Then, the user executes a script to create a table, followed by dropping the table. The terminal shows the success of these operations.

```
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> 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

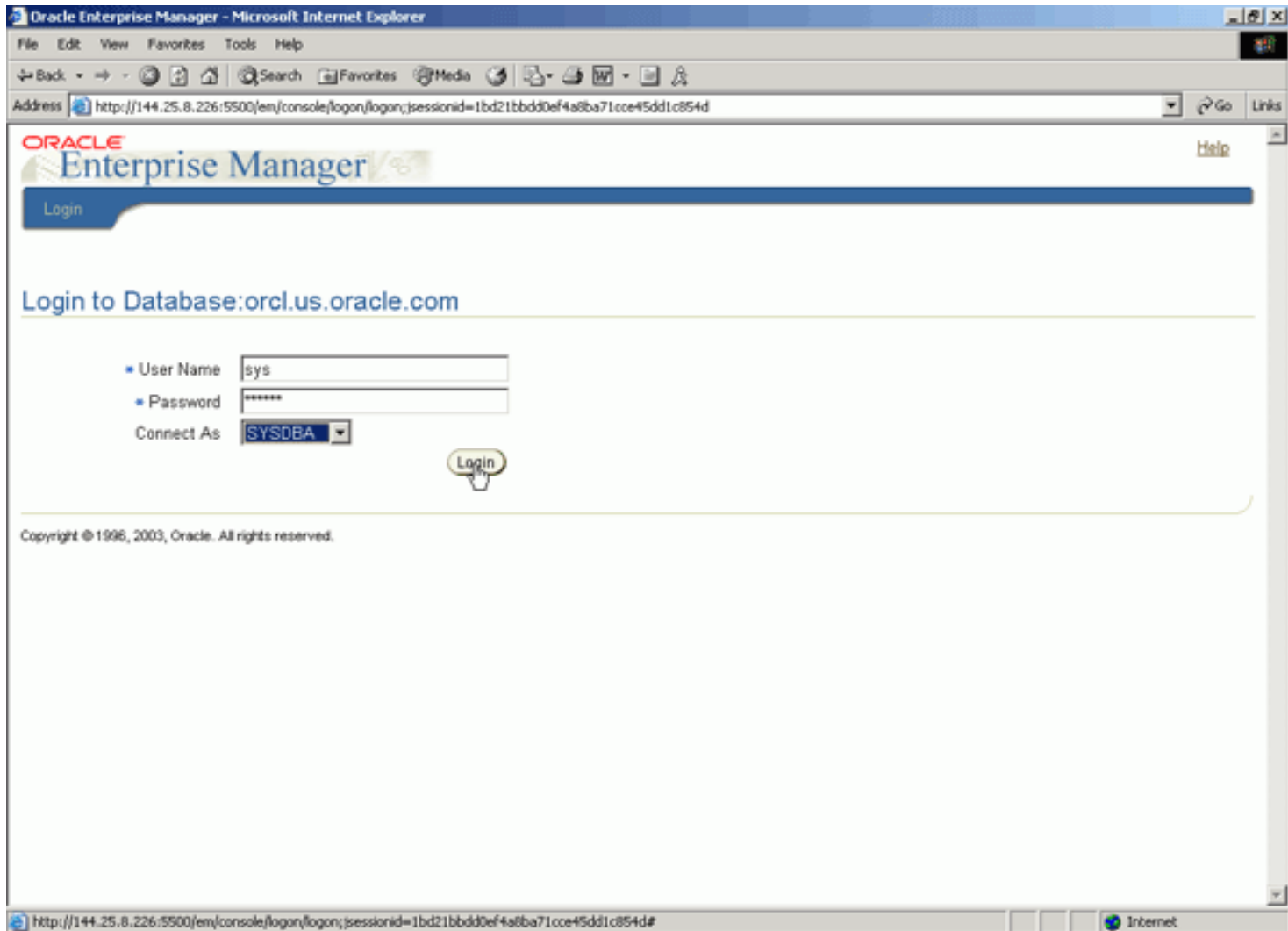
[Back to List of Topics](#)

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

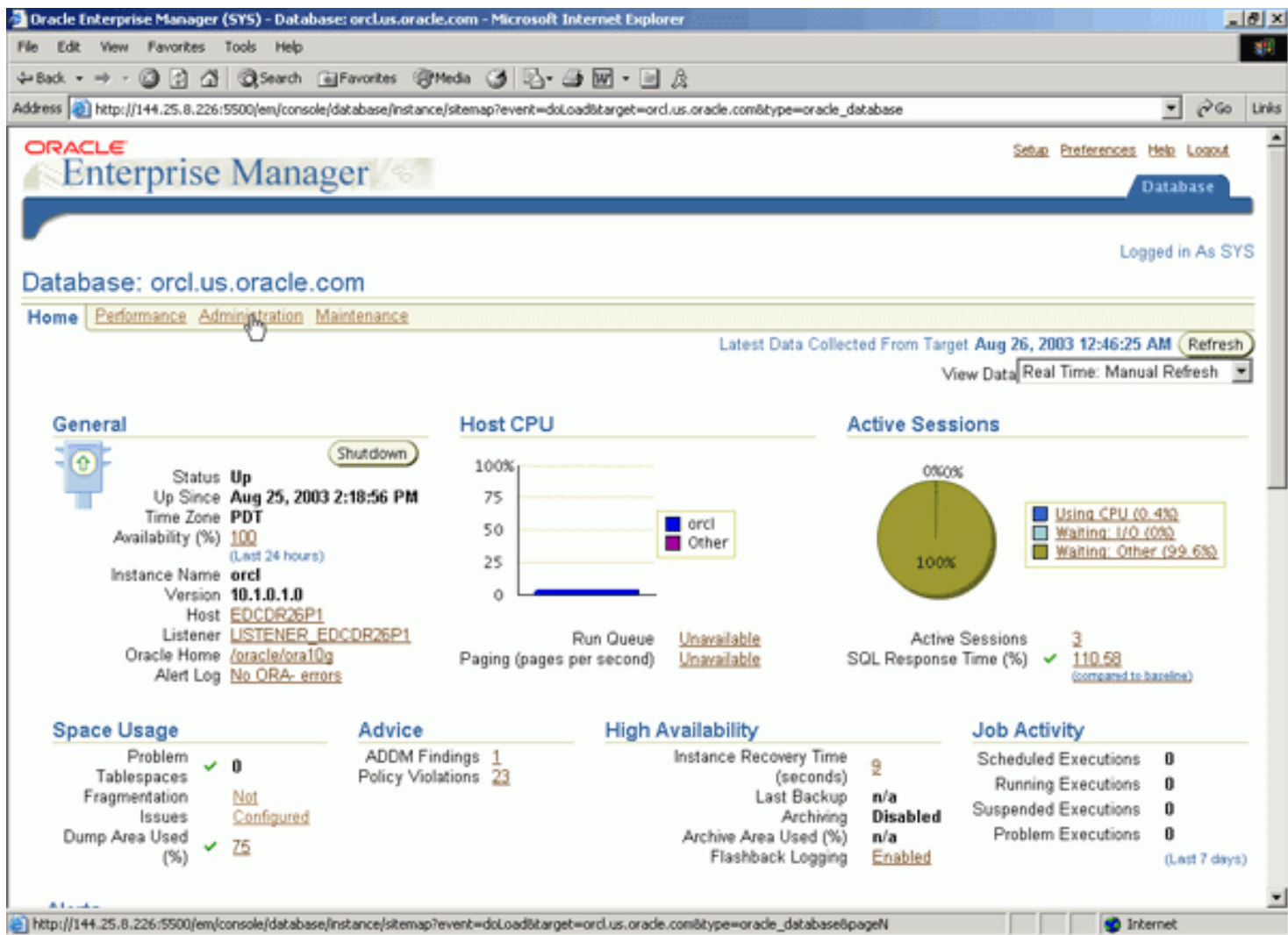
1. At this point, you can query the recycle bin for the table you just dropped. Open another browser window and enter the following URL:

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

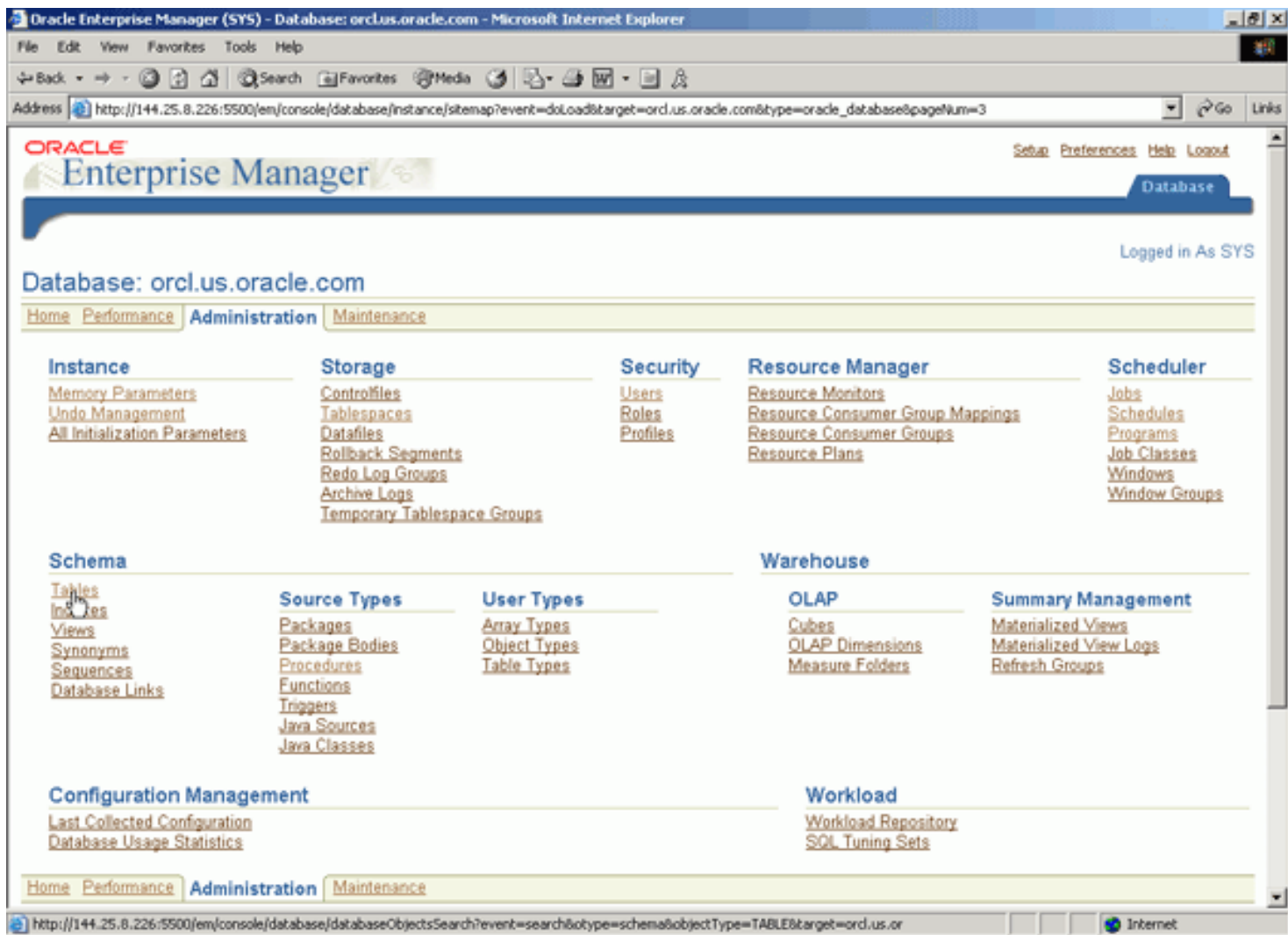
Enter **sys/<password>** as **SYSDBA** and click **Login** .



- Click the **Administration** tab.



- Click **Tables**.



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

Tables - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Media Print Mail

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 Go Links

ORACLE Enterprise Manager Database

Database: ord.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 are 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	0	NO
<input type="radio"/>	SYS	ALERT_QT	SYSAUX		0	0	0	NO
<input type="radio"/>	SYS	APPLY\$ CONF_HDLR_COLUMNS	SYSTEM		0	0	0	NO
<input type="radio"/>	SYS	APPLY\$ CONSTRAINT_COLUMNS	SYSTEM		0	0	0	NO
<input type="radio"/>	SYS	APPLY\$ DEST_OBJ	SYSTEM		0	0	0	NO
<input type="radio"/>	SYS	APPLY\$ DEST_OBJ_CMAP	SYSTEM		0	0	0	NO
<input type="radio"/>	SYS	APPLY\$ DEST_OBJ_OPS	SYSTEM		0	0	0	NO
<input type="radio"/>	SYS	APPLY\$ ERROR	SYSAUX		0	0	0	NO
<input type="radio"/>	SYS	APPLY\$ ERROR_HANDLER	SYSTEM		0	0	0	NO
<input type="radio"/>	SYS	APPLY\$ SOURCE_OBJ	SYSTEM		0	0	0	NO
<input type="radio"/>	SYS	APPLY\$ SOURCE_SCHEMA	SYSTEM		0	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.

