

# Performing Backups and Recovering Your Database

## Purpose

This lesson introduces Oracle Database 10 g features that enable you to more easily manage backup and recovery operations.

## Topics

This lesson discusses the following:

- ☒ [Overview](#)
- ☒ [Performing Backups](#)
- ☒ [Performing Recovery of a Datafile](#)
- ☒ [Flashback of the Database](#)
- ☒ [Change Tracking for Fast Incremental Backups](#)

## Overview

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## New Features to Support Backup and Recovery Operations

This lesson discusses new features that have been provided to streamline backup and recovery tasks. It introduces features that unify related recovery files within a specific area and simplify database administrator tasks.

In Oracle Database 10 g , flashback functionality has been extended. The Flashback Database feature provides a way for you to quickly revert your entire Oracle database to the state it was in at a past point in time. Flashback Database is discussed in detail in this lesson. In addition to flashback operations at the database level, it is also possible to flash back an entire table. You can also quickly recover a table that has been inadvertently dropped. The existing flashback query capabilities have also been enhanced. Refer to the [Recovering from Human Error](#) lesson for information on these additional flashback capabilities.

## Performing Backups

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In this section, you will perform the following tasks:

- ☒ [Configuring the Flash Recovery Area](#)
- ☒ [Backing up the Database](#)

## C onfiguring the Flash Recovery Area

The flash recovery area is a unified storage location for all recovery related files and activities in an Oracle database. All files that are needed to completely recover a database from a media failure are part of the flash recovery area. The recovery related files that can be created in the flash recovery area include: archived redo log files, control files, backups created by Recovery Manager (RMAN), flashback logs, and the change tracking file.

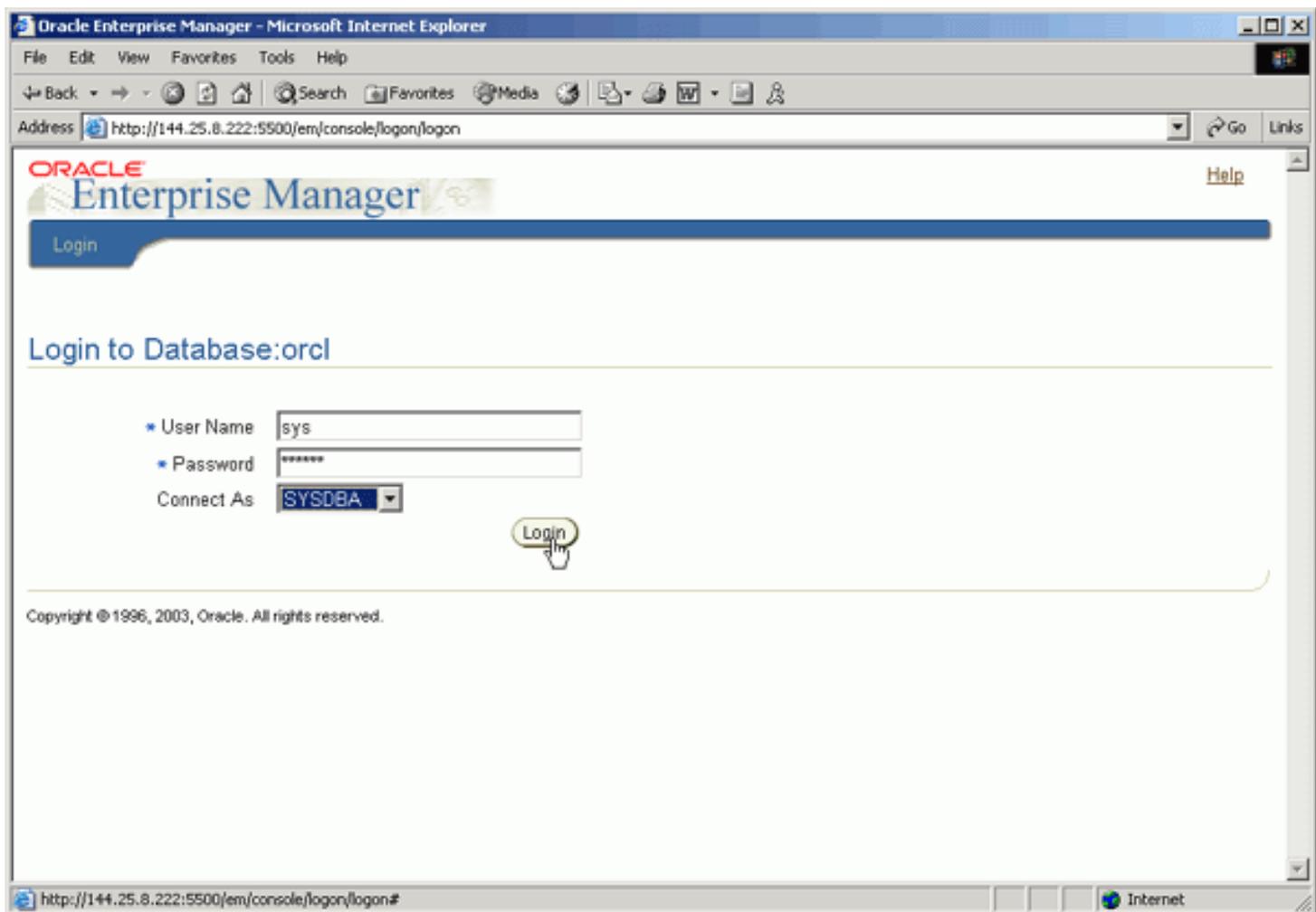
By allocating a storage location and unifying related recovery files within a specific area, the Oracle database server relieves the database administrator from having to manage the disk files created by these components.

Follow the steps below to verify that your database is in ARCHIVELOG mode and configure the flash recovery area.

1. Log in to Enterprise Manager Database Console by opening your browser and entering the following URL:

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

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



- The **Oracle Database Home** page allows you to view the current state of the database by displaying a series of metrics that portray the overall health of the database. The Oracle Database Home page provides a launch point for the database status and administration and configuration of the database environment. It contains four pages via subtabs with each page displaying subsections.

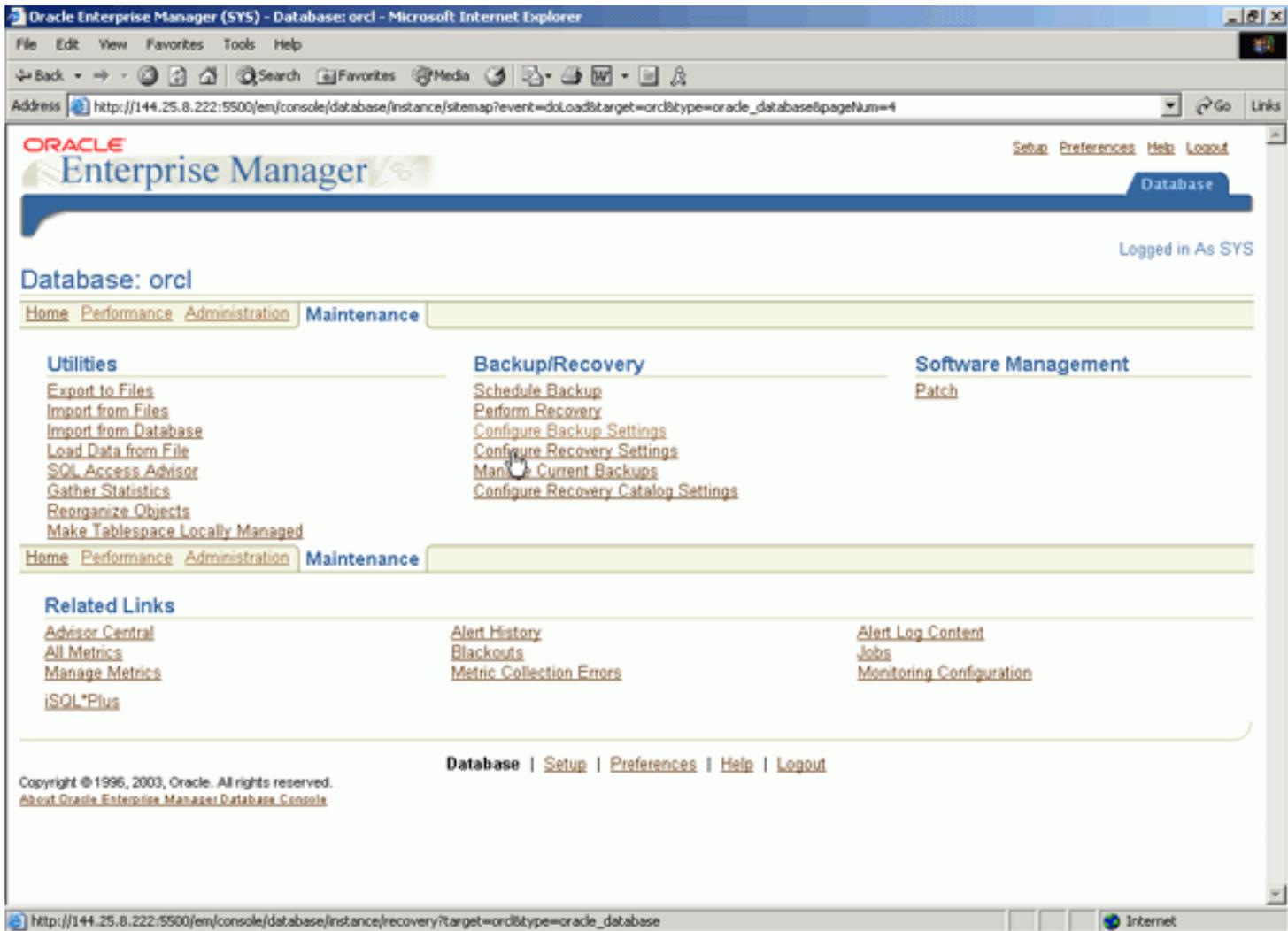
Click on the **Maintenance** tab.

The screenshot displays the Oracle Enterprise Manager (SYS) interface for the database 'orcl'. The browser window title is 'Oracle Enterprise Manager (SYS) - Database: orcl - Microsoft Internet Explorer'. The address bar shows the URL: 'http://1144.25.8.222:5500/em/console/database/instance/sitemap?event=doLoad&target=orcl&type=oracle\_database'. The page features the Oracle Enterprise Manager logo and navigation tabs: 'Home', 'Performance', 'Administration', and 'Maintenance'. The 'Maintenance' tab is selected. The page indicates 'Latest Data Collected From Target Sep 19, 2003 1:42:42 PM' and 'View Data: Real Time: Manual Refresh'. The main content area is divided into several sections:

- General:** Status is 'Up', Up Since 'Sep 19, 2003 9:28:32 AM', Time Zone 'PDT', Availability (%) '3.66 (Last 24 hours)', Instance Name 'orcl', Version '10.1.0.1.0', Host 'EDCDR22P1', Listener 'LISTENER\_EDCDR22P1', Oracle Home '/oracle/ora10g', and Alert Log 'No ORA- errors'. A 'Shutdown' button is visible.
- Host CPU:** A bar chart shows CPU usage for 'orcl' (purple) and 'Other' (blue). The 'orcl' bar is at 100%. Below the chart, 'Run Queue' is '2.96' and 'Paging (pages per second)' is 'Unavailable'.
- Active Sessions:** A pie chart shows session activity: 'Using CPU (0.93%)', 'Waiting: I/O (0.13%)', and 'Waiting: Other (99.94%)'. Below the chart, 'Active Sessions' is '1' and 'SQL Response Time (%)' is '247.34 (compared to baseline)'.
- Space Usage:** Problem '1', Tablespaces 'Not Configured', Fragmentation 'Not Configured', and Dump Area Used (%) 'ZZ'.
- Advice:** ADDM Findings '2' and Policy Violations '2'.
- High Availability:** Instance Recovery Time (seconds) '13', Last Backup 'Sep 19, 2003 9:38:02 AM Disabled', Archiving 'n/a', Archive Area Used (%) 'n/a', and Flashback Logging 'Enabled'.
- Job Activity:** Scheduled Executions '1', Running Executions '0', Suspended Executions '0', and Problem Executions '8 (Last 7 days)'.

The browser status bar at the bottom shows the URL and 'Internet'.

3. Select **Backup/Recovery -> Configure Recovery Settings** .



4. Scroll down to the **Media Recovery** and **Flash Recovery Area** sections to observe the new settings. When the flash recovery area and archiving are configured, the flash recovery area ( `USE_DB_RECOVERY_FILE_DEST` ) is configured for archive log destination 10. Scroll up to the top of the page.

Oracle Enterprise Manager (SYS) - Configure Recovery Settings - Microsoft Internet Explorer

Address: http://144.25.8.222:5500/em/console/database/instance/recovery?target=orcl&type=oracle\_database

9				Local
10	USE_DB_RECOVERY_FILE_DEST	0	VALID	Local

TIP It is recommended that archive log files be written to multiple locations spread across the different disks.  
 TIP You can specify up to 10 archive log destinations.

### Flash Recovery Area

It is highly recommended to use flash recovery area to automate your disk backup management.

Flash Recovery Area Location

Flash Recovery Area Size  GB

Flash Recovery Area Size must be set when the location is set

Used Flash Recovery Area Size (KB) **5449464**

Enable flashback logging for fast database point-in-time recovery\*

The flash recovery area must be set to enable flashback logging. Using flashback logs, you may recover your entire database to a prior point-in-time without restoring files. Flashback is the preferred point-in-time recovery method in the recovery wizard when appropriate.

Specify how far back you wish to flash the database in the future

Flashback Retention Time  Hours

Current size of the flashback logs **541864KB**

Lowest SCN in the flashback data **7318962**

Time of the lowest SCN in the flashback data **Sep 18, 2003 1:46:13 PM**

Apply changes to SPFILE only. Otherwise the changes will be made to both SPFILE and the running instance which requires that you restart the database to invoke static parameters.

TIP \* indicates controls, if changed, must restart database to invoke.

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

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Done Internet

5. Click **Database: orcl** .

**Configure Recovery Settings**

**Instance Recovery**

The FAST\_START\_MTTR\_TARGET initialization parameter specifies the number of seconds estimated for crash recovery. Oracle converts this number into a set of internal parameters and sets the recovery time as close as possible to these parameters. Setting FAST\_START\_MTTR\_TARGET to 0 will disable this functionality.

Current Estimated Mean Time To Recover (seconds) **13**

Desired Mean Time To Recover  Minutes

**MTTR Advice not yet available**

**Media Recovery**

The database is currently in ARCHIVELOG mode. In ARCHIVELOG mode, hot backups and recovery to the latest time is possible, but you must provide space for logs. If you change the database to ARCHIVELOG mode, you should make a backup immediately. In NOARCHIVELOG mode, you can make only cold backups and data may be lost in the event of database corruption.

ARCHIVELOG Mode\*

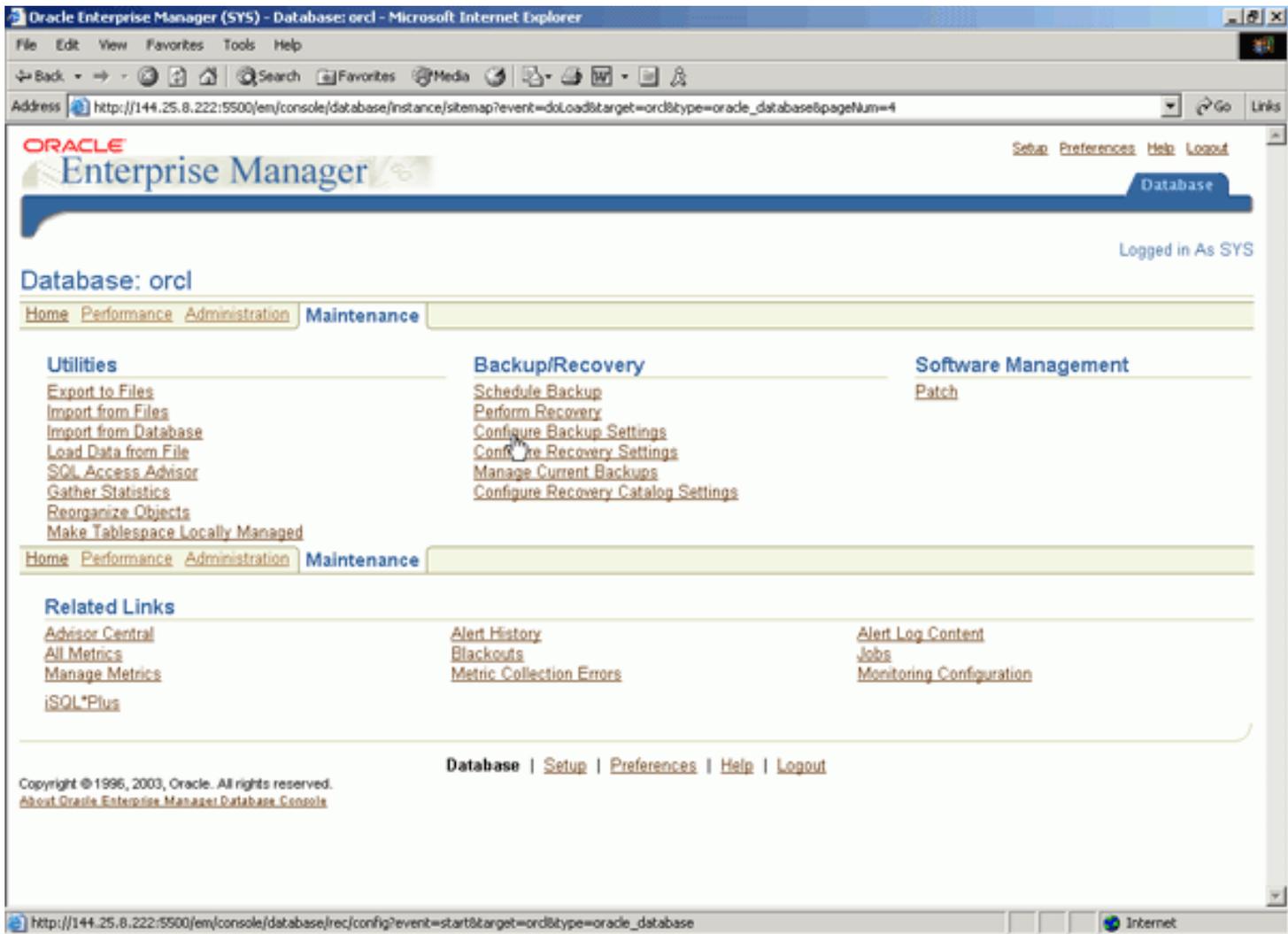
Compress Archived Redo Logs  
If changed, the new value will take effect during the next log switch.