**Oracle Enterprise Manager**

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

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	JOB_HISTORY	EXAMPLE		0	0		NO
<input type="radio"/>	HR	LOCATIONS	EXAMPLE		0	0		NO
<input type="radio"/>	HR	RB\$50944\$TABLE\$0	EXAMPLE		0	0		NO
<input type="radio"/>	HR	REGIONS	EXAMPLE		0	0		NO

[Recycle Bin](#)

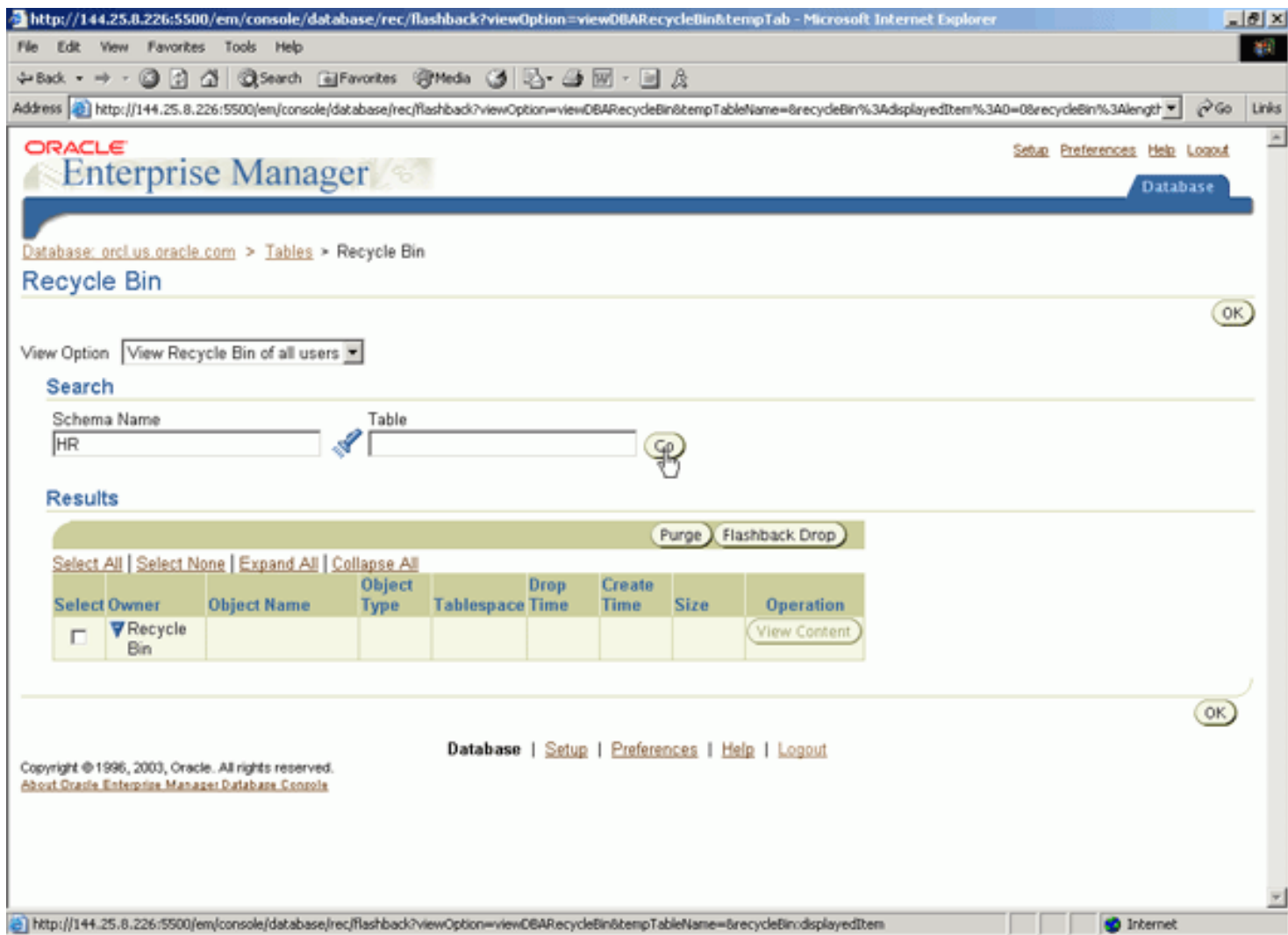
Database | [Setup](#) | [Preferences](#) | [Help](#) | [Logout](#)

Copyright © 1996-2003 Oracle. All rights reserved.

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

Copyright © 1996, 2003, Oracle. All rights reserved.  
About Oracle Enterprise Manager Database Console

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

Oracle Enterprise Manager - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <http://144.25.8.226:5500/em/console/database/schema/displayContents?sname=HR&pageName=/database/schema/displayContentsPage&sname=RB%24%2450944%24TAB> Go Links

ORACLE Enterprise Manager Database

Database: orcl.us.oracle.com > Tables > View Data for Table: HR.RB\$\$\$50944\$TABLE\$0

View Data for Table: HR.RB\$\$\$50944\$TABLE\$0

Refine Query OK

Query

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

Result

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

<http://144.25.8.226:5500/em/console/database/schema/displayContents?sname=HR&pageName=/database/schema/displayContentsPage&sname=RB%24%2450944%24TAB> Internet

## 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**.

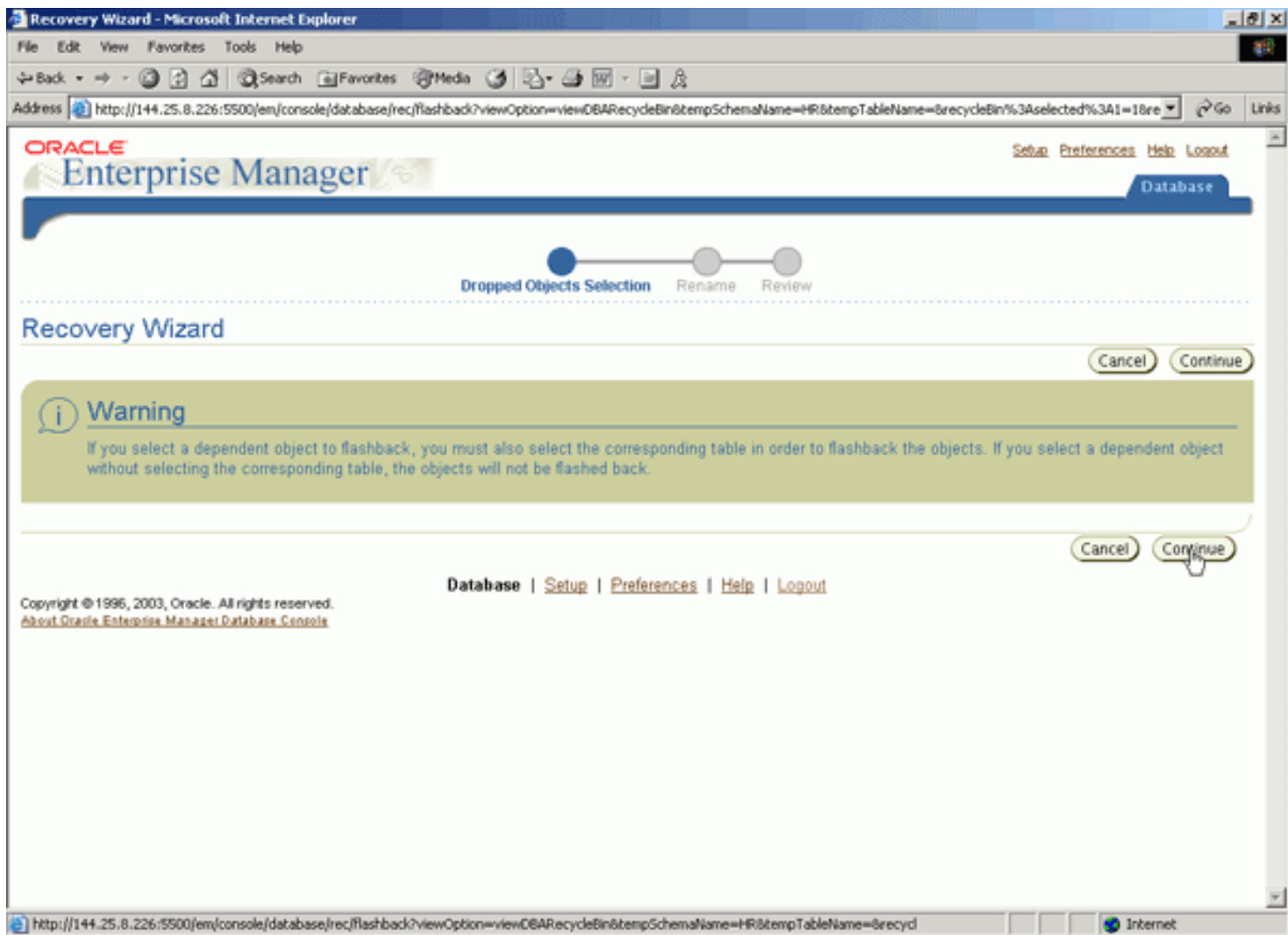
The screenshot shows the Oracle Enterprise Manager console in a Microsoft Internet Explorer browser. The address bar displays the URL: `http://144.25.8.226:5500/em/console/database/rec/flashback?event=redisplayRecycleBin&target=orc - Microsoft Internet Explorer`. The page title is "Oracle Enterprise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

Below the heading, there is a "View Option" dropdown set to "View Recycle Bin of all users". A "Search" section contains a "Schema Name" field with "HR" and a "Table" field, with a "Go" button. The "Results" section shows a table of objects in the recycle bin. Above the table are buttons for "Purge" and "Flashback Drop", with a mouse cursor clicking on "Flashback Drop".

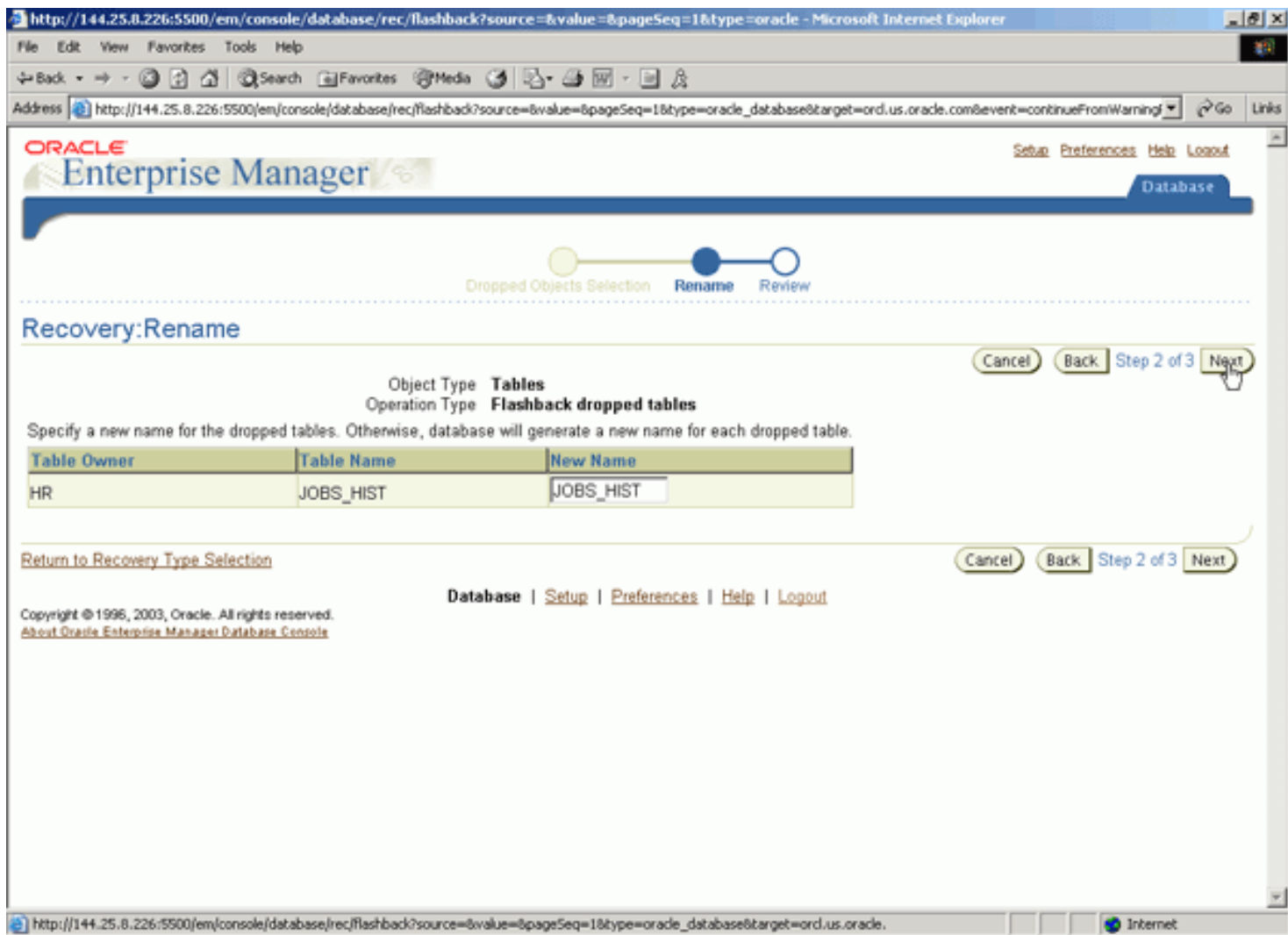
Select	Owner	Object Name	Object Type	Tablespace	Drop Time	Create Time	Size	Operation
<input type="checkbox"/>	Recycle Bin							<a href="#">View Content</a>
<input checked="" type="checkbox"/>	HR	JOBS_HIST	TABLE	EXAMPLE	2003-08-26:12:50:27	2003-08-26:12:49:07	8	<a href="#">View Content</a>

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 Console". Navigation links for "Database", "Setup", "Preferences", "Help", and "Logout" are also present.

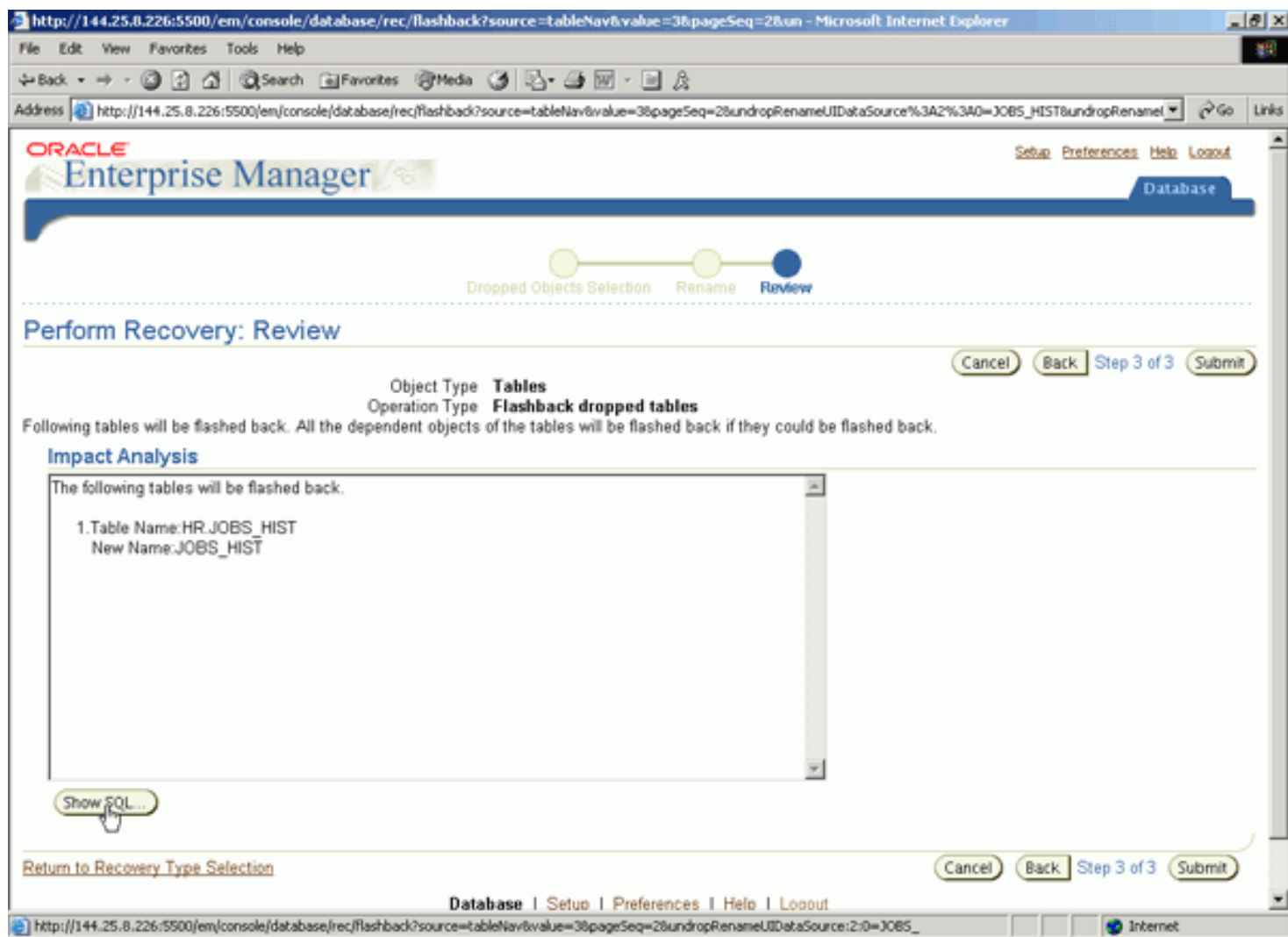
2. To recover a table from the recycle bin, you are required to recover all dependent objects as well. In this case there are no dependencies. Click **Continue**.