Log Archive Filename Format\*

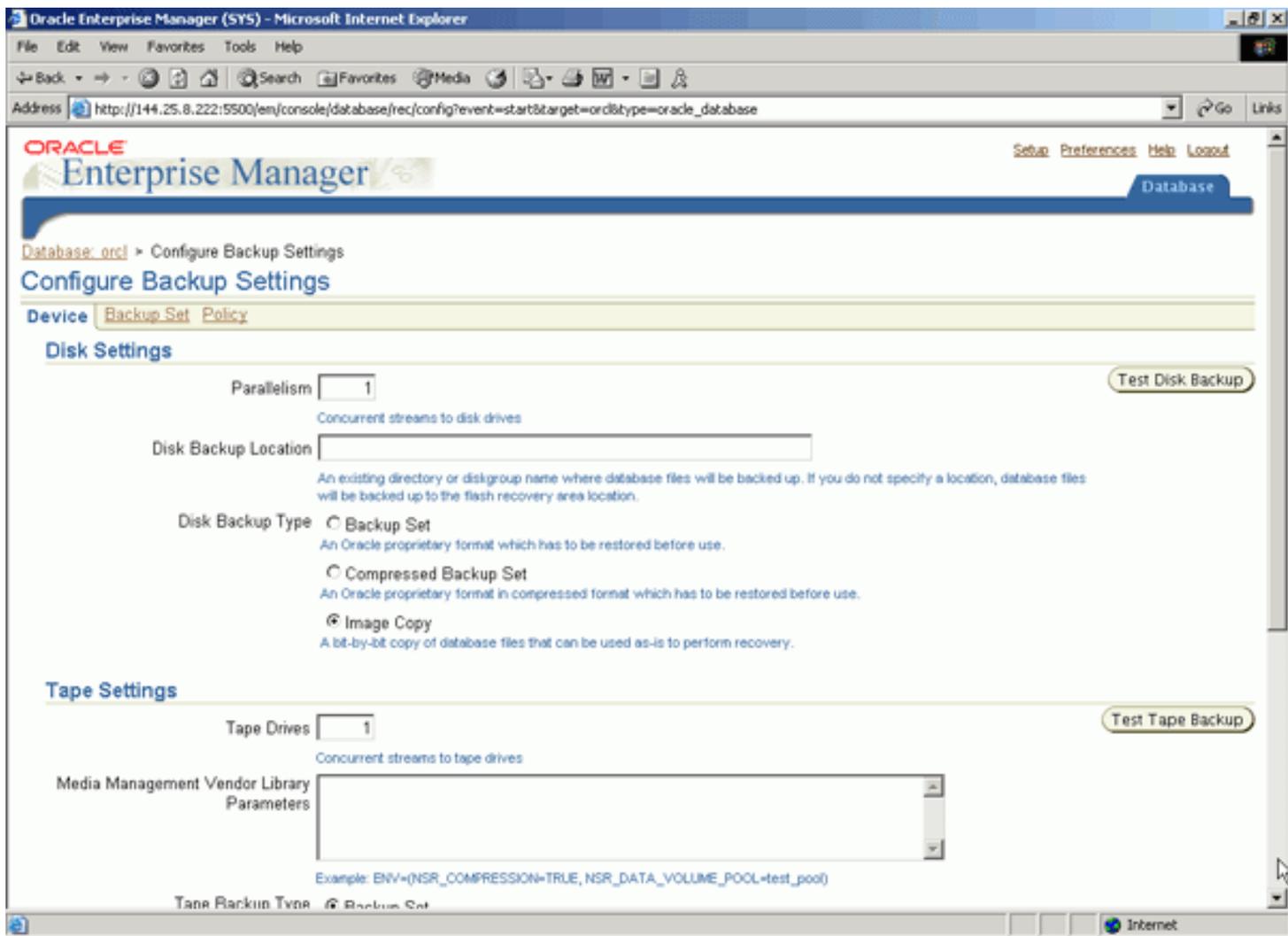
The naming convention for the archived log files. %s: log sequence number, %t: thread number, %S and %T: padding the filename to the left with zeroes.

Number	Archive Log Destination	Quota (512B)	Status	Type
1	<input type="text"/>	<input type="text"/>		Local
2	<input type="text"/>	<input type="text"/>		Local
3	<input type="text"/>	<input type="text"/>		Local

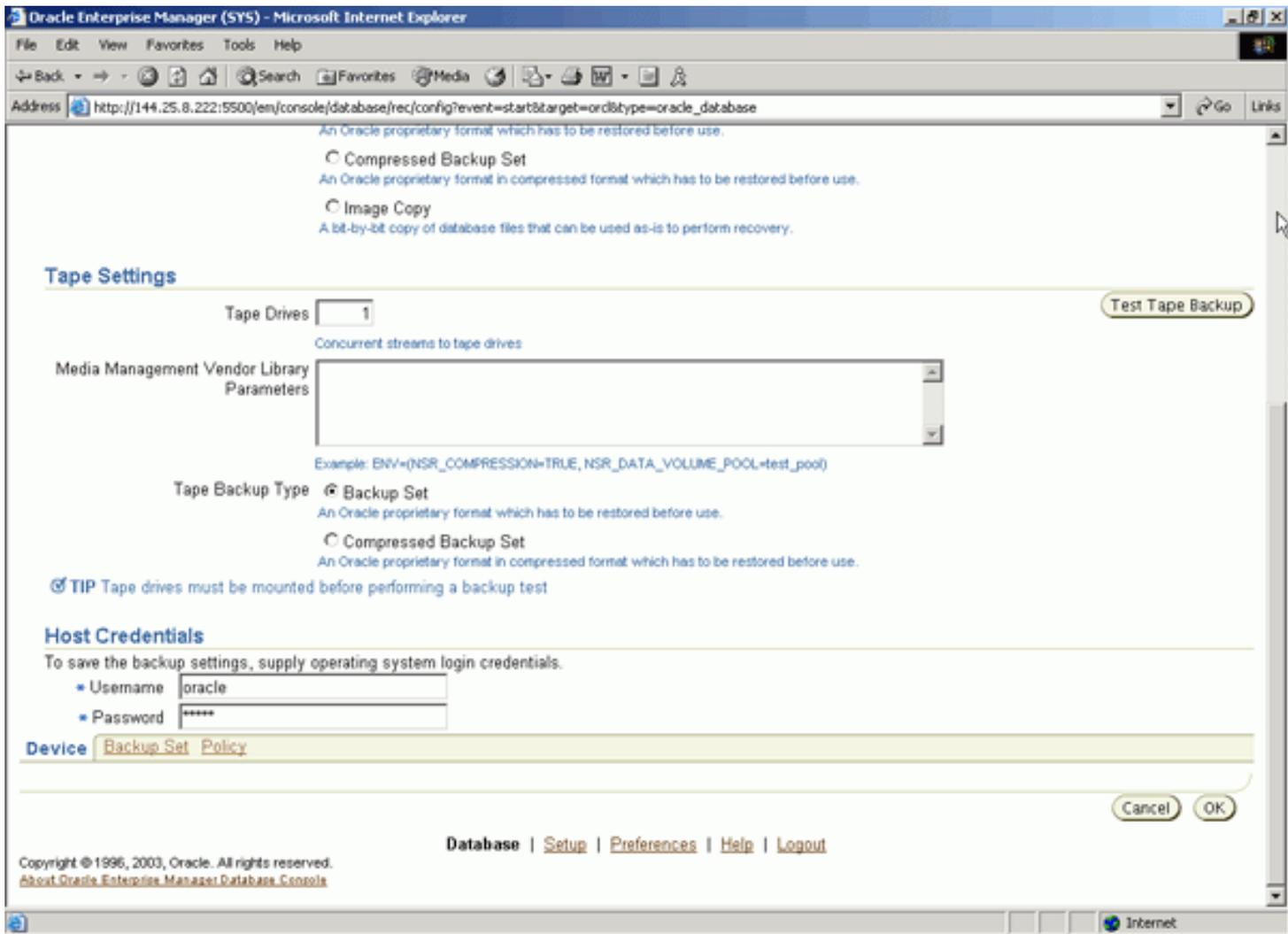
- Click **Configure Backup Settings** in the Backup/Recovery section.



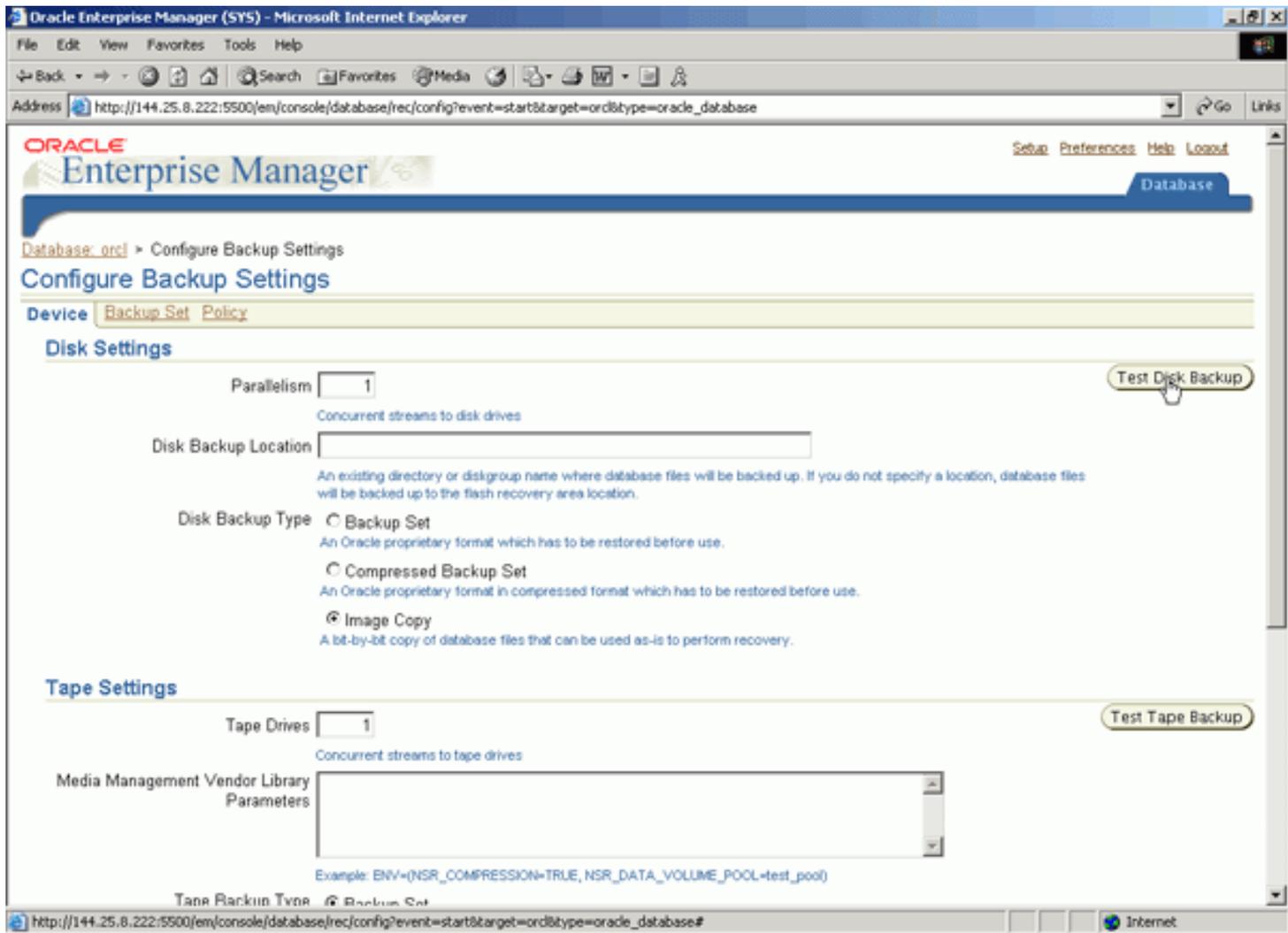
7. You will now test your configuration. Select **Image Copy** under Disk Settings for Disk Backup Type. Scroll down to **Host Credentials**.



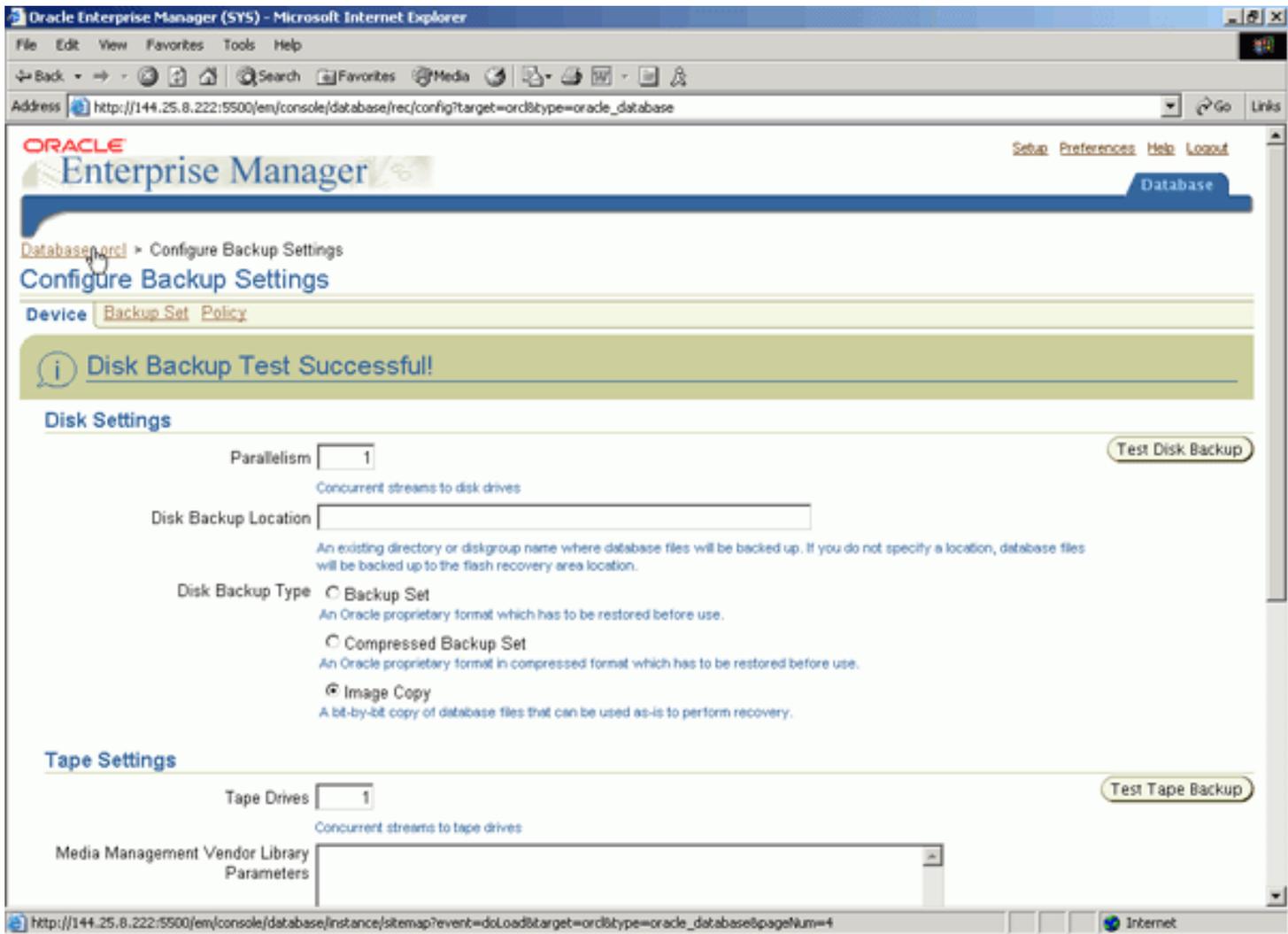
8. Enter your OS username and password and scroll up to the top of the page.