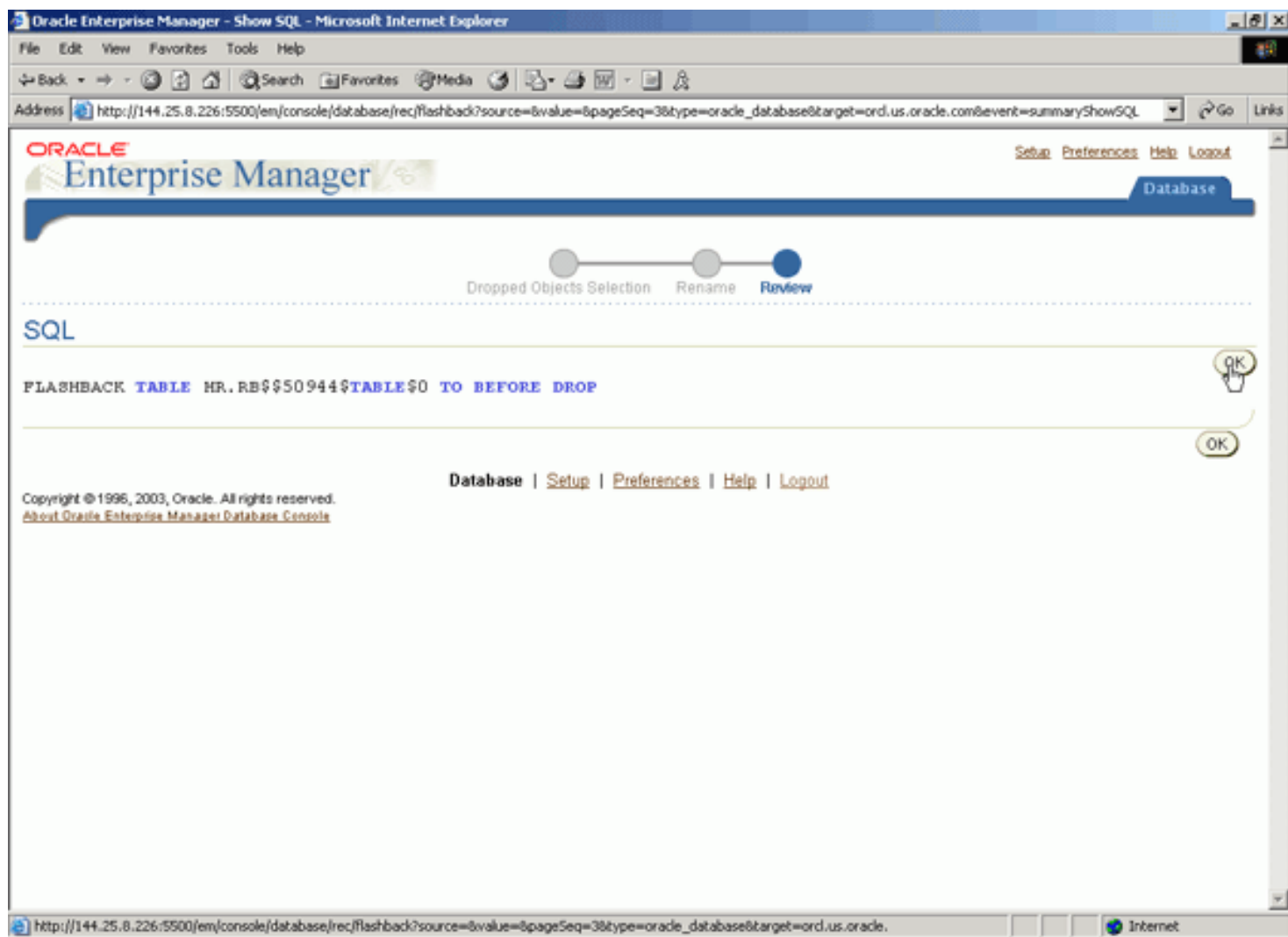
3. Click **Next** .



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

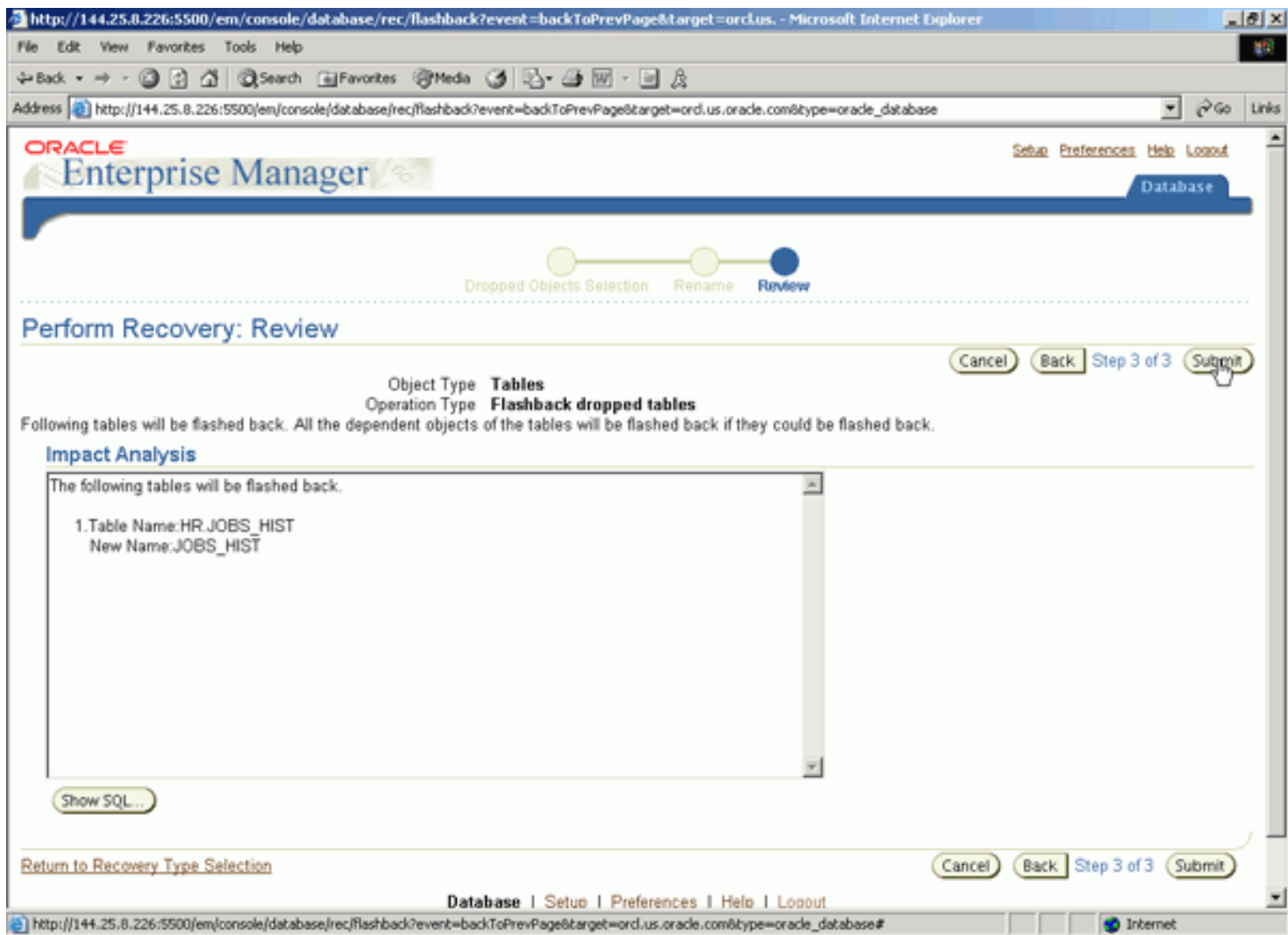


5. Review the SQL statement that will run. When done, click **OK**.

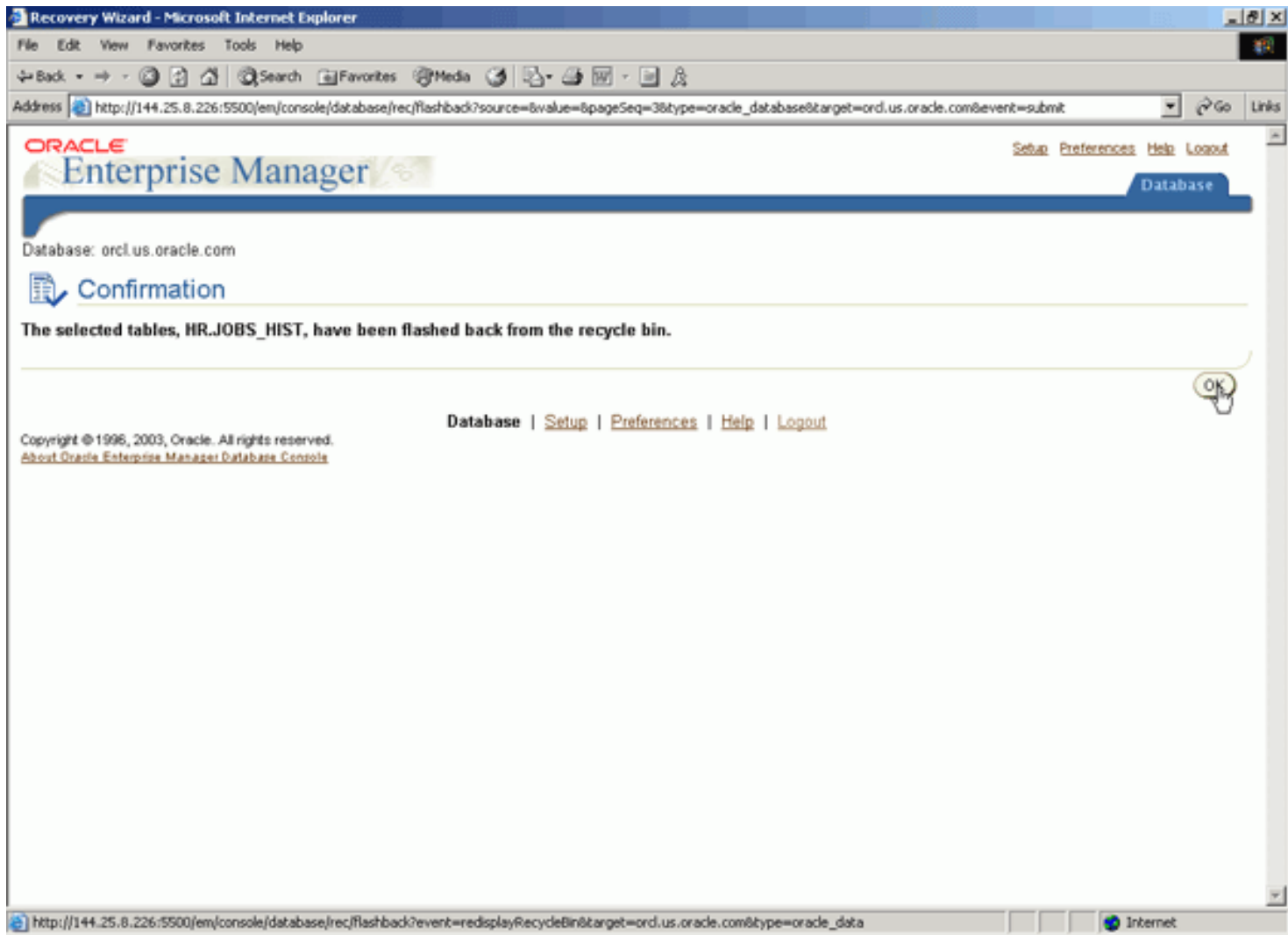


6. Click **Submit** .

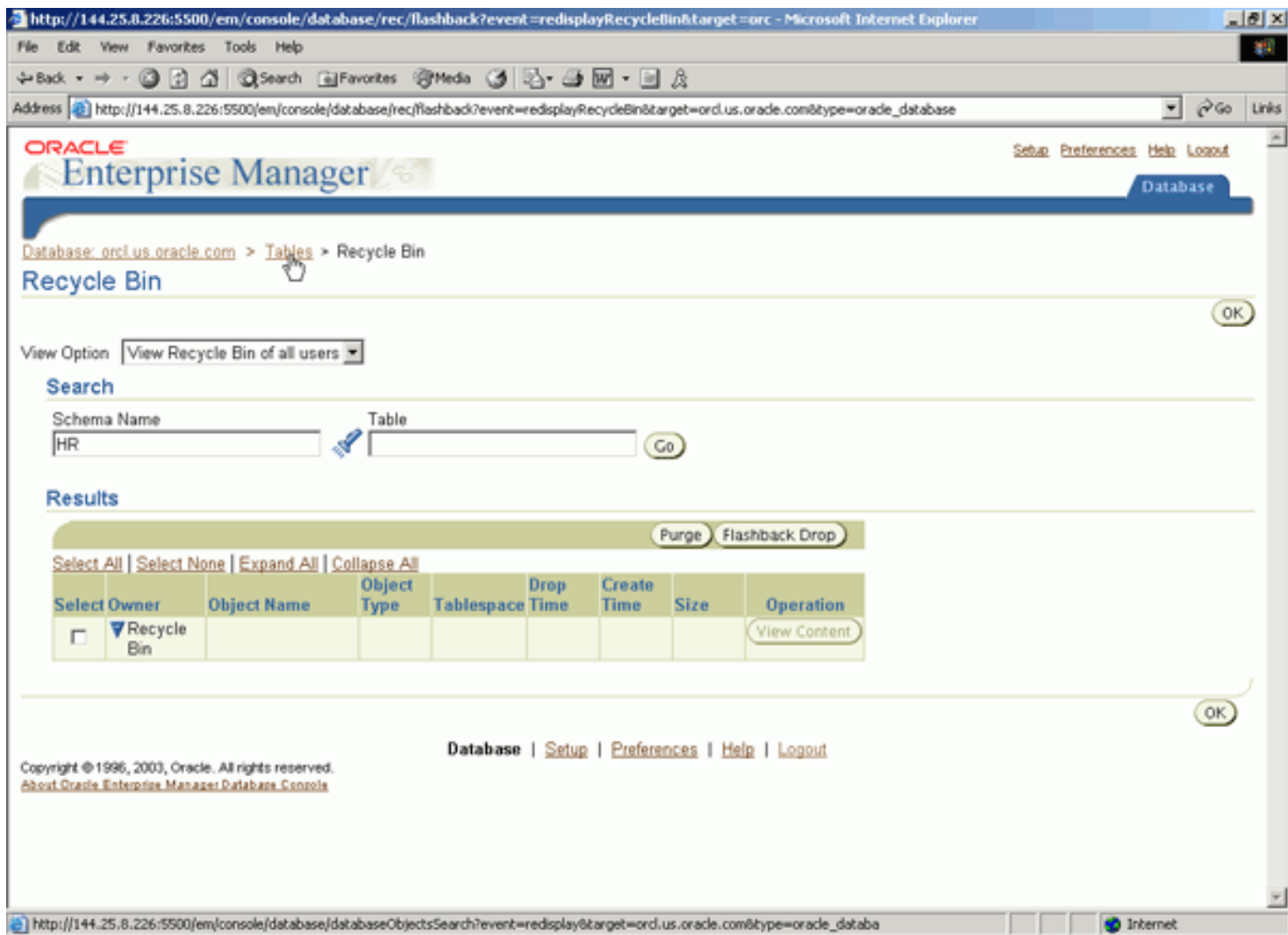




7. You receive a message saying the flashback drop was successful. Click **OK**.



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.



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

Tables - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Media Print Mail

Address http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?event=redisplay&target=orcl.us.oracle.com&type=oracle\_database Go Links

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

Table HR Go

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

Create Edit View Delete Actions Create Like Go

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

Recycle Bin

Database | Setup | Preferences | Help | Logout

Copyright © 1996 - 2003, Oracle. All rights reserved.

Internet

## 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**.

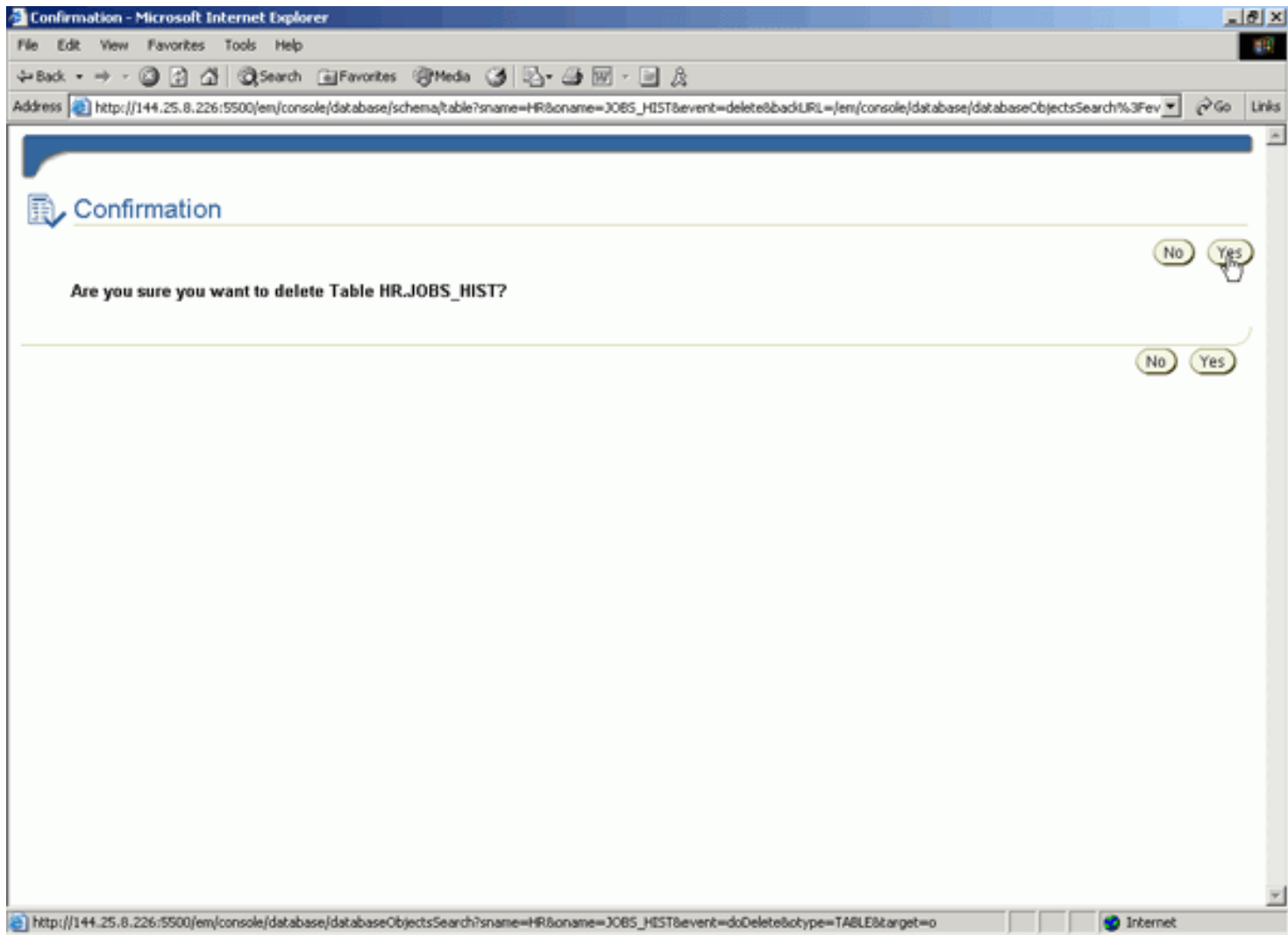
The screenshot shows the Oracle Enterprise Manager interface in a Microsoft Internet Explorer browser. The address bar shows the URL: `http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?event=redisplay&target=ord.us.oracle.com&type=oracle_database`. The page title is "Tables - Microsoft Internet Explorer". The Oracle Enterprise Manager logo is at the top left, and the "Database" tab is selected at the top right. The page is logged in as "SYS".

The "Tables" section shows a search filter for "Table" in the "HR" schema. The "Results" section displays a table of tables in the HR schema. The "JOBS\_HIST" table is selected, and the "Delete" button is highlighted in the "Actions" menu.

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

The "Delete" button is highlighted in the "Actions" menu. The "Create Like" button is also visible.

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



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

Tables - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address [http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?sname=HR&oname=JOBS\\_HIST&event=doDelete&otype=TABLE&target=ord.us.oracle.com&type=or](http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?sname=HR&oname=JOBS_HIST&event=doDelete&otype=TABLE&target=ord.us.oracle.com&type=or) Go Links

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(%).

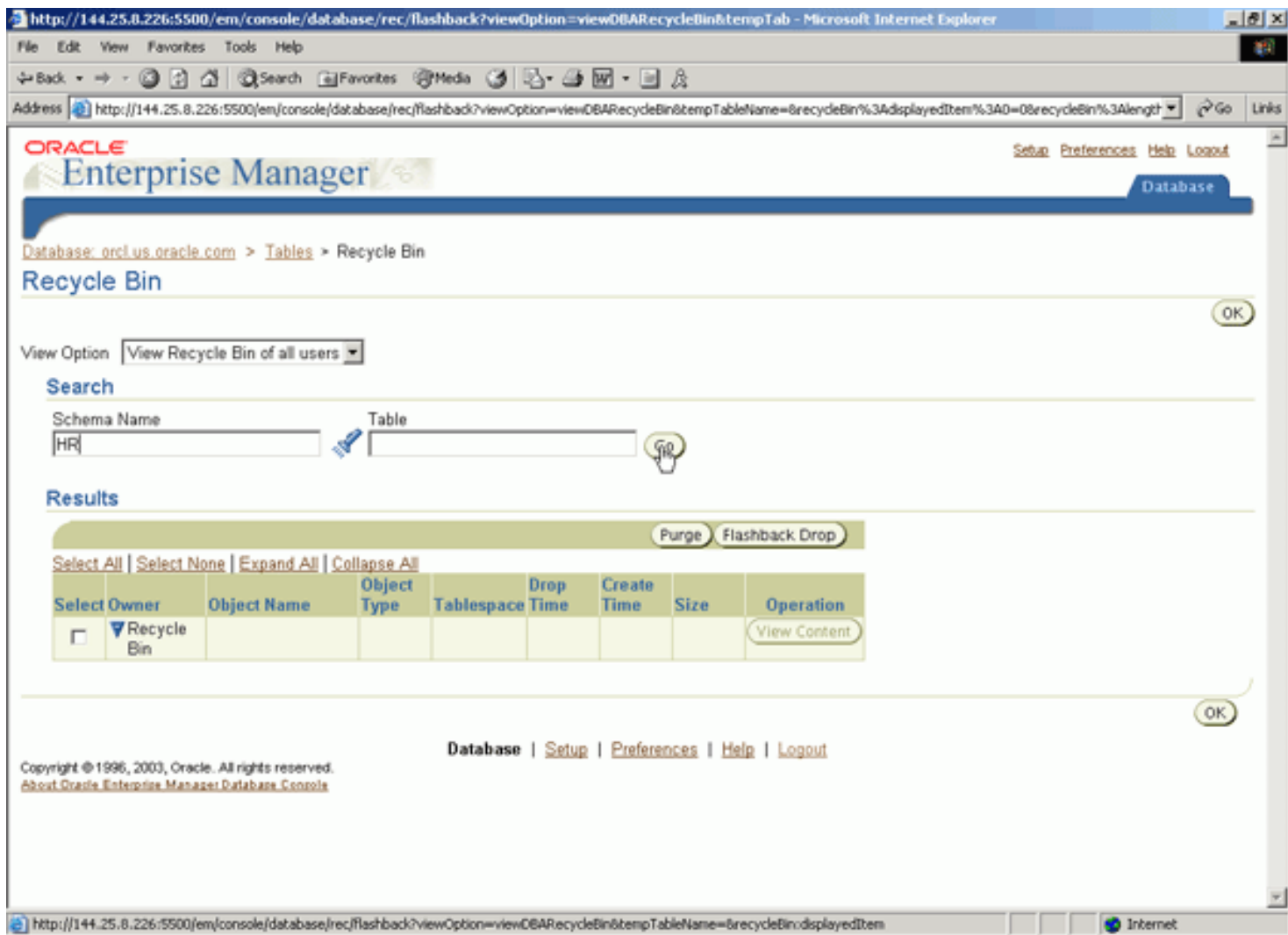
**Results**

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](#)

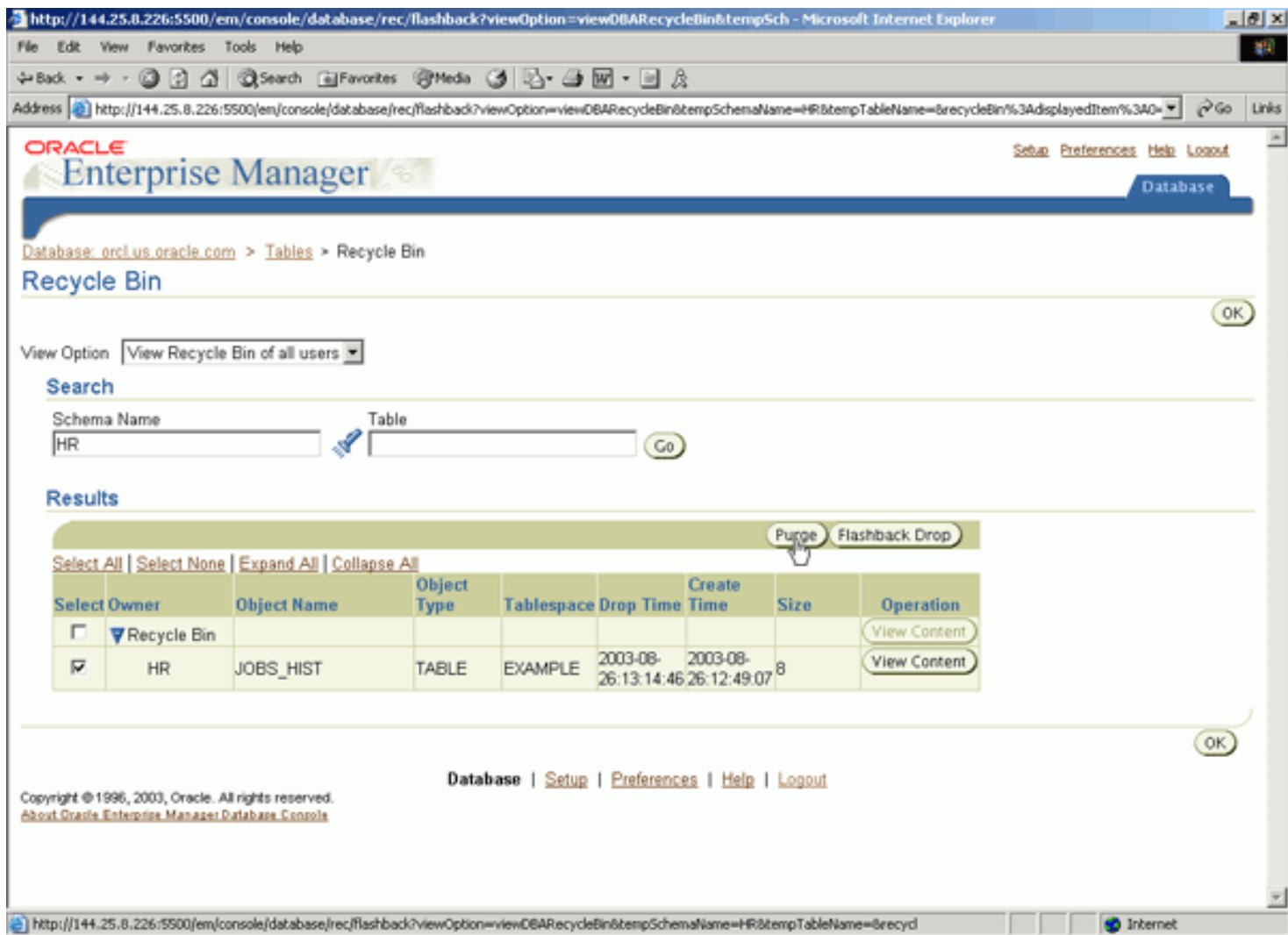
http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?sname=HR&oname=JOBS\_HIST&event=doDelete&otype=TABLE&target= Internet

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

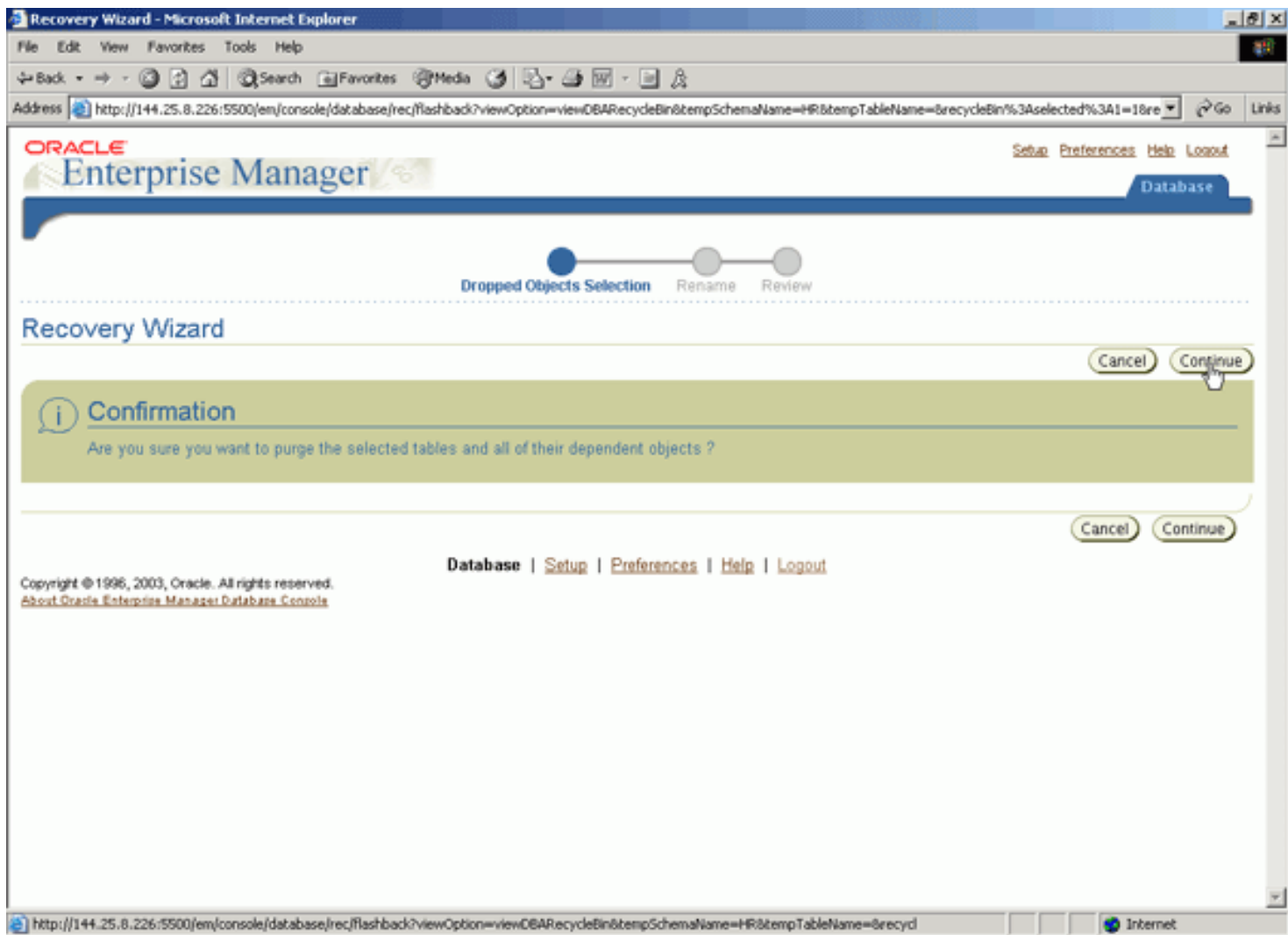