9. Click on **Test Disk Backup** . The location for the backup test will be the location set for the flash recovery area.



10. When you receive the successful notification click on **Database: orcl**.

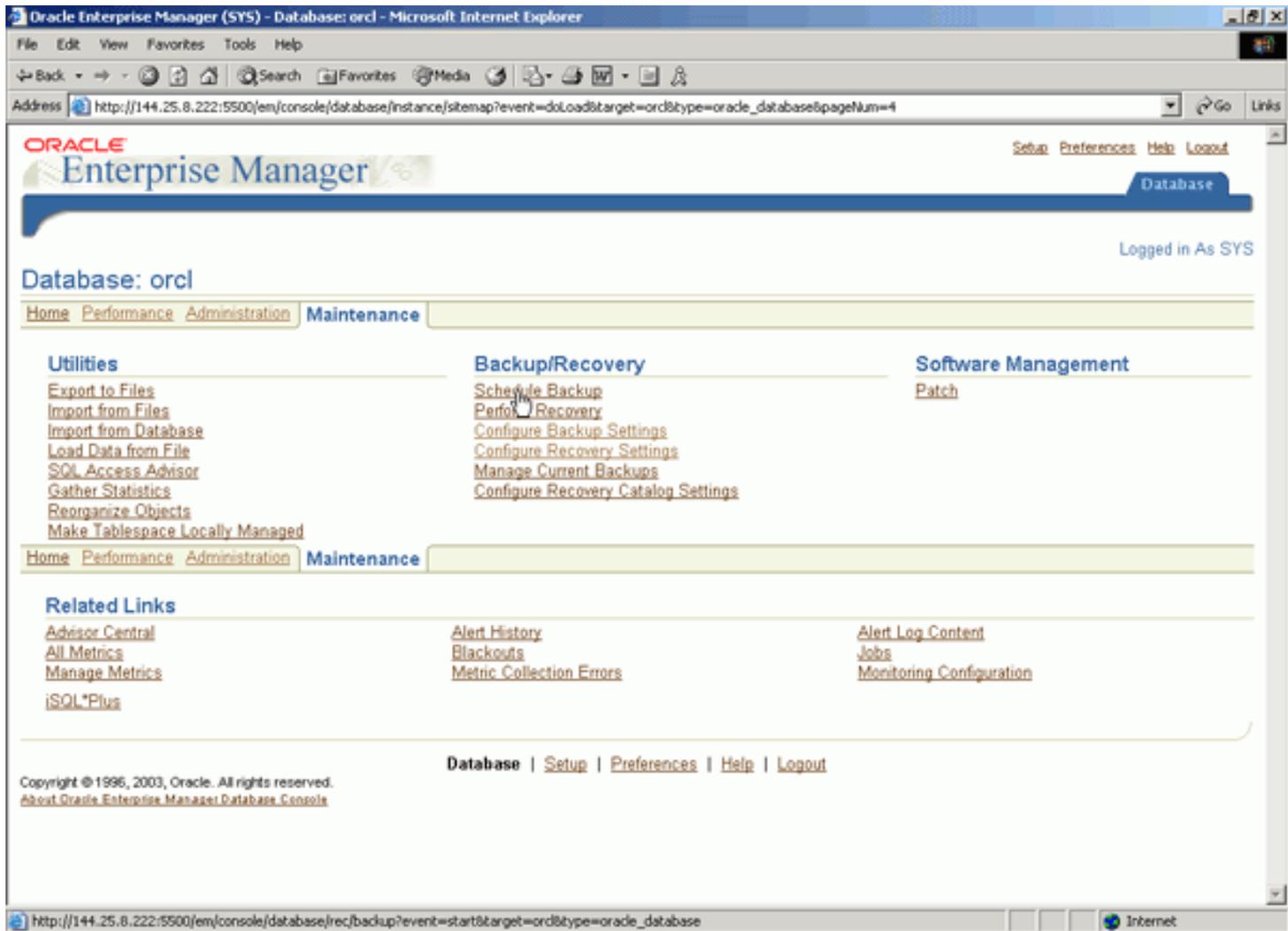


## Backing Up the Database

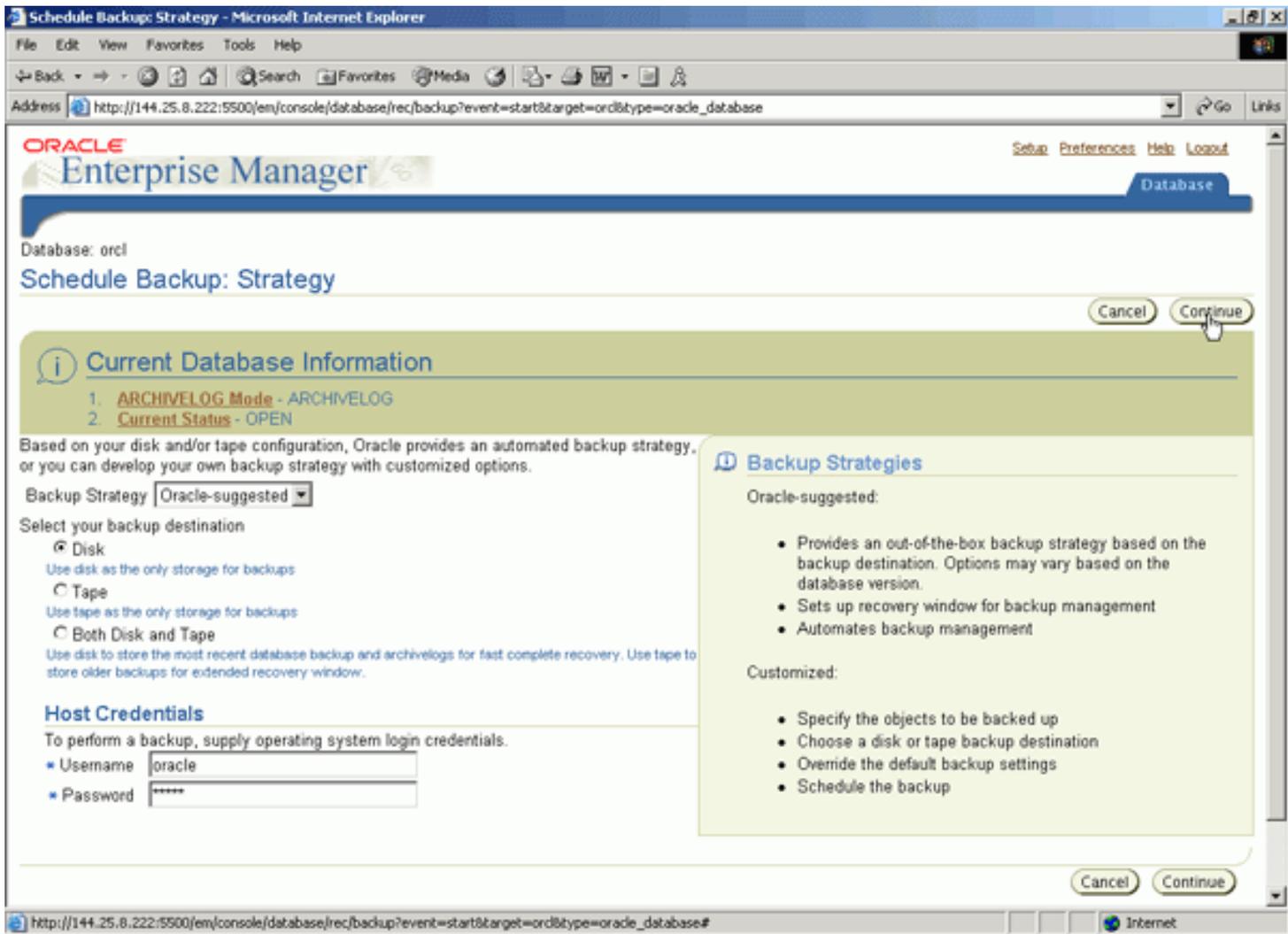
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Follow the steps below to take a whole database backup.

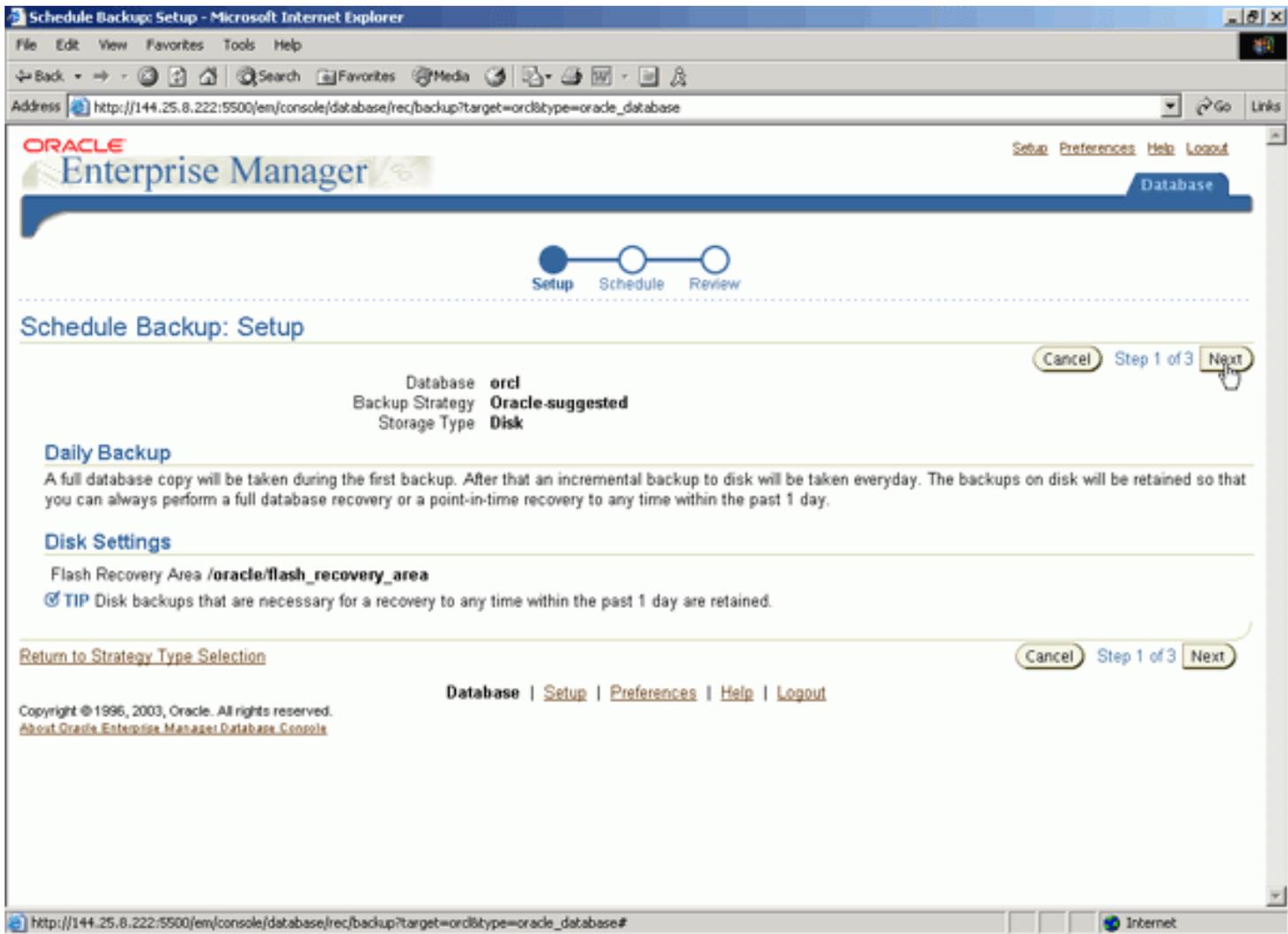
1. Click **Schedule Backup** in the Backup/Recovery section.



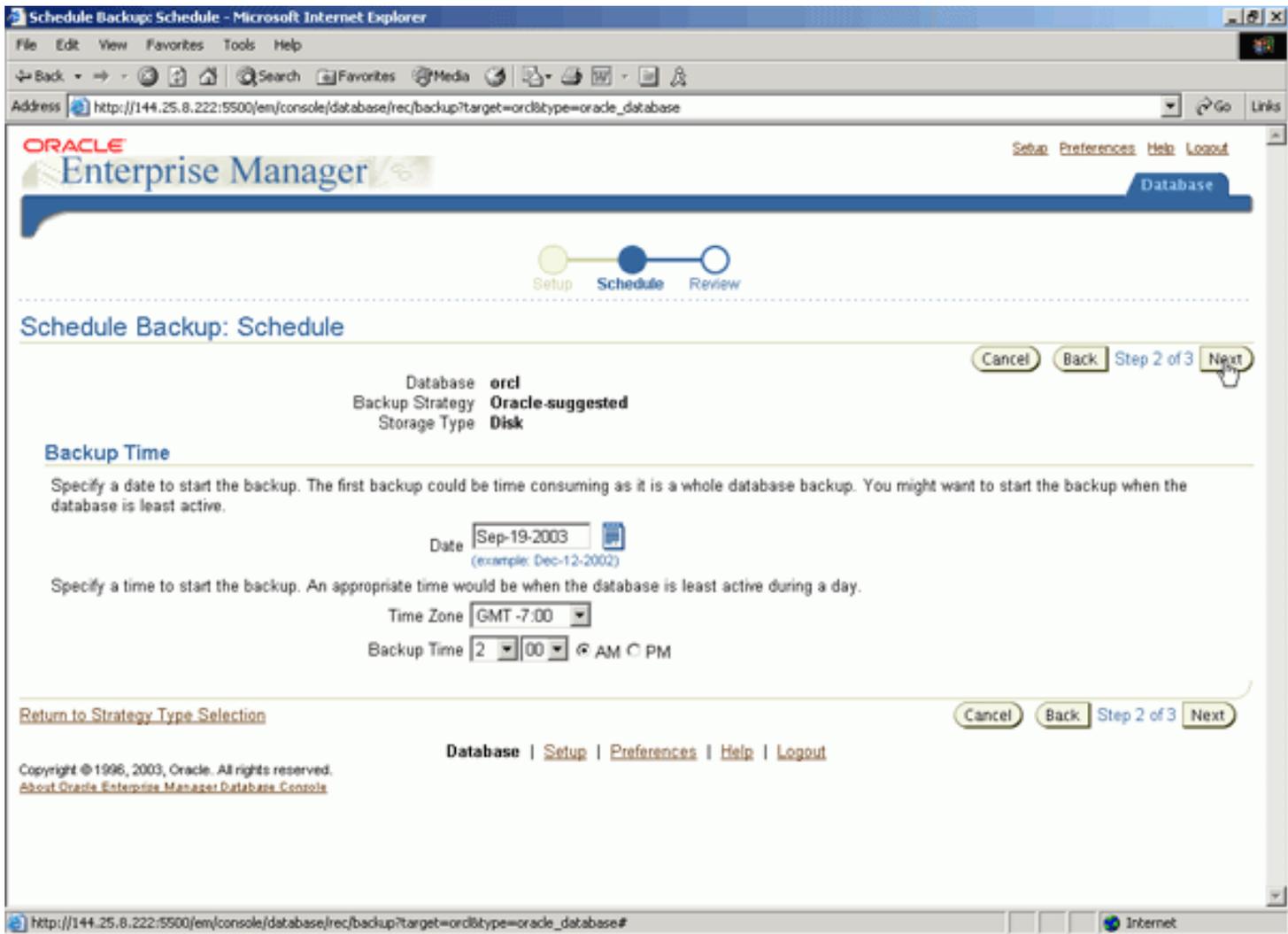
2. Choose **Oracle-suggested** for the Backup Strategy. Choose **Disk** under Select your backup destination. Enter your OS username and password. Then click **Continue**.