5. In the recycle bin, select the checkbox next to the JOBS\_HIST object and click **Purge**.

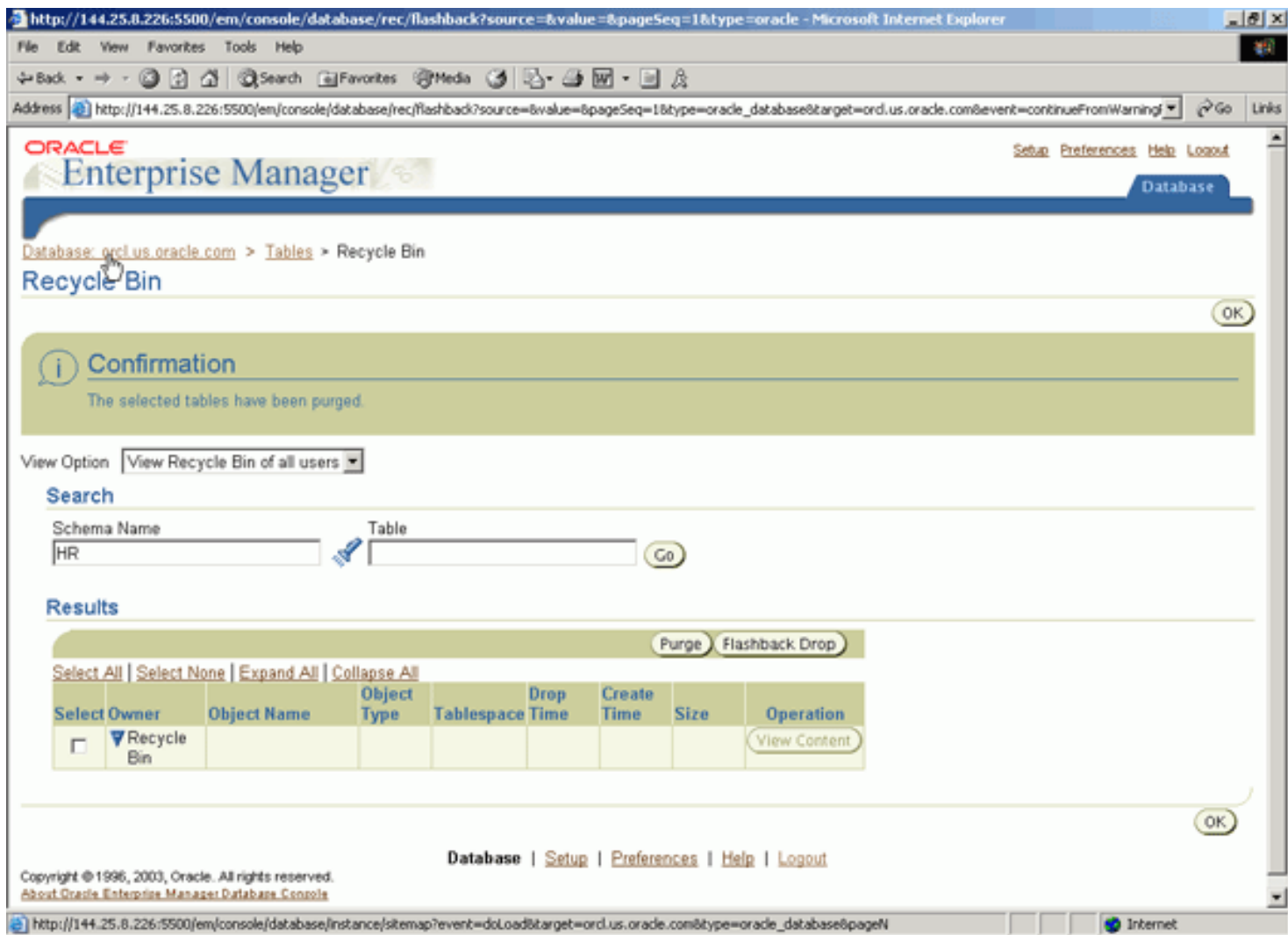




- Click **Continue** to confirm deletion.



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



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

[Back to List of Topics](#)

In Oracle9i, 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 10g, 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

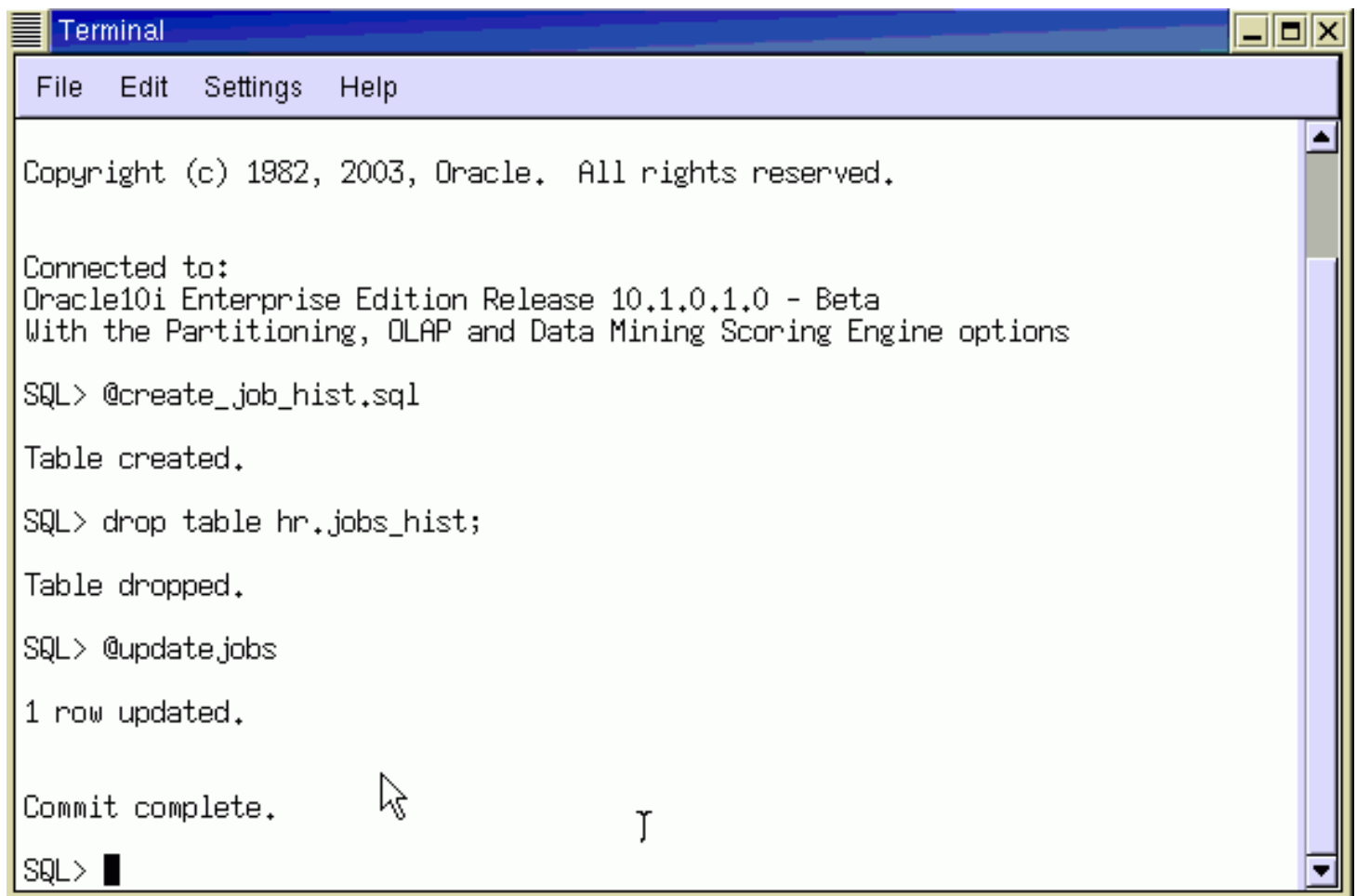
SET max_salary = max_salary + 2000

WHERE job_id = 'IT_PROG'

/

COMMIT

/
```

A screenshot of a SQL\*Plus terminal window. The window has a title bar labeled 'Terminal' and a menu bar with 'File', 'Edit', 'Settings', and 'Help'. The main text area shows the following output: '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.', and 'SQL> ' followed by a cursor. A mouse cursor is visible over the text 'Commit complete.'.

```
Terminal
File Edit Settings Help

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

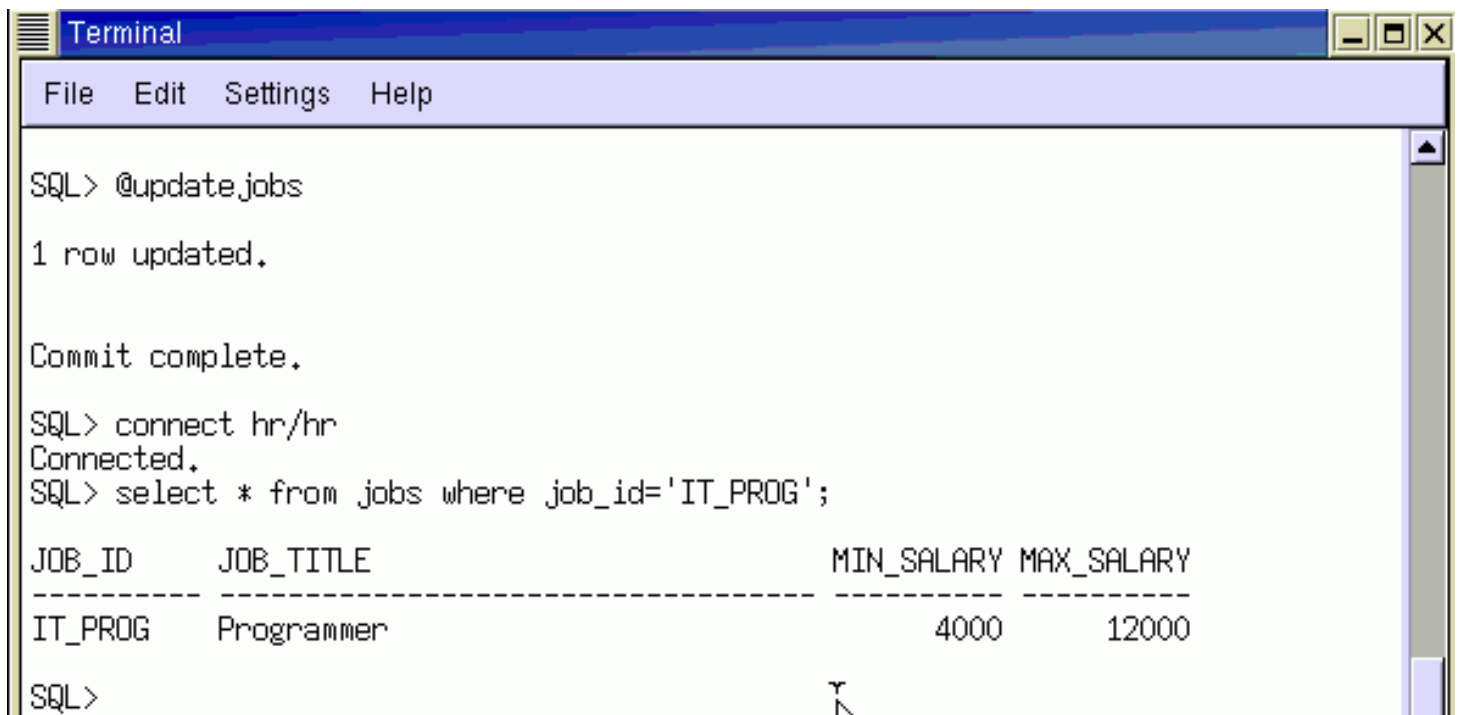
1 row updated.

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';
```



```
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

Back Forward Stop Search Favorites Media Print Mail News RSS Feeds

Address http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?event=redisplay&target=orcl.us.oracle.com&type=oracle\_database Go Links

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 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	JOB_HISTORY	EXAMPLE		0	0		NO
<input type="radio"/>	HR	LOCATIONS	EXAMPLE		0	0		NO
<input type="radio"/>	HR	REGIONS	EXAMPLE		0	0		NO

[Recycle Bin](#)

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

Copyright © 1996, 2003, Oracle. All rights reserved.  