3. Review the **Setup** page, then click **Next** .



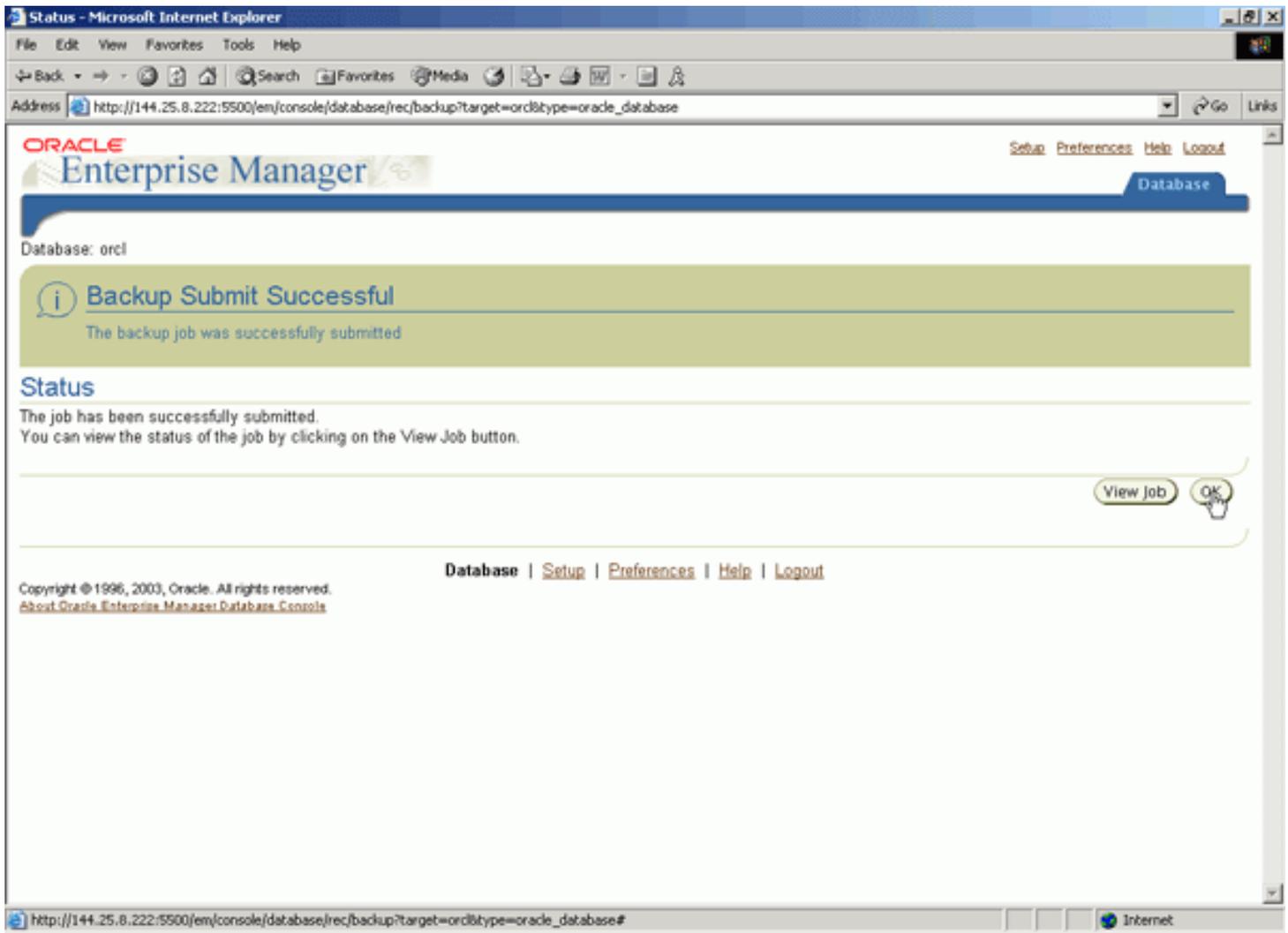
4. Review the **Schedule** page, then click **Next** .



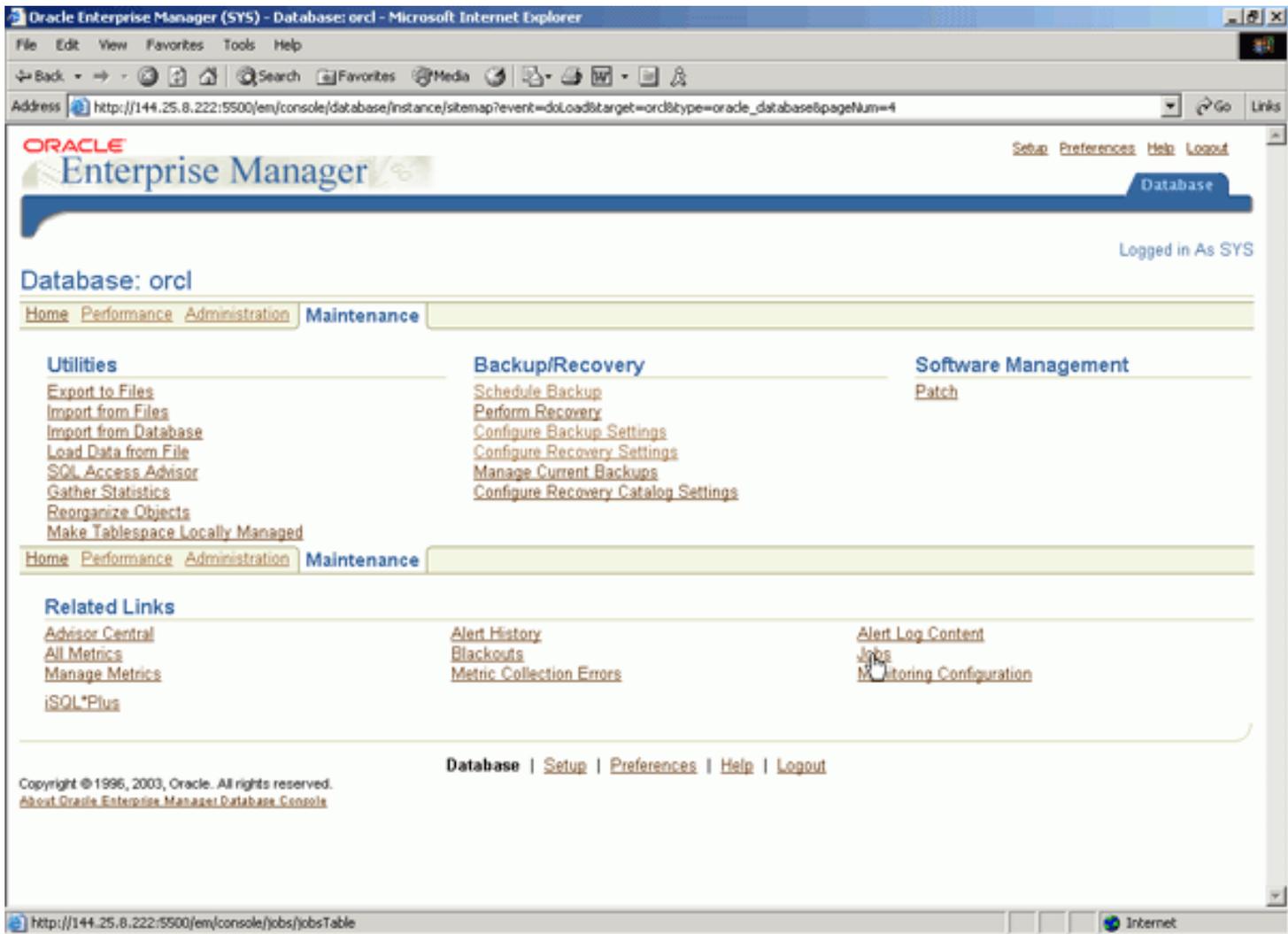
5. Review the **Review** page, then click **Submit Job** .



6. Your backup job has been submitted. Click **OK** .



7. Click on **Jobs** in the Related Links section.



8. You can view the status of your backup job on the **Job Activity** page. Click on your Backup job.

The screenshot shows the Oracle Enterprise Manager (EM) console in Microsoft Internet Explorer. The page title is "Oracle Enterprise Manager (SYS) - Job Activity". The address bar shows the URL: `http://144.25.8.226:5500/em/console/jobs/jobsTable`. The page content includes a search bar with "All" selected, a "Go" button, and a "TIP" indicating that entering "backup" will return all jobs with a name starting with "backup". There are also buttons for "Delete", "Stop", "Retry", "Suspend", "Resume", "Create Like", "Edit", and "View". A table lists the job activity:

Select	Name	Job Type	Status	Owner	Scheduled	Ended
<input type="checkbox"/>	<a href="#">BACKUP_ORCL.US.ORACLE.COM_000003</a>	Backup	Running	SYS	22-SEP-2003 02:00:00 -07:00	

At the bottom of the page, there is a copyright notice: "Copyright ©1996, 2003, Oracle. All rights reserved. About Oracle Enterprise Manager Database Console". The status bar at the bottom of the browser shows the URL: `http://144.25.8.226:5500/em/console/jobs/results?execId=C7F4F4C29D36E179E030007F01007E95&jobName=BACKUP_ORCL.US.ORACLE.COM_0000`.

9. Then scroll down and click on the **Backup** log.

Oracle Enterprise Manager (SYS) - Job: BACKUP\_ORCL.US.ORACLE.COM\_000003 - Microsoft Internet Explorer

Address: http://144.25.8.226:5500/em/console/jobs/results?ctxType=ctxSummary&execId=C7F4F4C29D36E179E030007F01007E95

### Job: BACKUP\_ORCL.US.ORACLE.COM\_000003

Page Refreshed September 22, 2003 6:18:16 PM PDT [Delete](#) [Edit](#)

#### Summary

The Stop and Suspend operations will wait for the current step to complete. A suspended job can be resumed later, at the next step. [Stop](#) [Suspend](#)

Status	<b>Running</b>	Type	<b>Backup</b>
Scheduled	22-SEP-2003 02:00:00 -07:00	Owner	<b>SYS</b>
Started	22-SEP-2003 18:17:04 -07:00	Description	<b>Backup Job:</b>
Start Delayed	16:17:04 hours	backup_strategy	<b>basic</b>
Running Time	1:11 minutes	daily_backup_script	<b>run [ allocate channel oem_disk_backup device type disk; recove...</b>
Repeating	<b>Daily</b>	db_10_or_higher	<b>YES</b>
	beginning Sep 22, 2003 2:00:00 AM	db_connect_string	<b>(DESCRIPTION=(ADDRESS_LIST=(ADDRESS=(PROTOCOL=TCP)(HOST=EDCDR26....</b>
		db_password	<b>*****</b>
		db_username	<b>SYS</b>
		device_type	<b>disk</b>
		host_password	<b>*****</b>
		host_username	<b>oracle</b>
		is_cold_backup	<b>NO</b>
		p_oracle_home	<b>[/oracle/ora10g]</b>
		p_oracle_sid	<b>[orcl]</b>
		use_rcvcat	<b>NO</b>

#### Logs

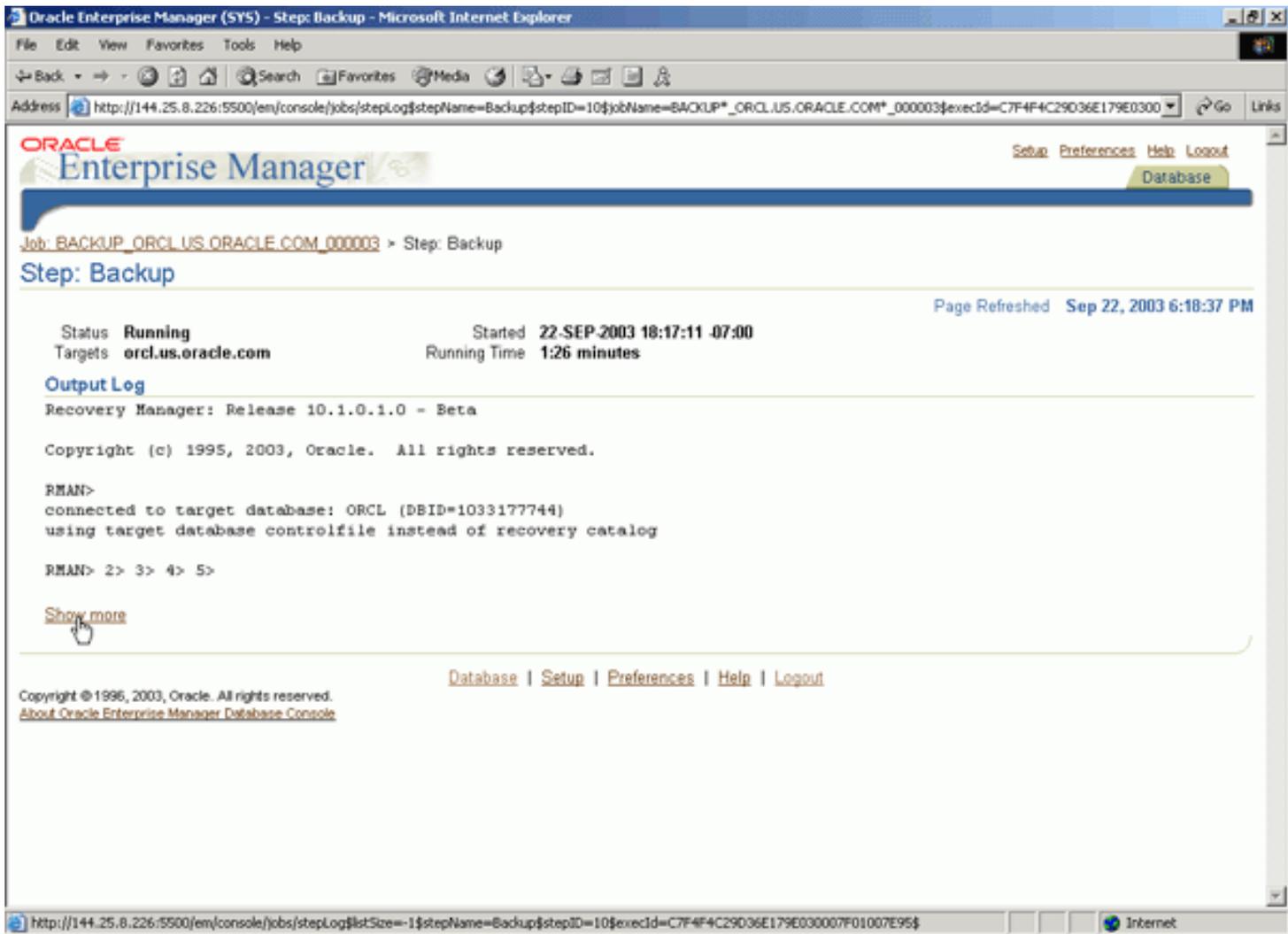
Search  [Go](#) [Advanced Search](#)

Name	Targets	Status	Started	Ended	Running (sec)
<a href="#">PreBackup</a>	orcl.us.oracle.com	Succeeded	22-SEP-2003 18:17:04 -07:00	22-SEP-2003 18:17:05 -07:00	1
<a href="#">Backup</a>	orcl.us.oracle.com	Running	22-SEP-2003 18:17:11 -07:00		64

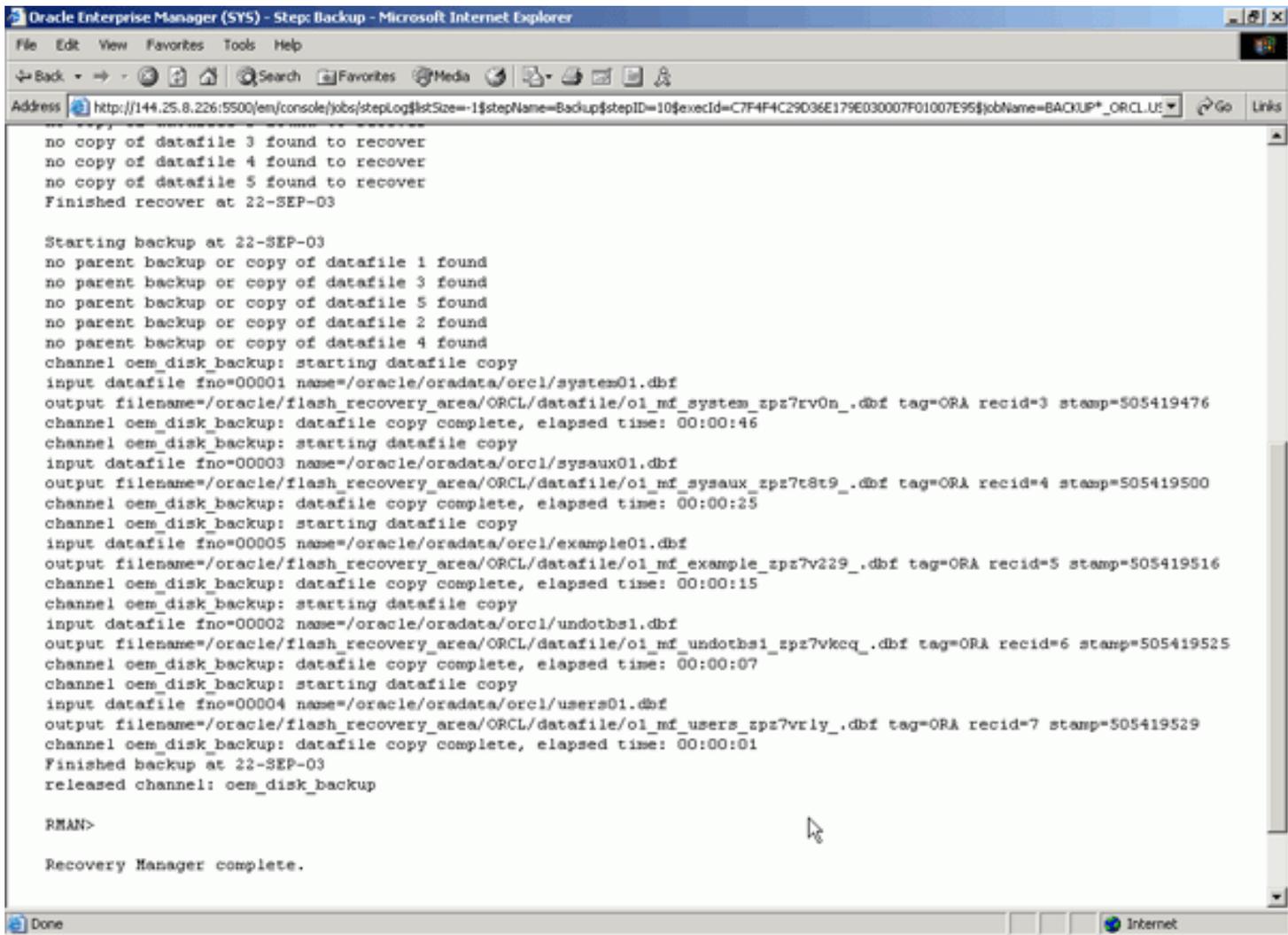
[Delete](#) [Edit](#)

Address: http://144.25.8.226:5500/em/console/jobs/stepLog?stepName=Backup&stepID=10&jobName=BACKUP\*\_ORCL.US.ORACLE.COM\*\_000003&execId=C7

10. Click on **Show More** .



11. You see what is currently in the log. You may need to click back and select the backup log again to see that the backup is progressing. When the backup is complete, scroll up to the top of the page.