[About Oracle Enterprise Manager Database Controls](#)

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

File Edit View Favorites Tools Help

Address <http://144.25.8.226:5500/em/console/database/schema/table?sname=HR&oname=JOBS&event=edit&cancelURL=/em/console/database/databaseObjectsSearch%3Fevent%3D> Go Links

ORACLE Enterprise Manager Database

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

### Edit Table: HR.JOBS

Show SQL Revert Apply

**General** Constraints Segments Storage Options

Name:

Schema:

Tablespace:

Organization: **Standard, Heap Organized**

### Columns

Set Default LOB Attributes

Insert Abstract Data Type Column Advanced Attributes Delete

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"/>	

Add 5 Table Columns

**TIP** Only table columns with a data type of BLOB, CLOB, NCLOB and TableType have advanced attributes.

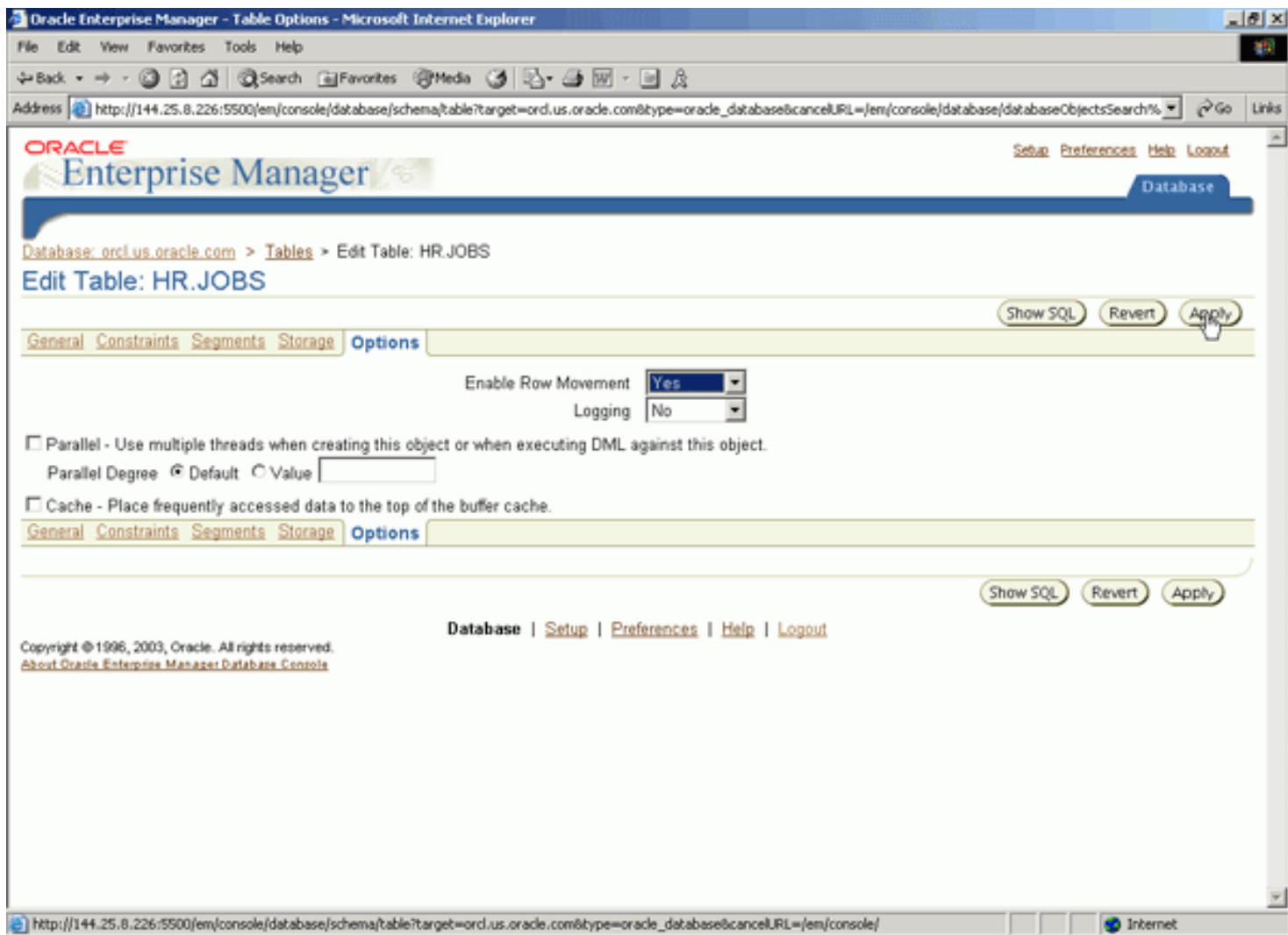
**General** Constraints Segments Storage Options

Show SQL Revert Apply

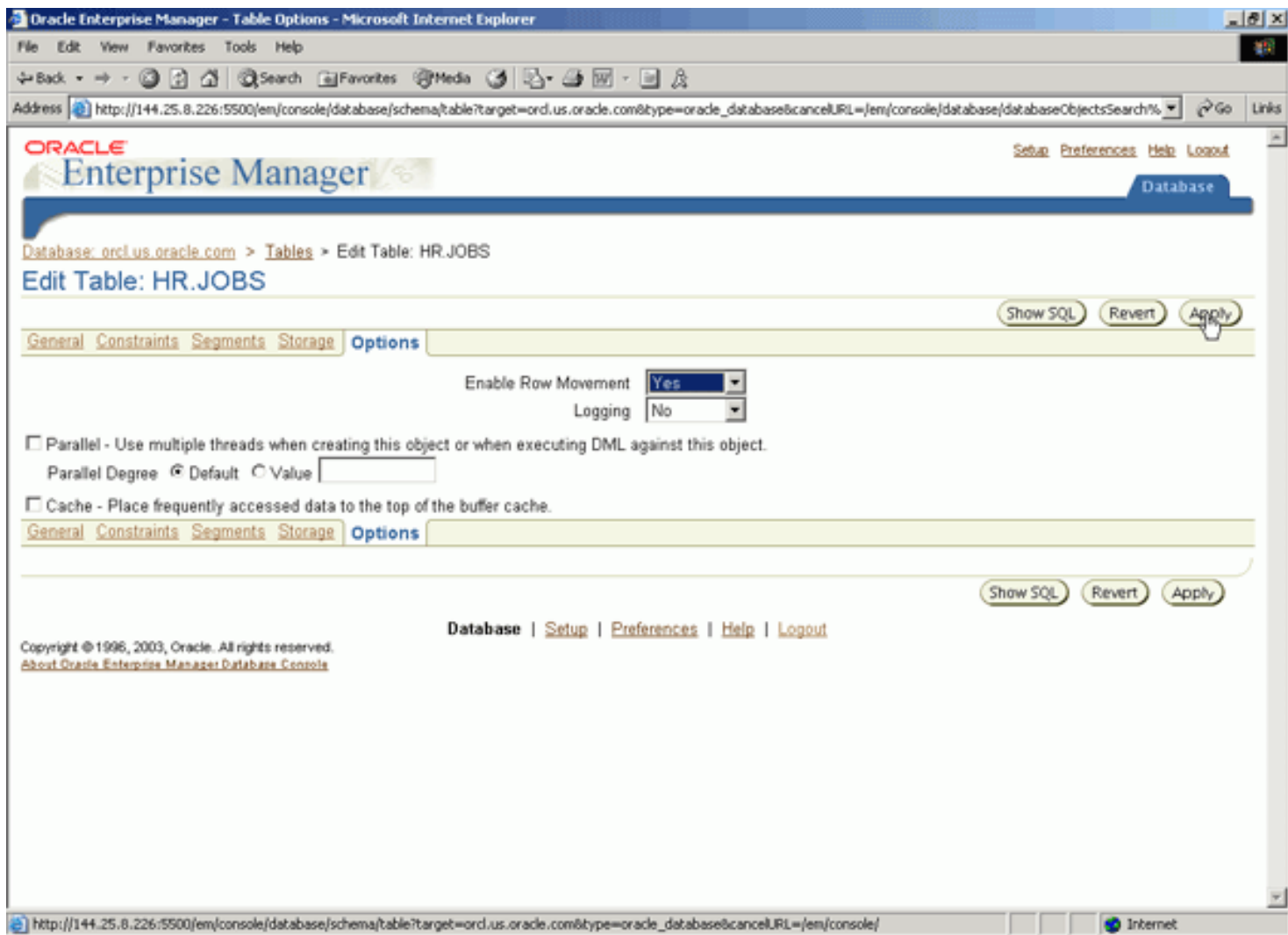
<http://144.25.8.226:5500/em/console/database/schema/table?sname=HR&oname=JOBS&event=edit&cancelURL=/em/console/database/databas> Internet

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





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

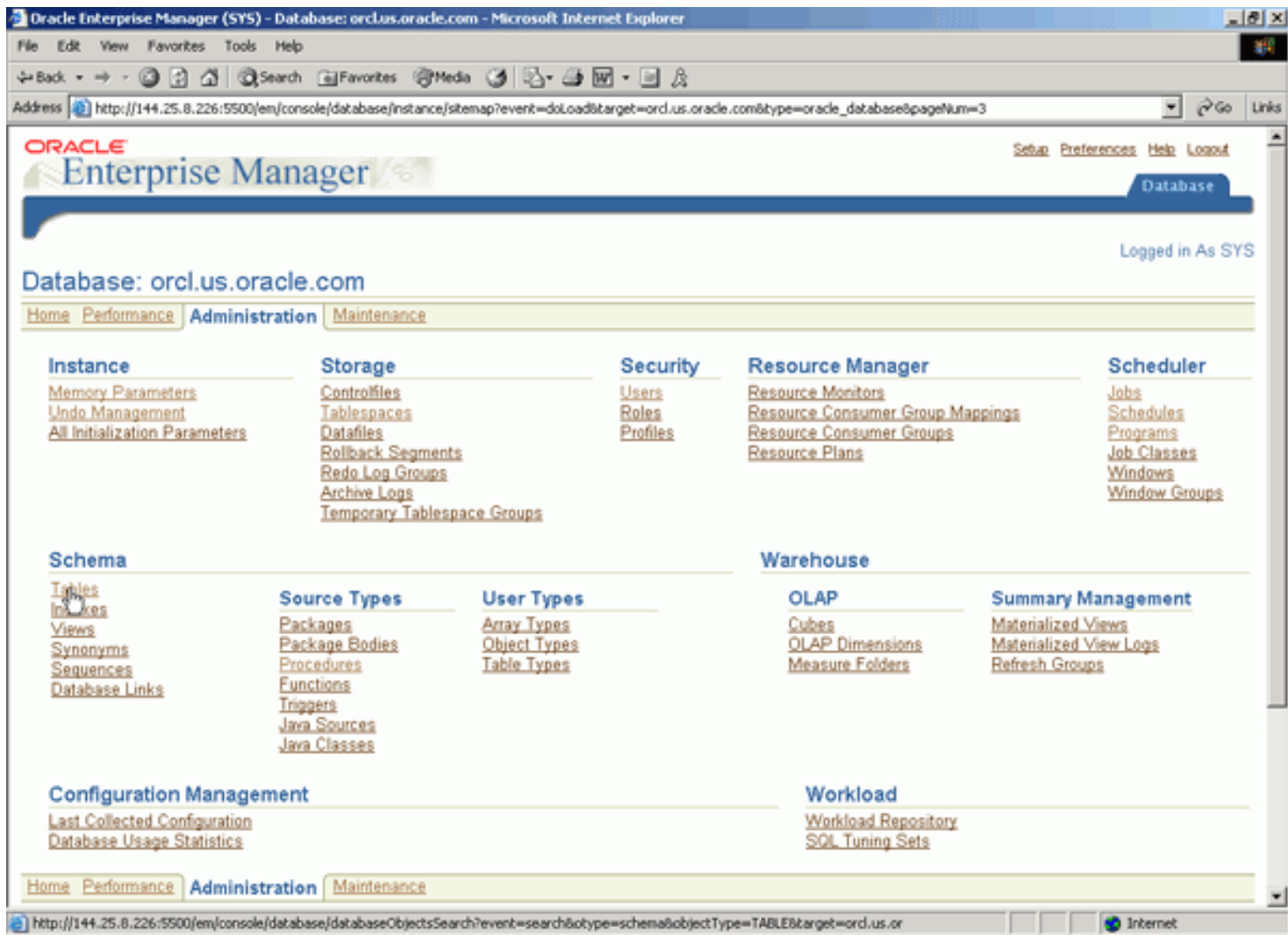


## Recover the JOBS Table to a Particular Point in Time

[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.



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

Tables - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Media Print View Source

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) Go Links

ORACLE Enterprise Manager 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 are 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	SYS_AUX		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	SYS_AUX		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

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

Tables - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Media Print View Source

Address http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?target=orcl.us.oracle.com&type=oracle\_database Go Links

ORACLE Enterprise Manager 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: Table Schema: HR Object Name:  Go

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**

Create Edit View Delete Actions Flashback Row History Go

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

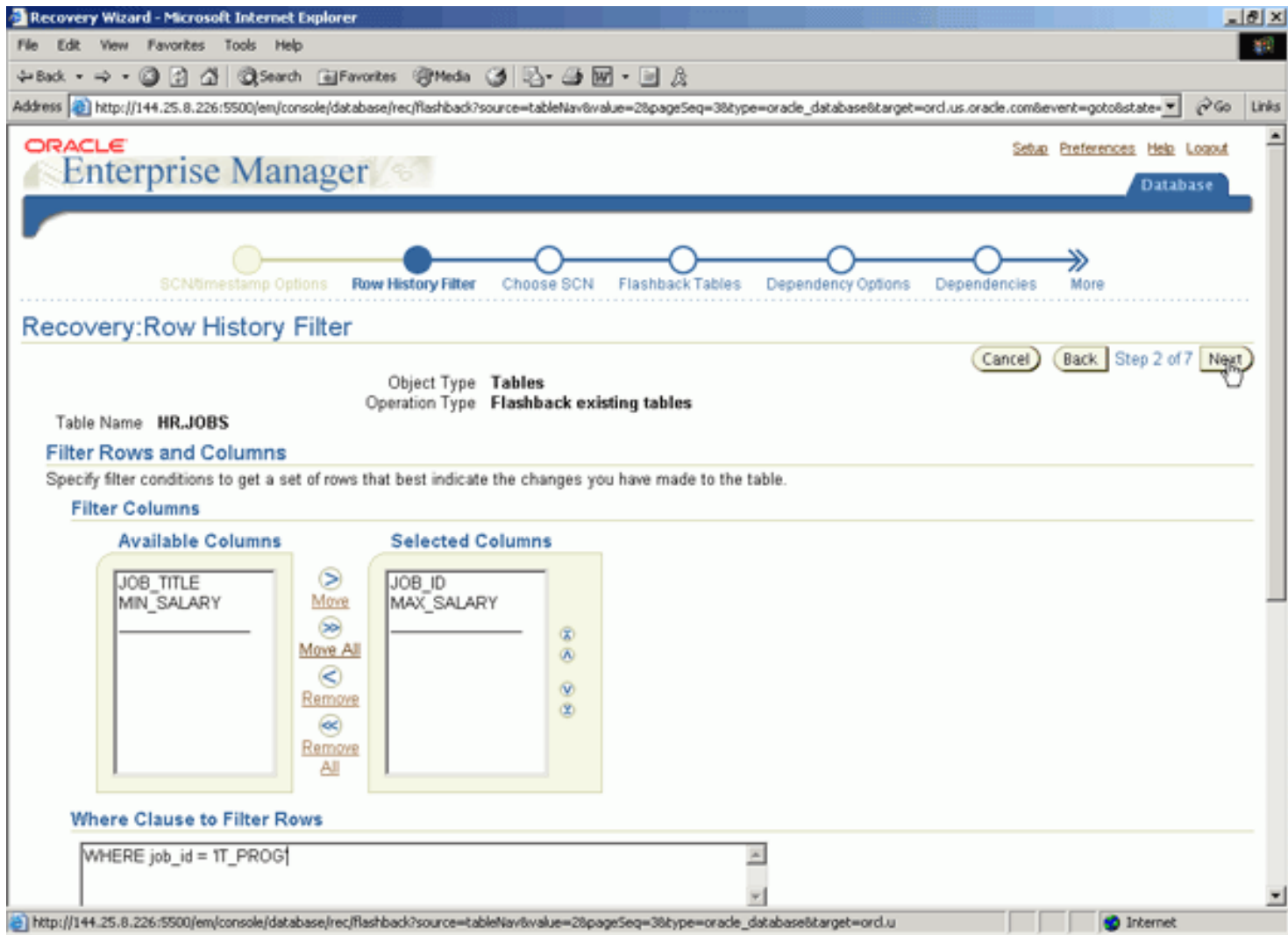
Recycle Bin

Database | Setup | Preferences | Help | Logout

Copyright © 1996, 2003, Oracle. All rights reserved.  