The screenshot shows a web browser window titled "Oracle Enterprise Manager (SYS) - Step: Backup - Microsoft Internet Explorer". The address bar contains a URL: `http://144.25.8.226:5500/em/console/jobs/stepLog?stSize=-1&stepName=Backup&stepID=10&execId=C7F4C29D36E179E030007F01007E95&jobName=BACKUP*_ORCL.U...`. The main content area displays a log of database recovery and backup operations. The log starts with "no copy of datafile 3 found to recover", "no copy of datafile 4 found to recover", and "no copy of datafile 5 found to recover", followed by "Finished recover at 22-SEP-03". It then begins a backup process: "Starting backup at 22-SEP-03". The backup logs show that no parent backup or copy of datafiles 1, 3, 5, 2, and 4 were found. The backup proceeds with copying datafiles 1, 3, 5, 2, and 4. Each datafile copy is detailed with its input filename, output filename, tag, recid, and stamp. For example, datafile 1 (system01.dbf) is copied to `/oracle/flash_recovery_area/ORCL/datafile/01_mf_system_zpz7rv0n_.dbf` with tag=ORA, recid=3, and stamp=505419476. The backup finishes at 22-SEP-03, and the channel is released. The prompt "RMAN>" is shown, followed by "Recovery Manager complete."

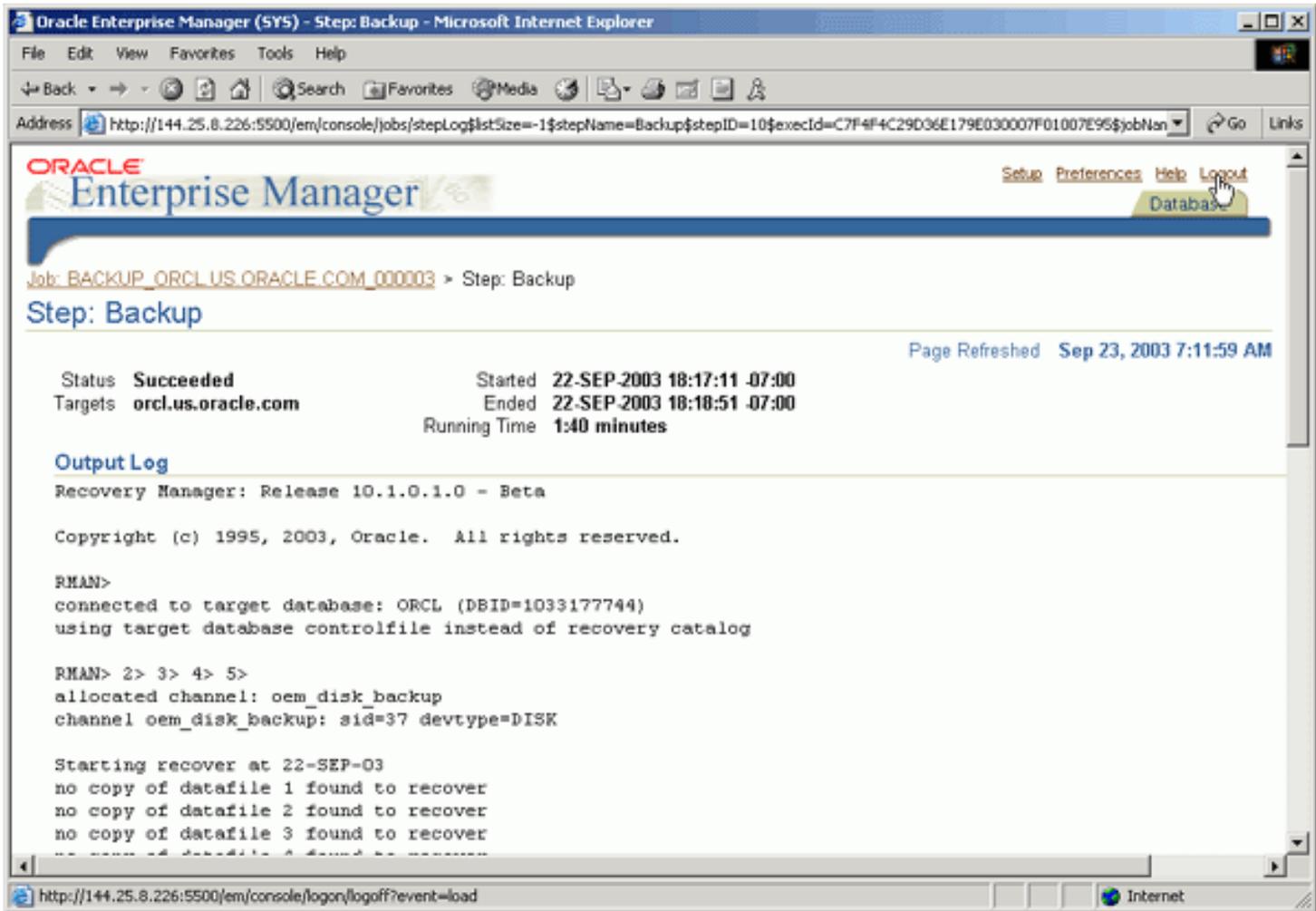
```
no copy of datafile 3 found to recover
no copy of datafile 4 found to recover
no copy of datafile 5 found to recover
Finished recover at 22-SEP-03

Starting backup at 22-SEP-03
no parent backup or copy of datafile 1 found
no parent backup or copy of datafile 3 found
no parent backup or copy of datafile 5 found
no parent backup or copy of datafile 2 found
no parent backup or copy of datafile 4 found
channel oem_disk_backup: starting datafile copy
input datafile fno=00001 name=/oracle/oradata/orcl/system01.dbf
output filename=/oracle/flash_recovery_area/ORCL/datafile/01_mf_system_zpz7rv0n_.dbf tag=ORA recid=3 stamp=505419476
channel oem_disk_backup: datafile copy complete, elapsed time: 00:00:46
channel oem_disk_backup: starting datafile copy
input datafile fno=00003 name=/oracle/oradata/orcl/sysaux01.dbf
output filename=/oracle/flash_recovery_area/ORCL/datafile/01_mf_sysaux_zpz7t8t9_.dbf tag=ORA recid=4 stamp=505419500
channel oem_disk_backup: datafile copy complete, elapsed time: 00:00:25
channel oem_disk_backup: starting datafile copy
input datafile fno=00005 name=/oracle/oradata/orcl/example01.dbf
output filename=/oracle/flash_recovery_area/ORCL/datafile/01_mf_example_zpz7v229_.dbf tag=ORA recid=5 stamp=505419516
channel oem_disk_backup: datafile copy complete, elapsed time: 00:00:15
channel oem_disk_backup: starting datafile copy
input datafile fno=00002 name=/oracle/oradata/orcl/undotbs1.dbf
output filename=/oracle/flash_recovery_area/ORCL/datafile/01_mf_undotbs1_zpz7vkcq_.dbf tag=ORA recid=6 stamp=505419525
channel oem_disk_backup: datafile copy complete, elapsed time: 00:00:07
channel oem_disk_backup: starting datafile copy
input datafile fno=00004 name=/oracle/oradata/orcl/users01.dbf
output filename=/oracle/flash_recovery_area/ORCL/datafile/01_mf_users_zpz7vriy_.dbf tag=ORA recid=7 stamp=505419529
channel oem_disk_backup: datafile copy complete, elapsed time: 00:00:01
Finished backup at 22-SEP-03
released channel: oem_disk_backup

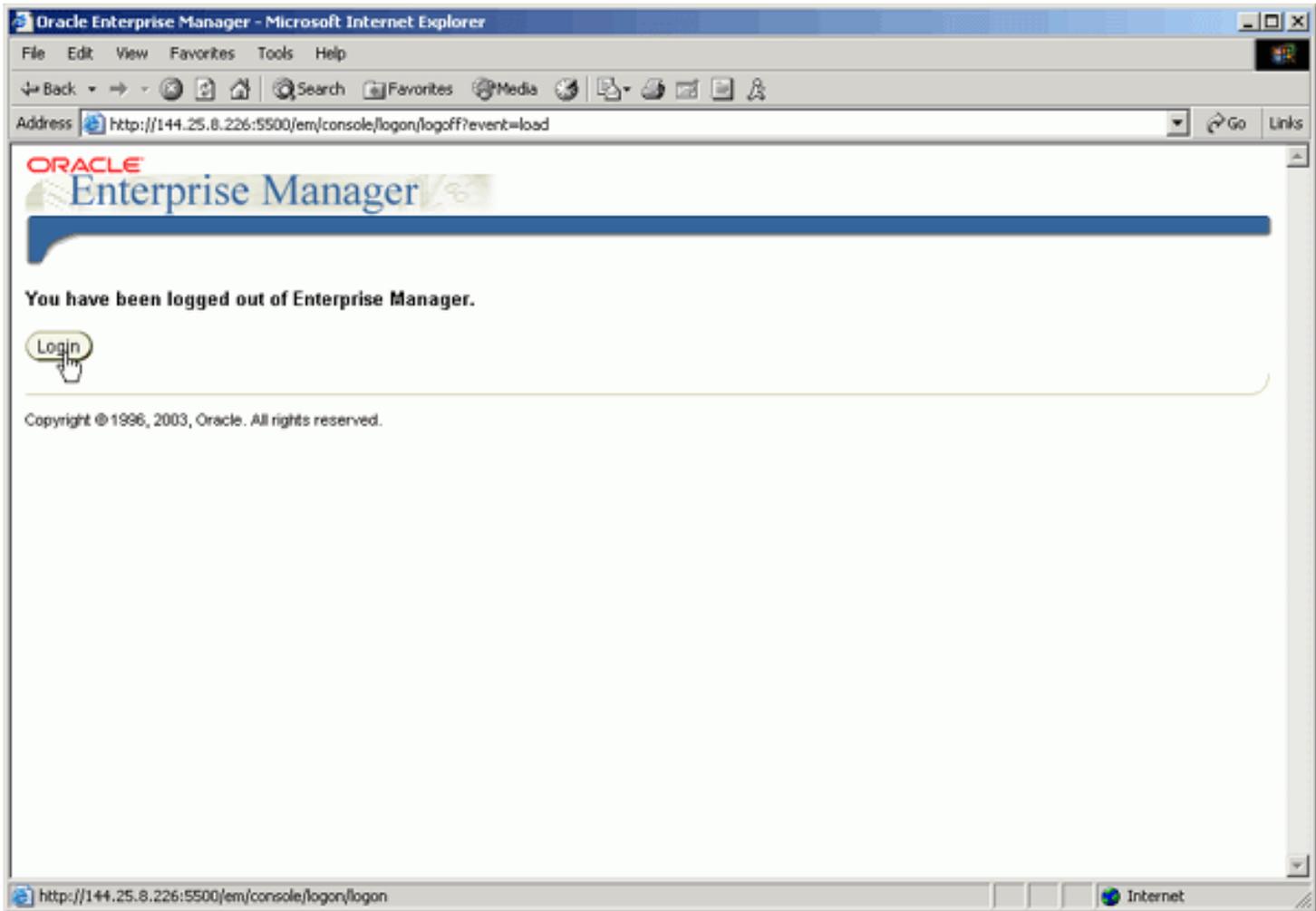
RMAN>

Recovery Manager complete.
```

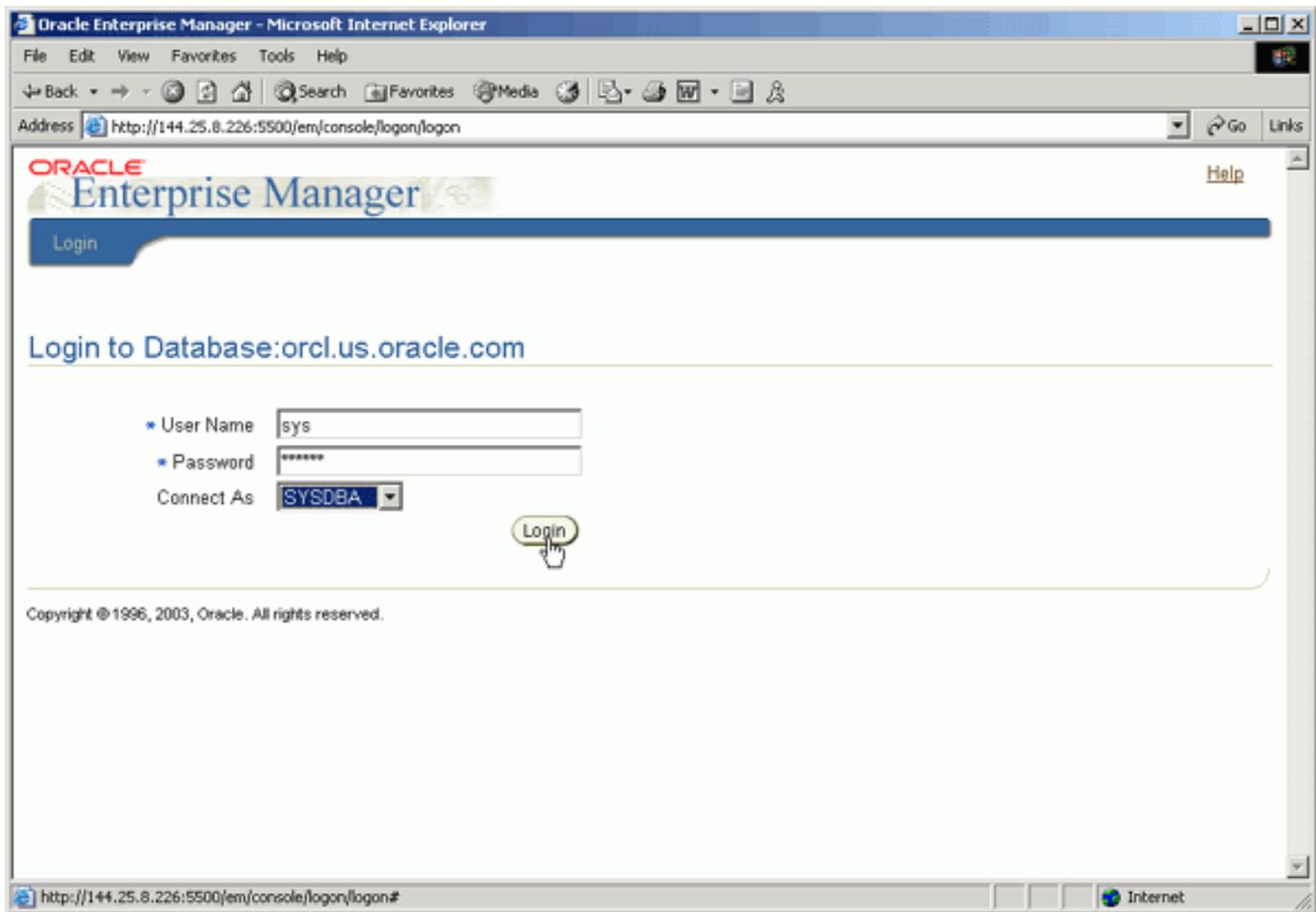
## 12. Click Logout .



13. Click **Login** .



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



## Performing Recovery of a Datafile

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You can easily recover a datafile or your entire database through Enterprise Manager.