About Oracle Enterprise Manager Database Controls

http://144.25.8.226:5500/em/console/database/databaseObjectsSearch?target=orcl.us.oracle.com&type=oracle\_database# Internet

4. 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** .



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

The screenshot shows the Oracle Enterprise Manager interface for the 'Recovery: Choose SCN' step. The breadcrumb trail at the top indicates the current step is 'Choose SCN' out of 7 steps. The page title is 'Recovery: Choose SCN'. Below the title, the 'Object Type' is 'Tables' and the 'Operation Type' is 'Flashback existing tables'. The 'Table Name' is 'HR.JOBS'. A message states: '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.' Below this is a table titled 'Row History Result' with columns: 'Select Flashback SCN', 'Flashback Timestamp', 'Transaction ID', 'Operation', 'JOB\_ID', and 'MAX\_SALARY'. The table contains one row with the following data: '1105098', '27-AUG-03 07:27:08 AM', '0200290050050000', 'UPDATE', 'IT\_PROG', and '12000'. At the bottom of the page, there are navigation buttons: 'Cancel', 'Back', 'Step 3 of 7', and 'Next'. The 'Next' button is highlighted with a mouse cursor. The footer of the page includes the copyright notice: 'Copyright © 1996, 2003, Oracle. All rights reserved. About Oracle Enterprise Manager Database Console'.

Oracle Enterprise Manager

Setup Preferences Help Logout

Database

SCN timestamp Options Row History Filter Choose SCN Flashback Tables Dependency Options Dependencies More

Recovery: Choose SCN

Cancel Back Step 3 of 7 Next

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

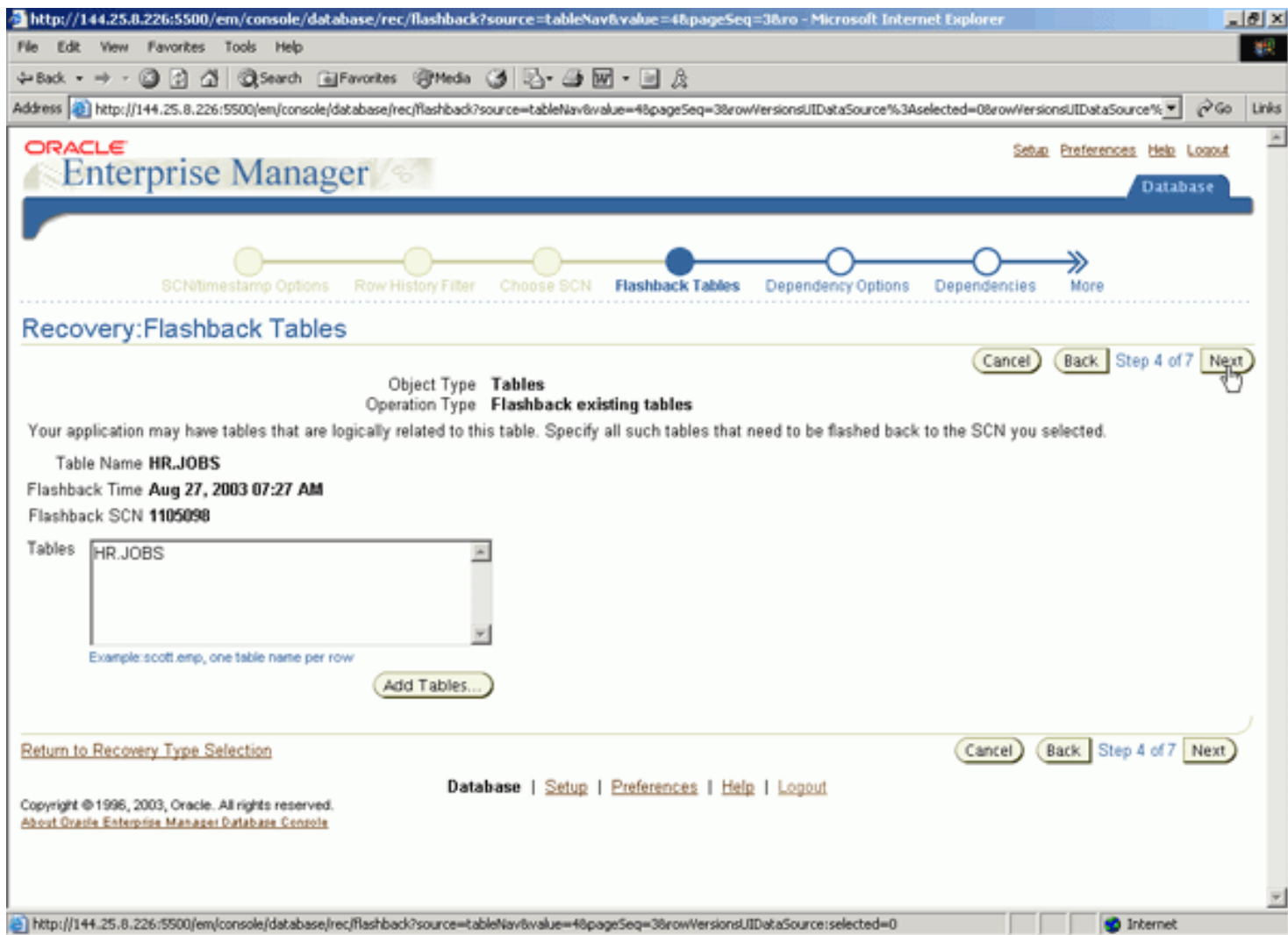
Cancel Back Step 3 of 7 Next

Database | Setup | Preferences | Help | Logout

Copyright © 1996, 2003, Oracle. All rights reserved.  
About Oracle Enterprise Manager Database Console

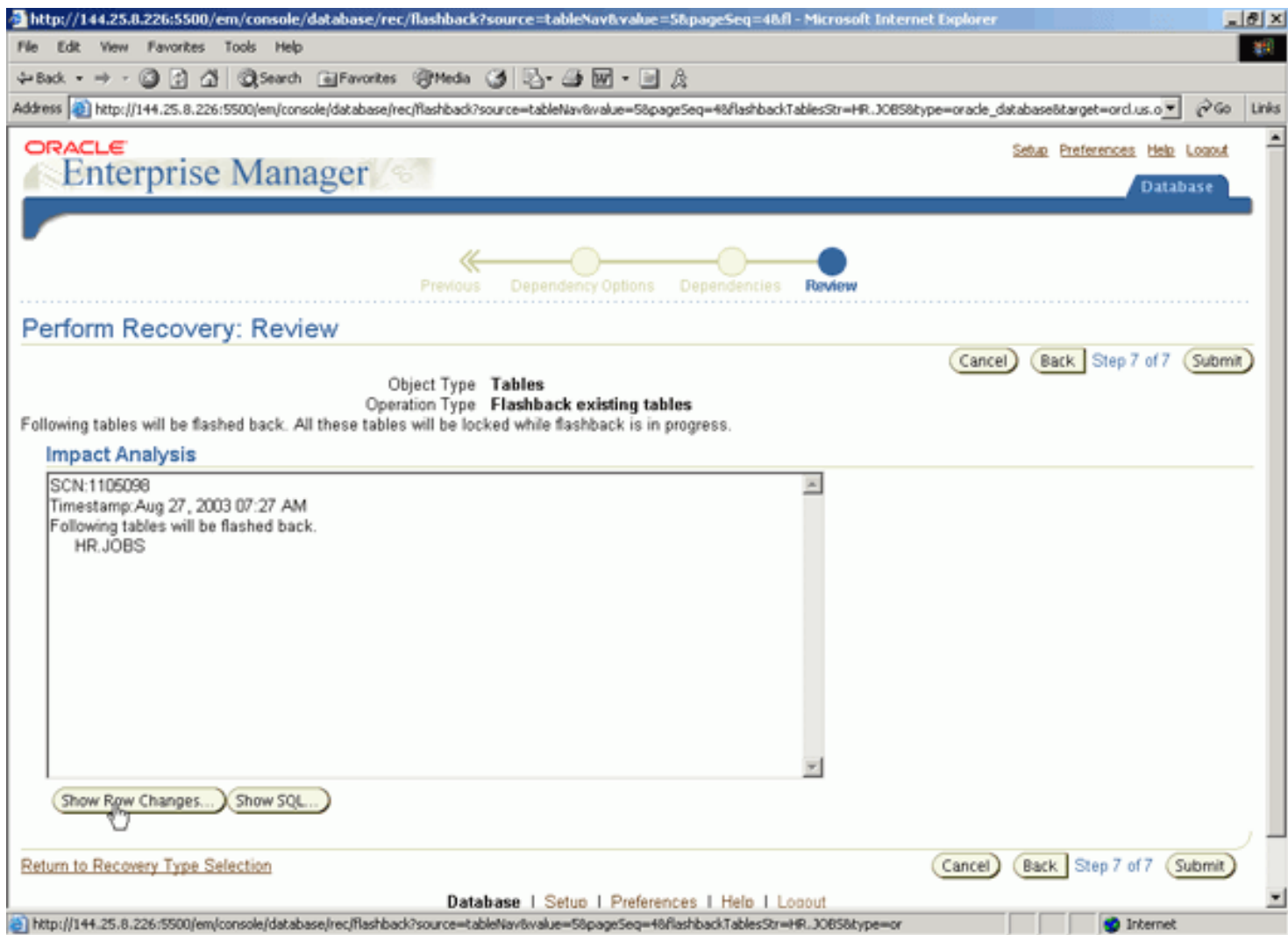
6. Click **Next** .



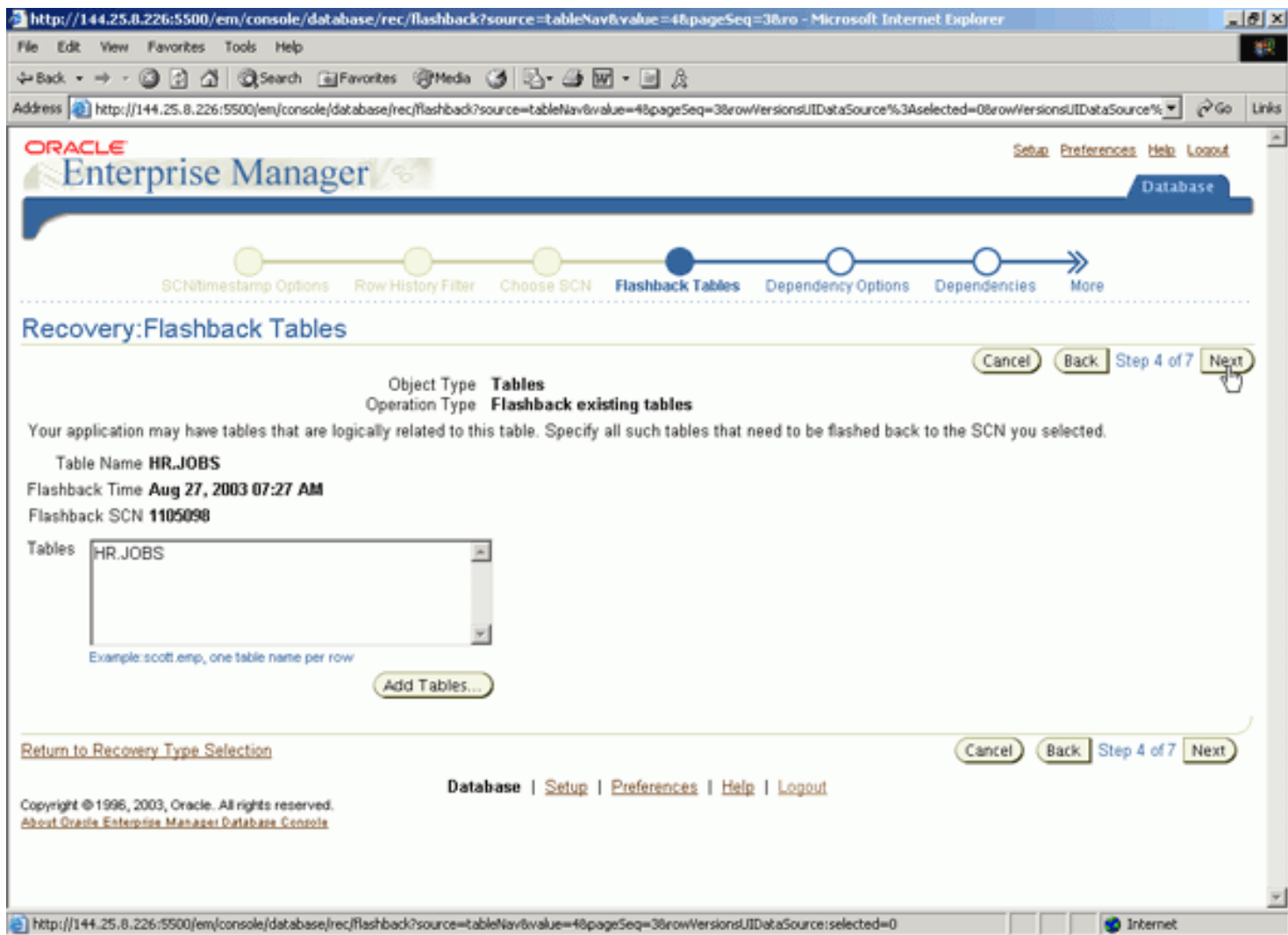