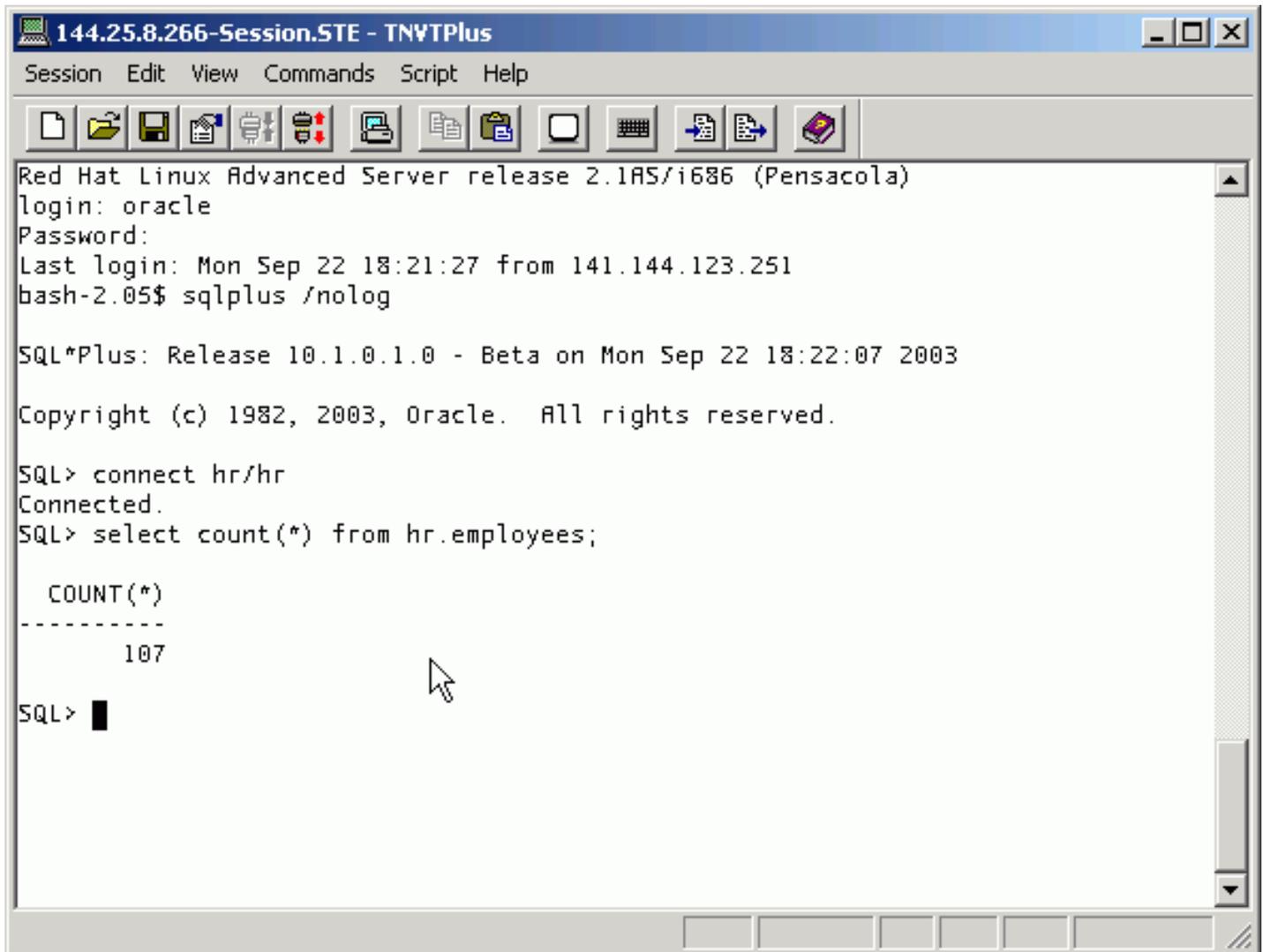
You can use the Flashback Database feature to quickly revert an Oracle database to the state it was in at a previous time without restoring datafiles and performing media recovery. You can use Enterprise Manager or the FLASHBACK DATABASE command to flashback your database.

The Simplified Recovery Through Resetlogs feature is an enhancement to recovery operations so that previous incarnation backups can be used for recovery of the current database incarnation. You no longer need to take a whole database backup after a RESETLOGS operation before you open the database for production use.

In this section you will recover a datafile through Enterprise Manager. You will simulate the loss of a datafile by deleting a datafile from an open database. Perform the steps listed below to simulate the loss of a datafile in your database and recover the datafile:

1. Invoke SQL\*Plus and connect as the HR user. Query the EMPLOYEES table as follows:

```
sqlplus /nolog
connect hr/hr@orcl
SELECT count(*) FROM hr.employees;
exit
```

A screenshot of a terminal window titled "144.25.8.266-Session.STE - TNVTPPlus". The window has a menu bar with "Session", "Edit", "View", "Commands", "Script", and "Help". Below the menu bar is a toolbar with various icons. The terminal content shows the following sequence of commands and output:

```
Red Hat Linux Advanced Server release 2.1AS/i686 (Pensacola)
login: oracle
Password:
Last login: Mon Sep 22 18:21:27 from 141.144.123.251
bash-2.05$ sqlplus /nolog

SQL*Plus: Release 10.1.0.1.0 - Beta on Mon Sep 22 18:22:07 2003

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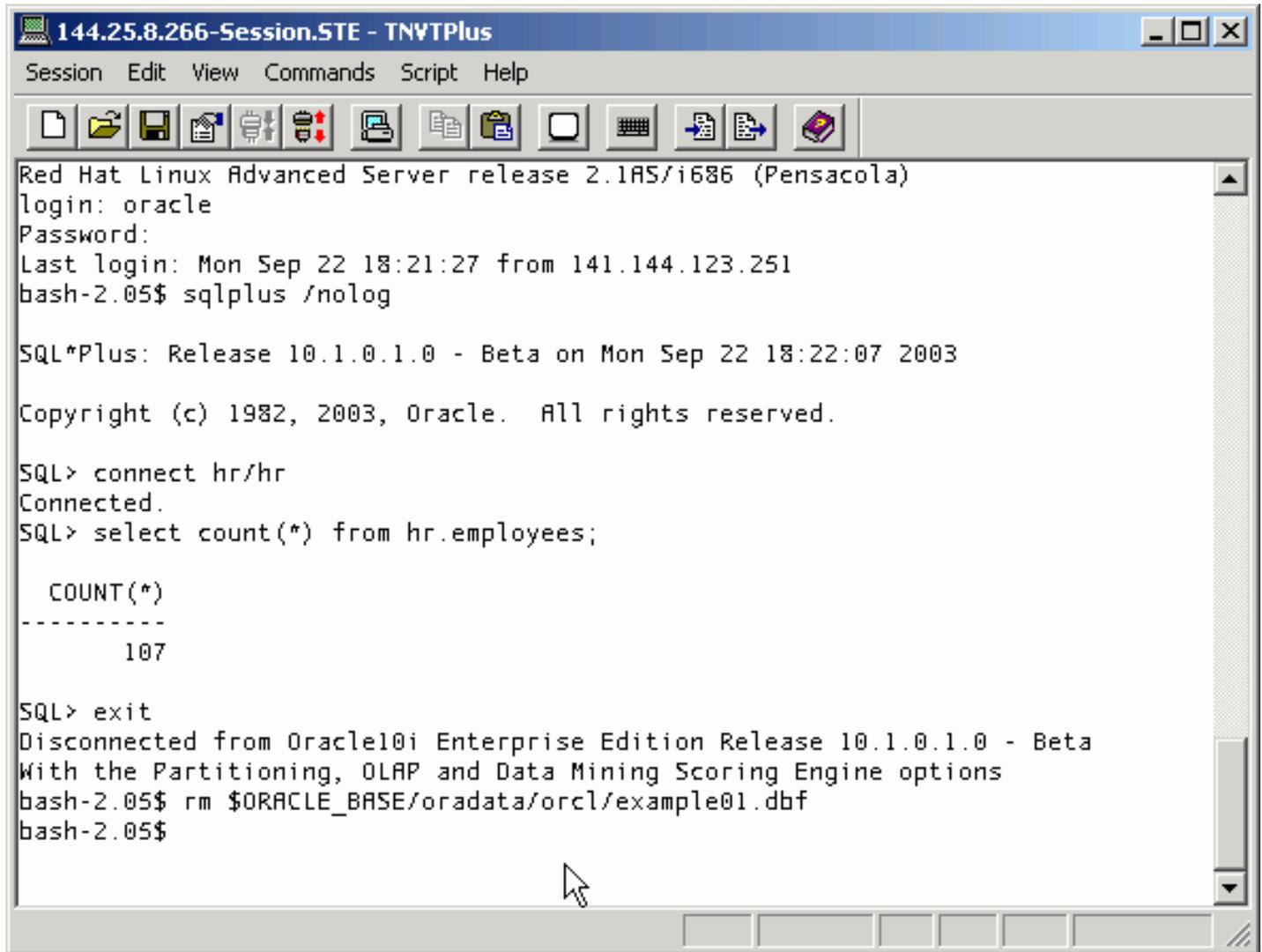
SQL> connect hr/hr
Connected.
SQL> select count(*) from hr.employees;

  COUNT(*)
-----
         107

SQL> █
```

- The `EMPLOYEES` table is stored in the `EXAMPLE` tablespace. The `EXAMPLE` tablespace is comprised of the `example01.dbf` data file. Simulate the loss of the `example01.dbf` data file by issuing the following command at the operating system prompt:

```
rm $ORACLE_BASE/oradata/orcl/example01.dbf
```



The screenshot shows a terminal window titled "144.25.8.266-Session.STE - TNVTPlus". The window contains the following text:

```
Red Hat Linux Advanced Server release 2.1AS/i686 (Pensacola)
login: oracle
Password:
Last login: Mon Sep 22 18:21:27 from 141.144.123.251
bash-2.05$ sqlplus /nolog

SQL*Plus: Release 10.1.0.1.0 - Beta on Mon Sep 22 18:22:07 2003

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

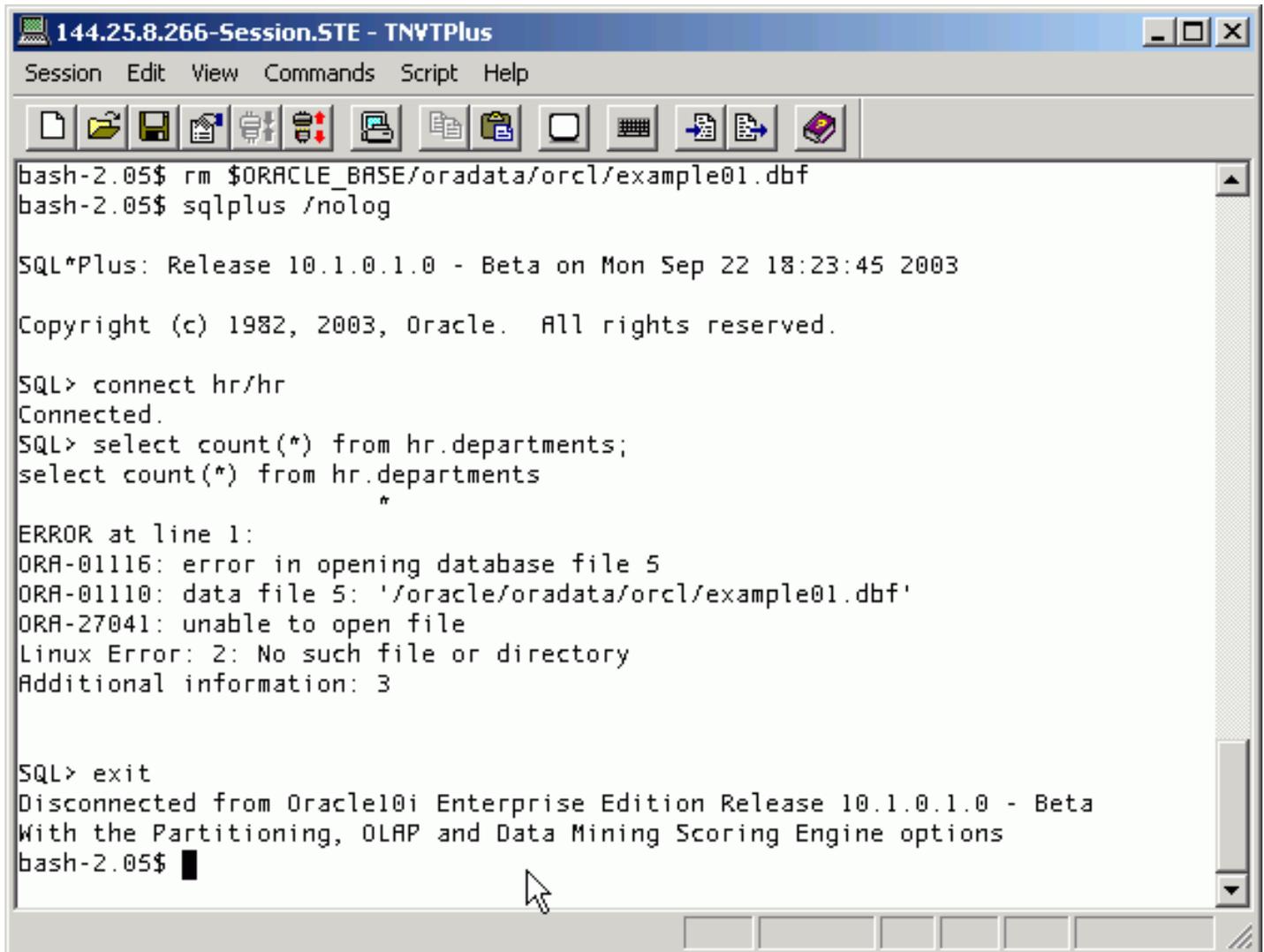
SQL> connect hr/hr
Connected.
SQL> select count(*) from hr.employees;

   COUNT(*)
-----
         107

SQL> exit
Disconnected from Oracle10i Enterprise Edition Release 10.1.0.1.0 - Beta
With the Partitioning, OLAP and Data Mining Scoring Engine options
bash-2.05$ rm $ORACLE_BASE/oradata/orcl/example01.dbf
bash-2.05$
```

3. Verify the loss of the `example01.dbf` data file. Connect to your database using SQL\*Plus as the HR user. Issue the following query against the `DEPARTMENTS` table:

```
sqlplus /nolog
connect hr/hr@orcl
SELECT count(*) FROM hr.departments;
exit
```



The screenshot shows a terminal window titled "144.25.8.266-Session.STE - TNYTPlus". The terminal displays the following sequence of commands and output:

```
bash-2.05$ rm $ORACLE_BASE/oradata/orcl/example01.dbf
bash-2.05$ sqlplus /nolog

SQL*Plus: Release 10.1.0.1.0 - Beta on Mon Sep 22 18:23:45 2003
Copyright (c) 1982, 2003, Oracle. All rights reserved.

SQL> connect hr/hr
Connected.
SQL> select count(*) from hr.departments;
select count(*) from hr.departments
*
ERROR at line 1:
ORA-01116: error in opening database file 5
ORA-01110: data file 5: '/oracle/oradata/orcl/example01.dbf'
ORA-27041: unable to open file
Linux Error: 2: No such file or directory
Additional information: 3

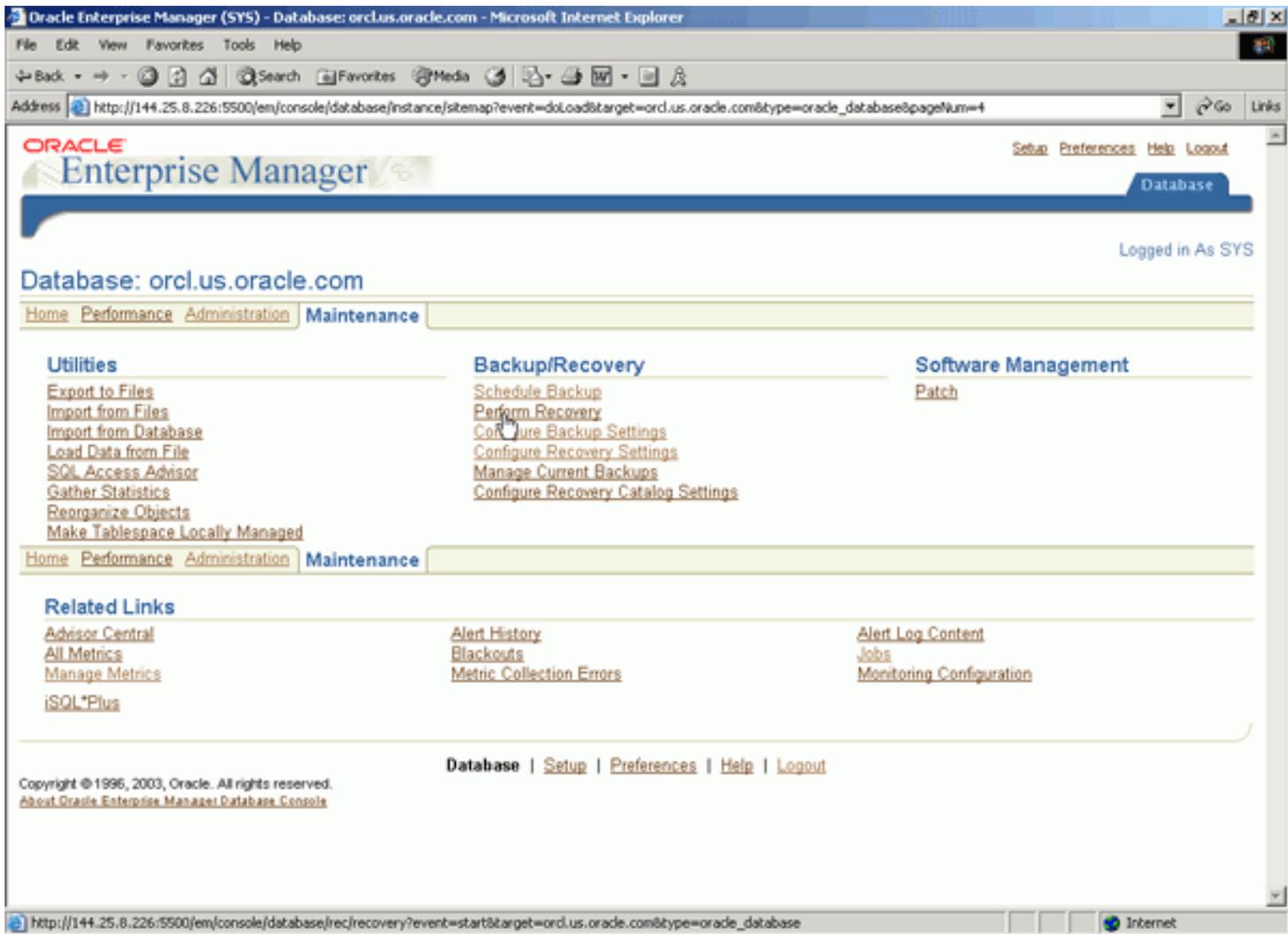
SQL> exit
Disconnected from Oracle10i Enterprise Edition Release 10.1.0.1.0 - Beta
With the Partitioning, OLAP and Data Mining Scoring Engine options
bash-2.05$ █
```

- You will now use Enterprise Manager to recover your datafile. Switch back to Enterprise Manager. Click on the **Maintenance** tab.

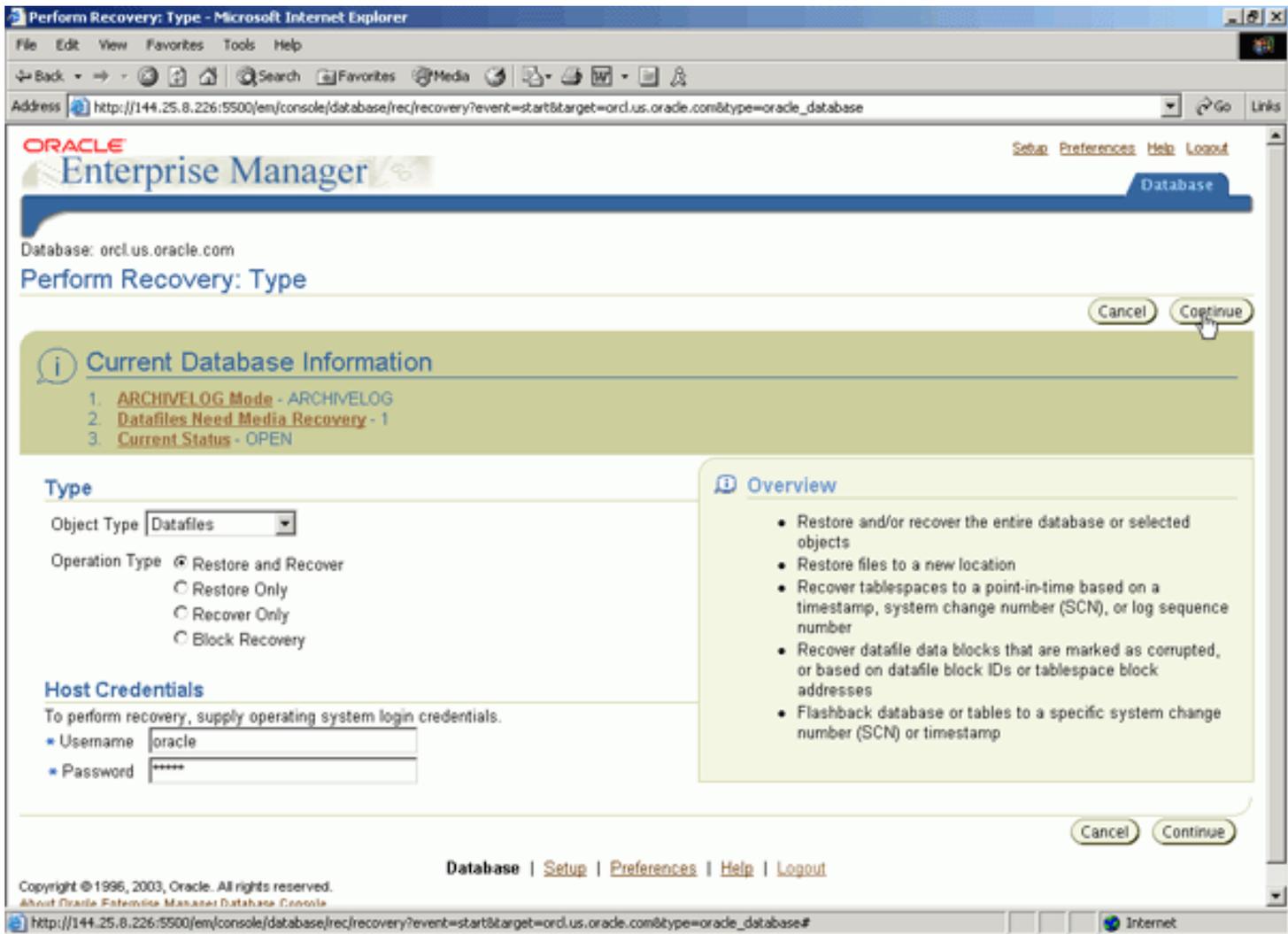
The screenshot shows the Oracle Enterprise Manager (EM) console for a database named 'orcl'. The interface includes a navigation menu with 'Home', 'Performance', 'Administration', and 'Maintenance' tabs. The 'Maintenance' tab is currently selected. The main content area displays several key performance indicators (KPIs) and status reports:

- General:** Status is 'Up', up since 'Sep 19, 2003 9:28:32 AM'. Availability is 3.66% (Last 24 hours). Instance Name is 'orcl', Version is '10.1.0.1.0', Host is 'EDCDR22P1', Listener is 'LISTENER\_EDCDR22P1', Oracle Home is '/oracle/ora10g', and Alert Log shows 'No ORA- errors'.
- Host CPU:** A bar chart shows CPU usage for 'orcl' (purple) and 'Other' (blue). The 'orcl' bar is at 100%. Run Queue is 2.96, and Paging is 'Unavailable'.
- Active Sessions:** A pie chart shows session distribution: 'Using CPU (0.99%)', 'Waiting: I/O (0.13%)', and 'Waiting: Other (99%)'. There is 1 Active Session and an SQL Response Time of 247.34% (compared to baseline).
- Space Usage:** 1 Problem, Tablespaces 'Not Configured', and Dump Area Used at 77%.
- Advice:** 2 ADDM Findings and 2 Policy Violations.
- High Availability:** Instance Recovery Time is 13 seconds. Last Backup is 'Sep 19, 2003 9:38:02 AM' (Successful). Archiving is 'Disabled', Archive Area Used is 'n/a', and Flashback Logging is 'Enabled'.
- Job Activity:** 1 Scheduled Execution, 0 Running Executions, 0 Suspended Executions, and 2 Problem Executions (Last 7 days).

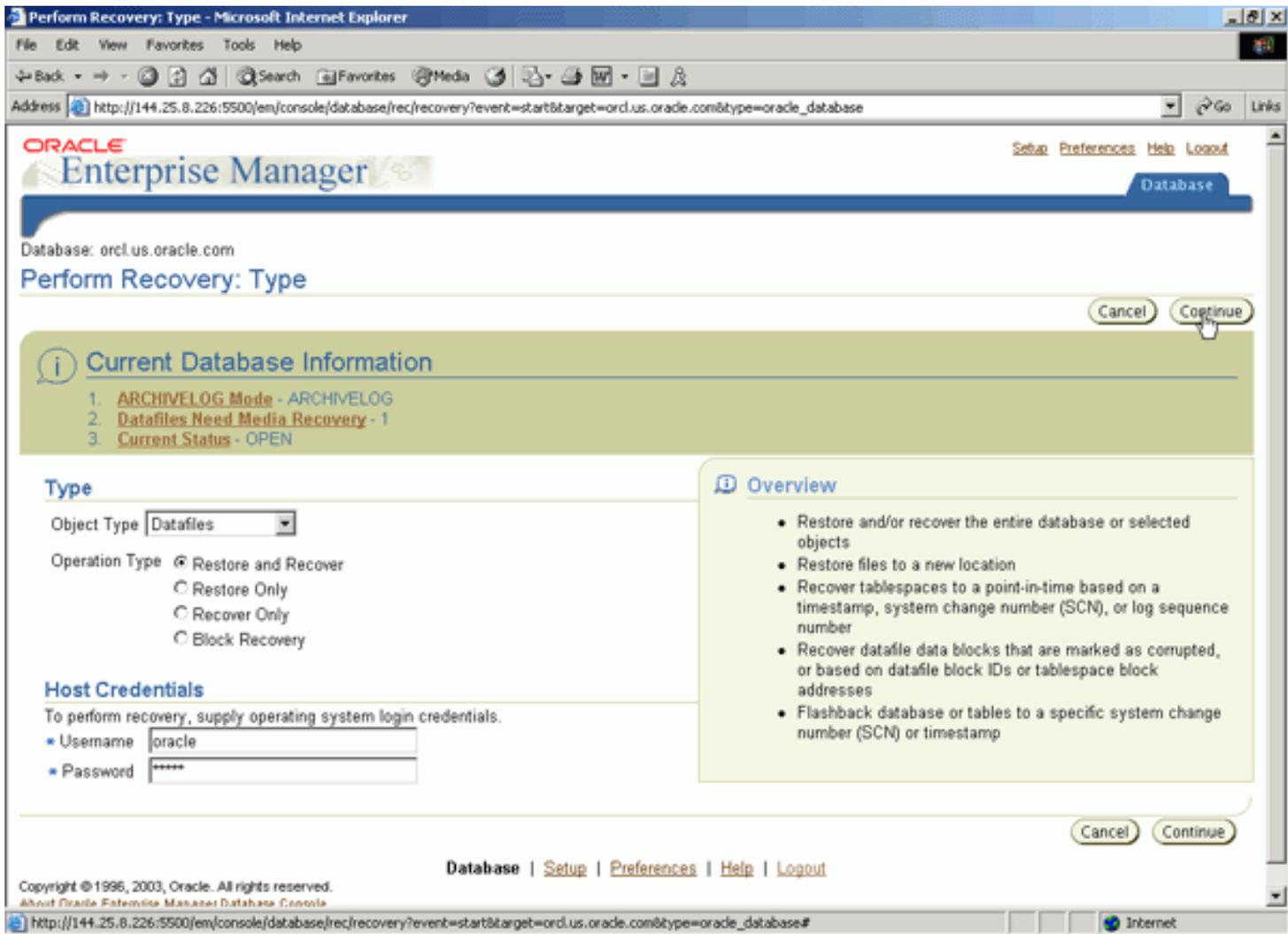
- Click on **Perform Recovery** in the Backup/Recovery section.



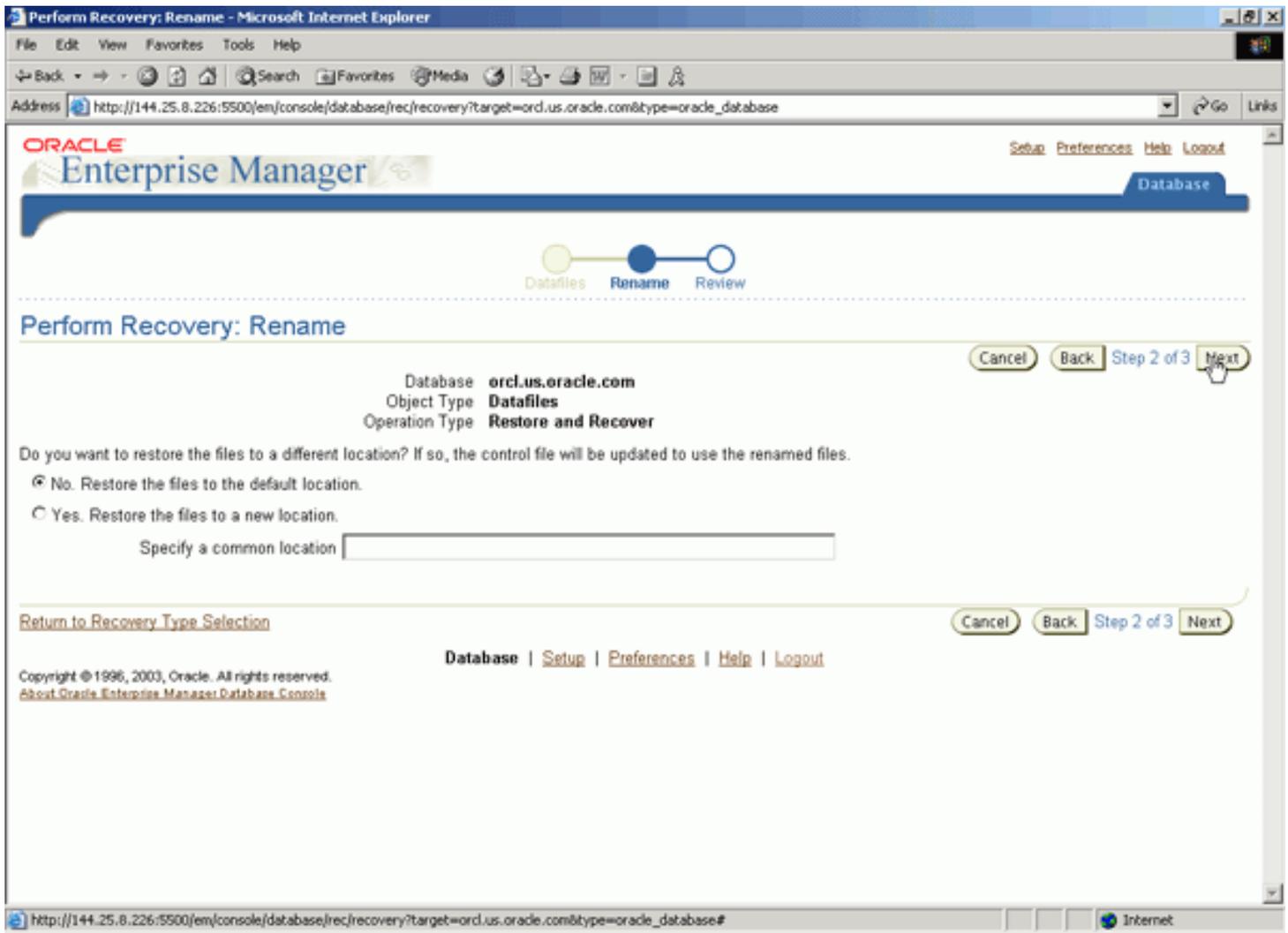
6. Notice the indication that one datafile needs recovery in the Current Database Information section. Select **Restore and Recover** . In the Host Credentials section enter **oracle/URin2** and click **Continue** .



7. Select the `/oracle/oradata/orcl/example01.dbf` datafile checkbox and click **Next** .



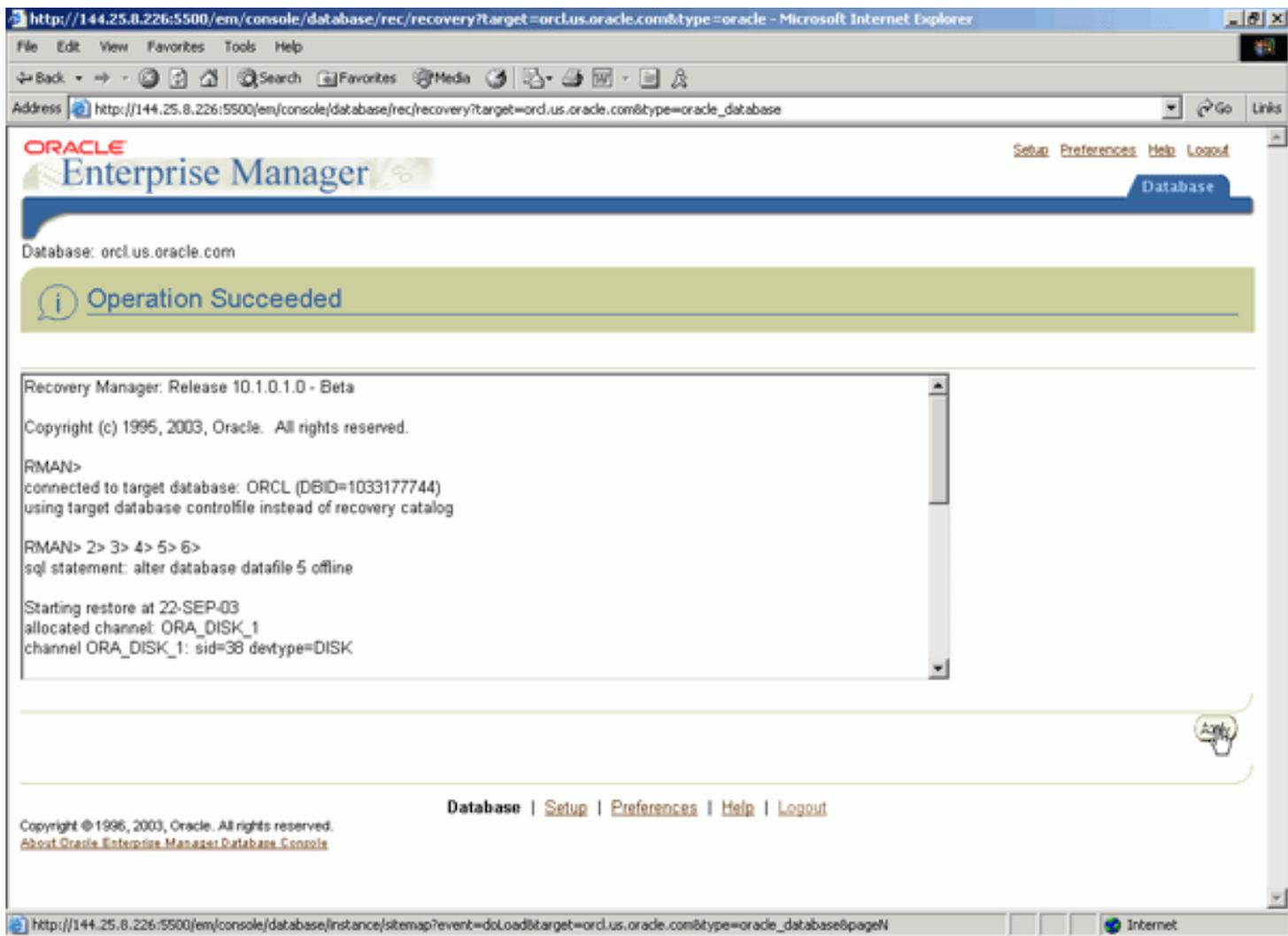
8. Restore the datafile to its original location by selecting: **No. Restore the files to the default location** . Click **Next** .