7. You may want to see what will change. Click **Show Row Changes**.

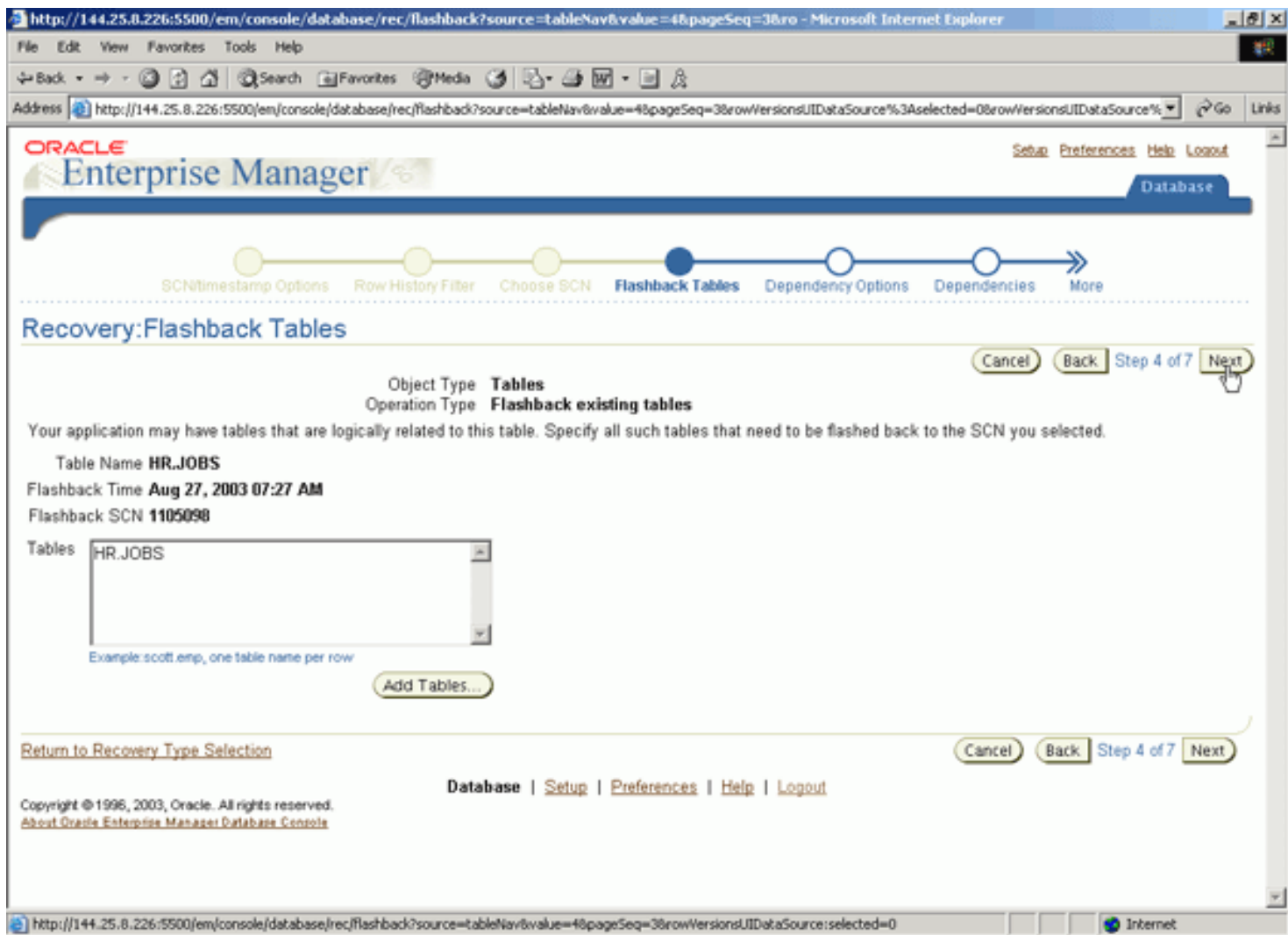




8. Click **Continue** .

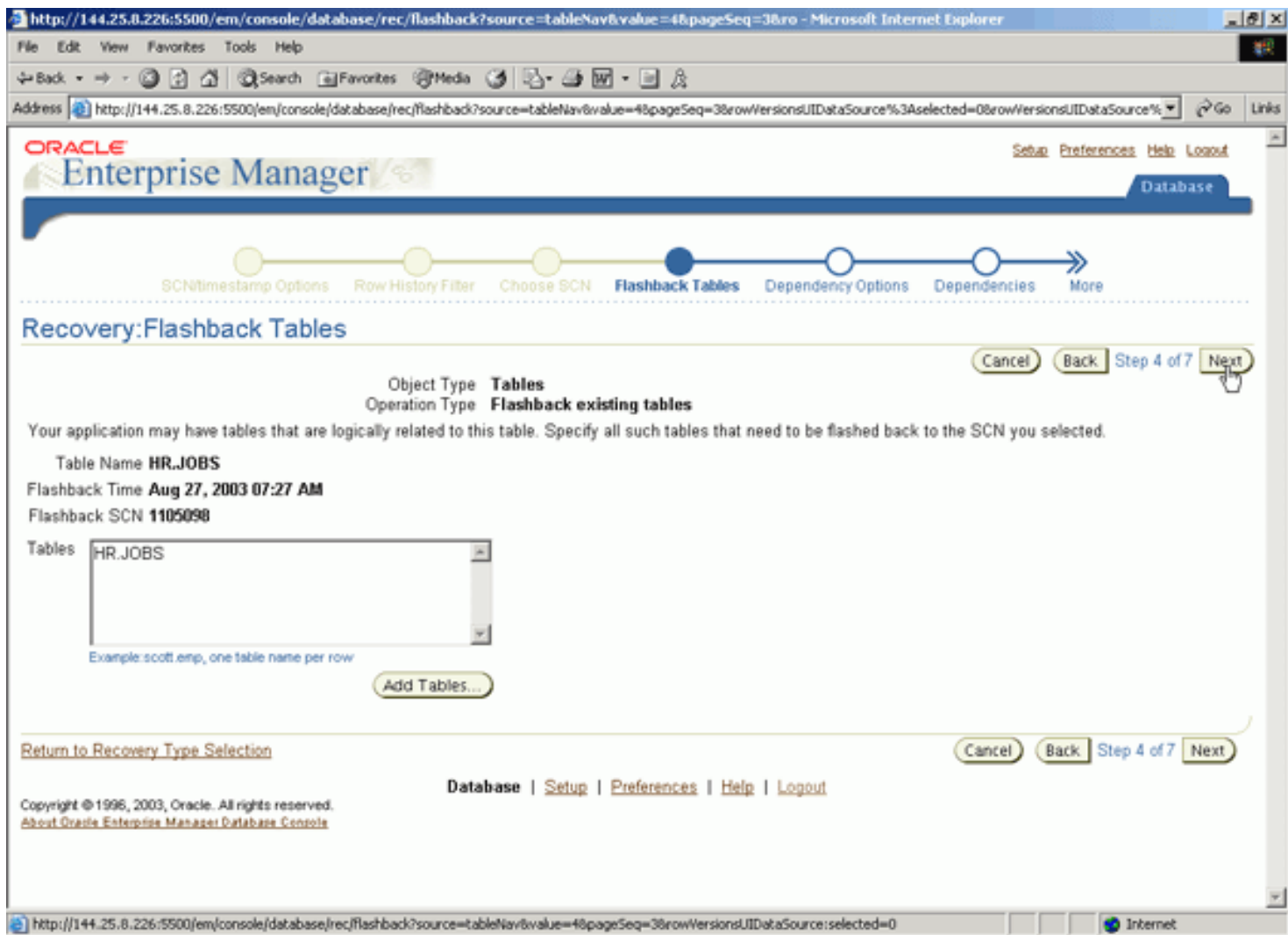


9. You will see the objects that will change as a result of the flashback operation. Click **OK**.



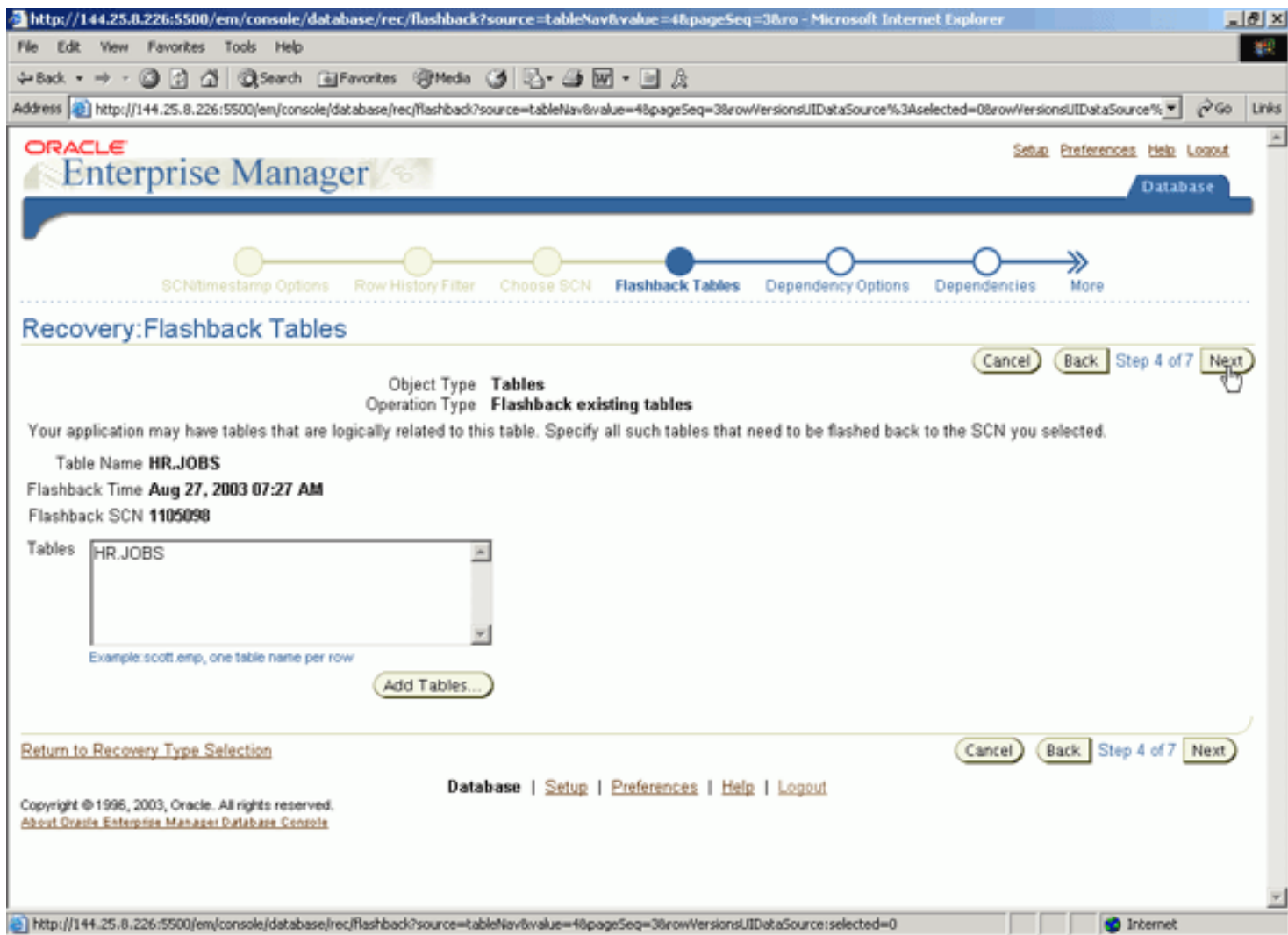
You are now ready to perform the flashback operation. Click **Submit** .

10.



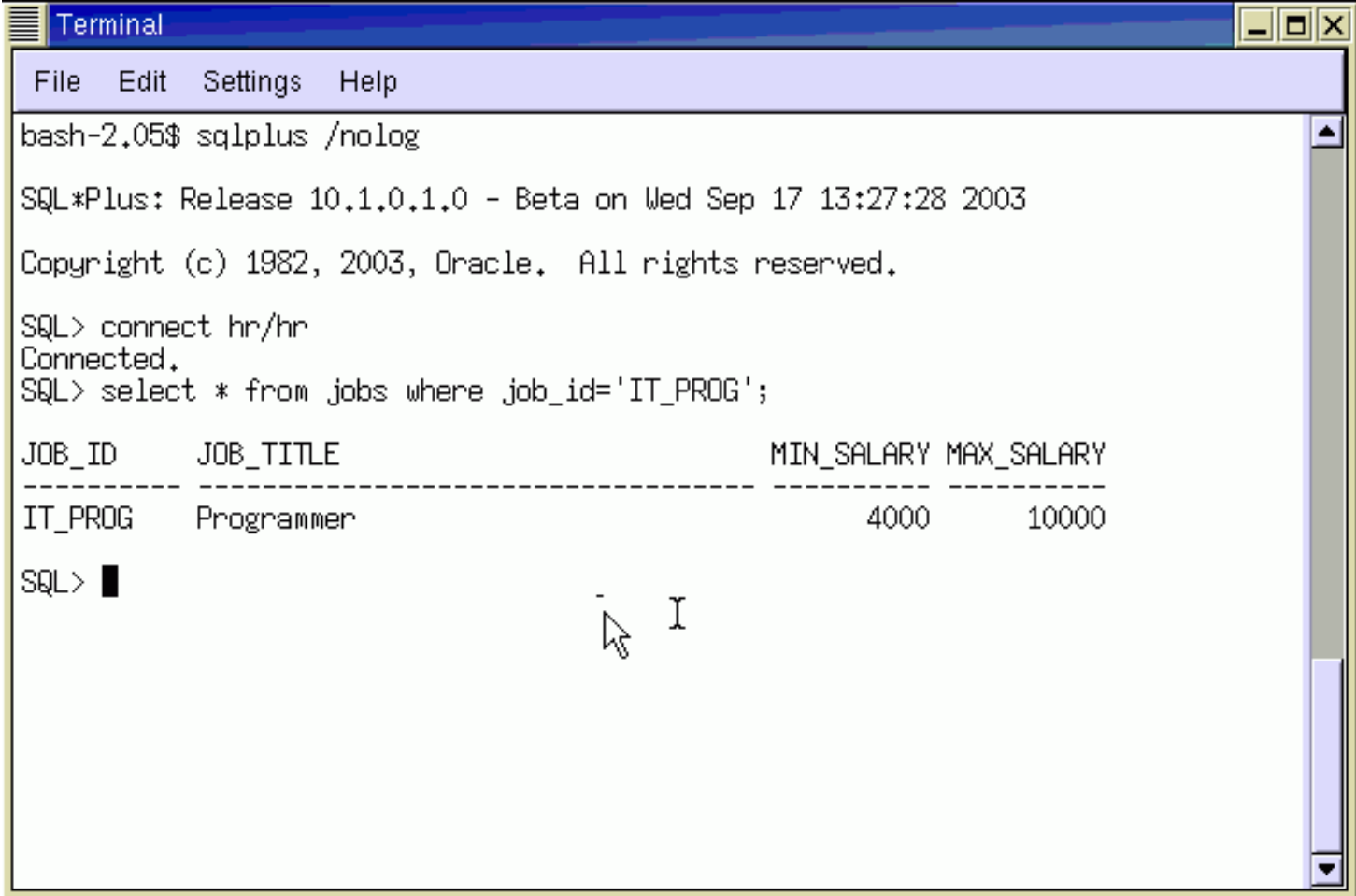
The flashback operation has completed successfully. Click **OK**.

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';
```



The screenshot shows a terminal window titled "Terminal" with a menu bar (File, Edit, Settings, Help). The command prompt is "bash-2.05\$". The user enters "sqlplus /nolog". The output shows "SQL\*Plus: Release 10.1.0.1.0 - Beta on Wed Sep 17 13:27:28 2003" and "Copyright (c) 1982, 2003, Oracle. All rights reserved." The user then enters "SQL> connect hr/hr", and the output is "Connected." The user enters "SQL> select \* from jobs where job\_id='IT\_PROG';". The output is a table with columns JOB\_ID, JOB\_TITLE, MIN\_SALARY, and MAX\_SALARY. The table shows one row for IT\_PROG with a minimum salary of 4000 and a maximum salary of 10000. The prompt "SQL>" is followed by a cursor and a space.

```
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.