9. Review the recovery job you are about to submit. Click **Submit** .



10. View the **Operation Succeeded** page. Click **OK** .



11. You will now verify the recovery. Invoke SQL\*Plus in your terminal window. Connect as the HR user to the `orcl` database. Query the `DEPARTMENTS` table again.

```
sqlplus /nolog
connect hr/hr@orcl
SELECT count(*) FROM hr.departments;
exit
```

The screenshot shows a terminal window titled "144.25.8.266-Session.STE - TNSPlus". The window contains the following text:

```

ORA-01110: data file 5: '/oracle/oradata/orcl/example01.dbf'
ORA-27041: unable to open file
Linux Error: 2: No such file or directory
Additional information: 3

SQL> exit
Disconnected from Oracle10i Enterprise Edition Release 10.1.0.1.0 - Beta
With the Partitioning, OLAP and Data Mining Scoring Engine options
bash-2.05$ sqlplus /nolog

SQL*Plus: Release 10.1.0.1.0 - Beta on Mon Sep 22 18:28:53 2003

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

SQL> connect hr/hr
Connected.
SQL> select count(*) from hr.departments;

  COUNT(*)
-----
         27

SQL>

```

## Flashback of the Database

[Back to Topic List](#)

The Flashback Database feature provides a way for you to quickly revert your entire Oracle database to the state it was in at a past point in time. You can use Flashback Database to back out changes that have resulted in logical data corruption or are a result of user error. Flashback Database is faster than traditional point-in-time recovery using backups and redo log files. The time to restore a database is now proportional to the number of changes that need to be backed out, not the size of the database.

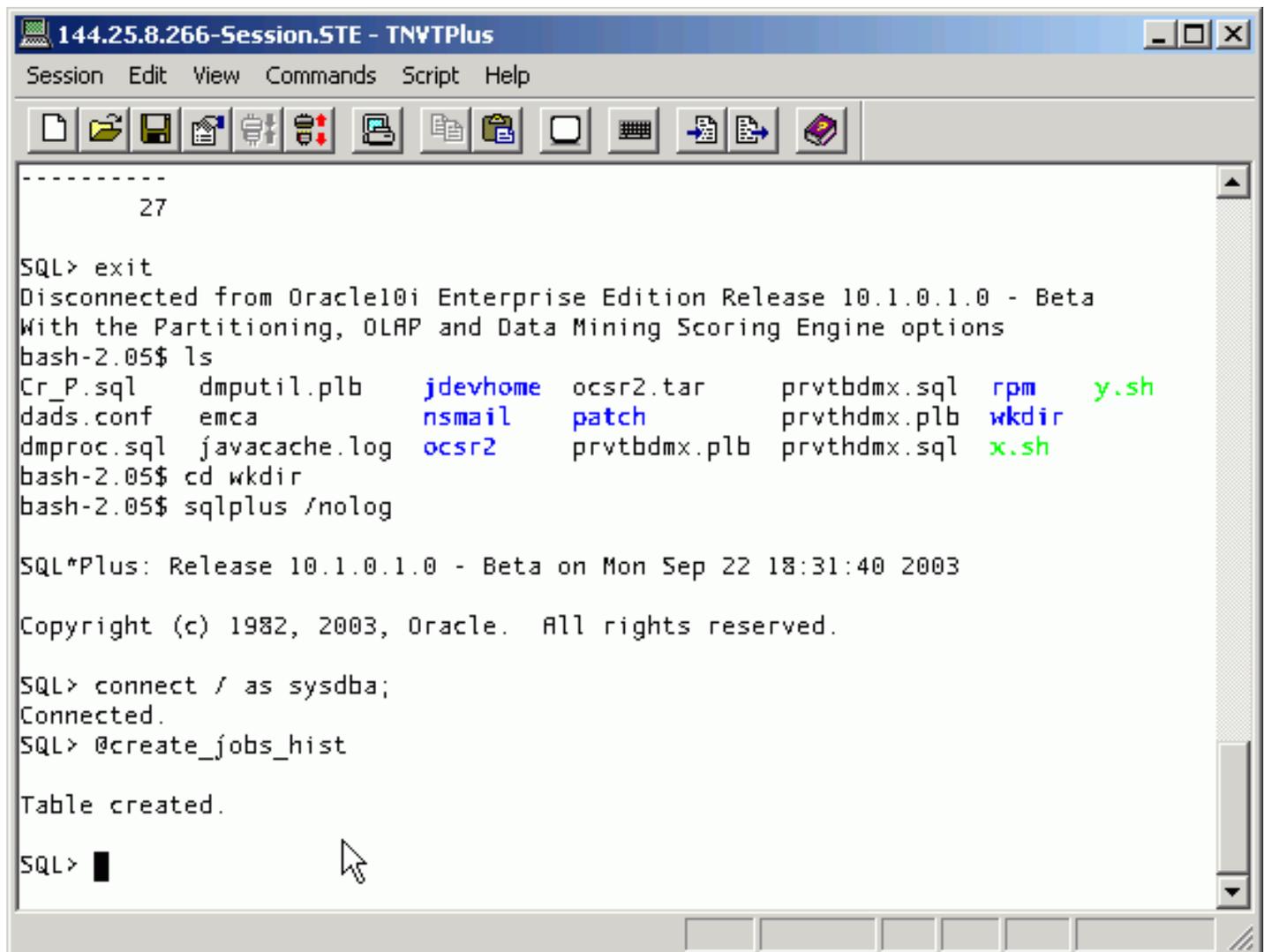
Flashback Database is implemented using a new type of log file called a Flashback Database log. Flashback Database logs contain data block images for changed blocks and other information that enables the operation. The data block images are used to quickly back out changes to the database during the Flashback Database operation.

When you request a flashback of the database, the Oracle database server uses the Flashback Database logs to back out changes. Perform the following steps:

1. Open a terminal window. Log in to SQL\*Plus as SYSDBA. Create the HR.JOBS\_HIST table by executing the CREATE\_JOBS\_HIST script as follows:

```
cd wkdir
sqlplus /nolog
connect / as sysdba
@CREATE_JOBS_HIST
```

```
SELECT count(*) FROM hr.jobs_hist;
```



The screenshot shows a terminal window with the following content:

```
-----
27

SQL> exit
Disconnected from Oracle10i Enterprise Edition Release 10.1.0.1.0 - Beta
With the Partitioning, OLAP and Data Mining Scoring Engine options
bash-2.05$ ls
Cr_P.sql      dmputil.plb      jdevhome  ocsr2.tar      prvtbdmx.sql  rpm      y.sh
dads.conf    emca              nsmail    patch          prvthdmx.plb  wkdir
dmproc.sql   javacache.log    ocsr2     prvtbdmx.plb  prvthdmx.sql  x.sh
bash-2.05$ cd wkdir
bash-2.05$ sqlplus /nolog

SQL*Plus: Release 10.1.0.1.0 - Beta on Mon Sep 22 18:31:40 2003

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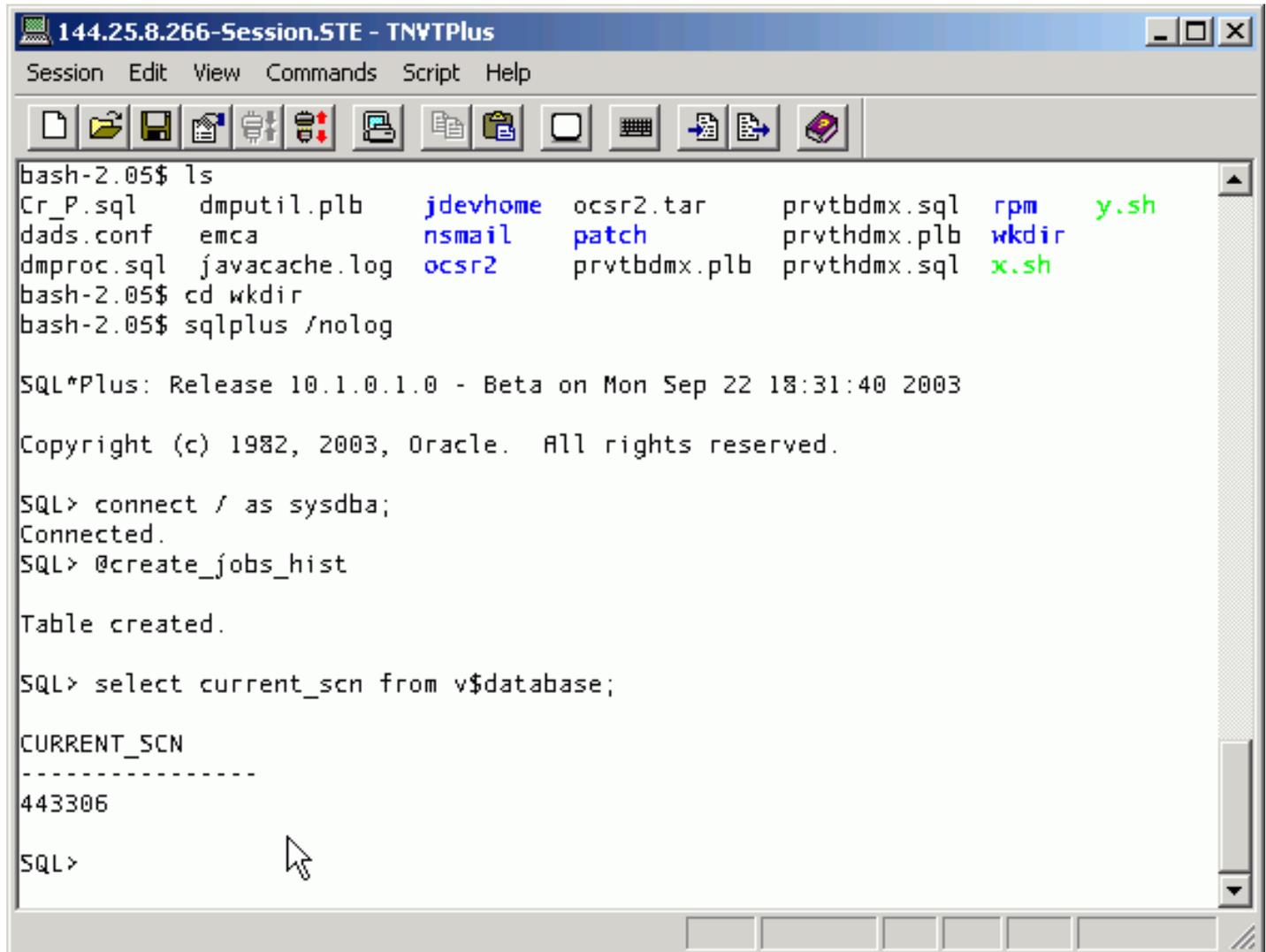
SQL> connect / as sysdba;
Connected.
SQL> @create_jobs_hist

Table created.

SQL> █
```

- Determine the current System Change Number (SCN) by issuing the following query. **Write down this number.**

```
SELECT current_scn FROM v$database;
```



The screenshot shows a terminal window titled "144.25.8.266-Session.STE - TNVTPlus". The terminal displays the following commands and output:

```
bash-2.05$ ls
Cr_P.sql      dmputil.plb   jdevhome     ocsr2.tar     prvtdmx.sql   rpm           y.sh
dads.conf     emca          nsmail       patch         prvthdmx.plb wkdir
dmproc.sql    javacache.log ocsr2        prvtdmx.plb   prvthdmx.sql  x.sh
bash-2.05$ cd wkdir
bash-2.05$ sqlplus /nolog

SQL*Plus: Release 10.1.0.1.0 - Beta on Mon Sep 22 18:31:40 2003

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

SQL> connect / as sysdba;
Connected.
SQL> @create_jobs_hist

Table created.

SQL> select current_scn from v$database;

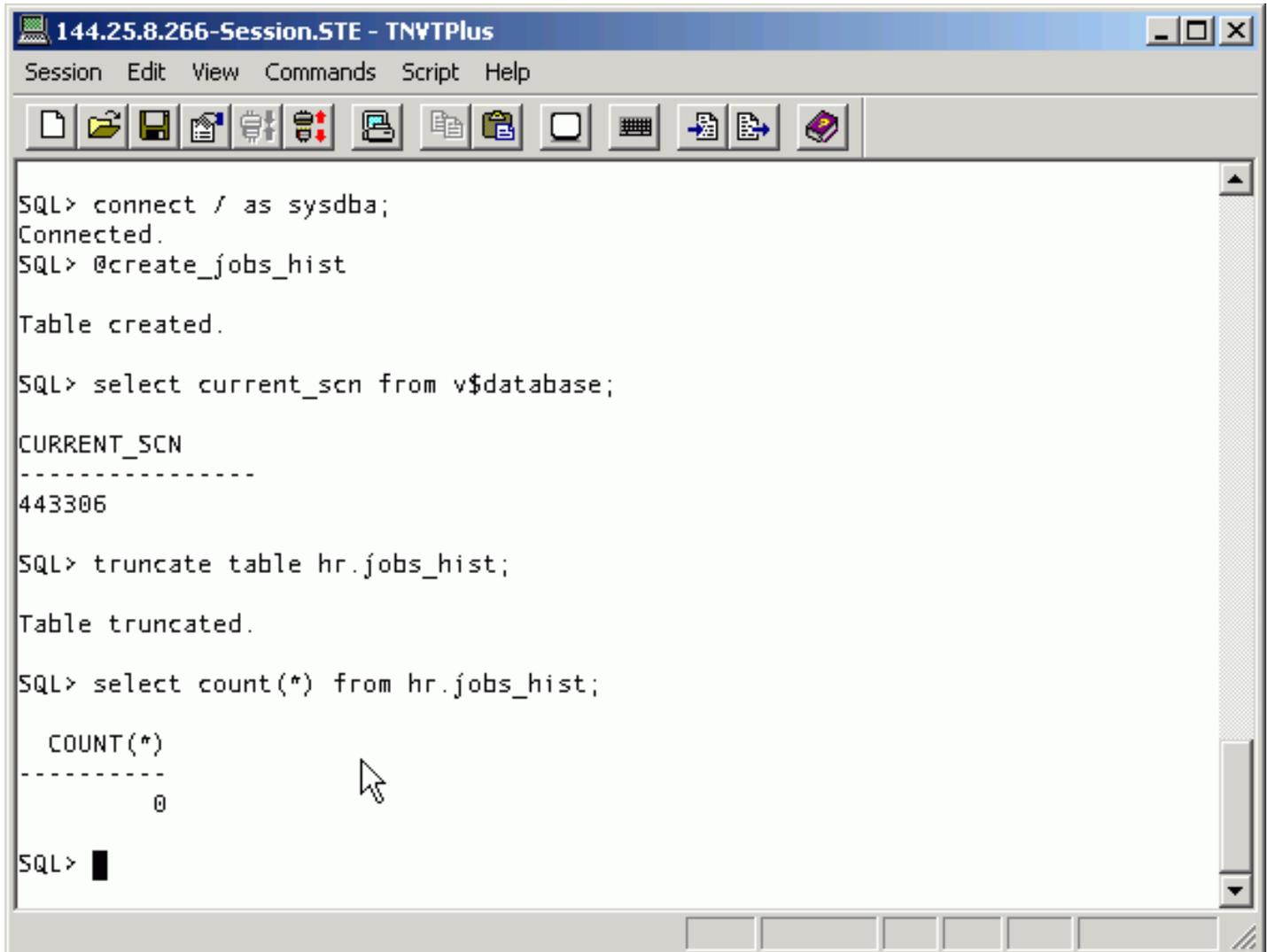
CURRENT_SCN
-----
443306

SQL>
```

3. Truncate the HR.JOBS\_HIST table to simulate user error.

```
TRUNCATE TABLE hr.jobs_hist;
```

```
SELECT count(*) FROM hr.jobs_hist;
```



```
SQL> connect / as sysdba;
Connected.
SQL> @create_jobs_hist

Table created.

SQL> select current_scn from v$database;

CURRENT_SCN
-----
443306

SQL> truncate table hr.jobs_hist;

Table truncated.

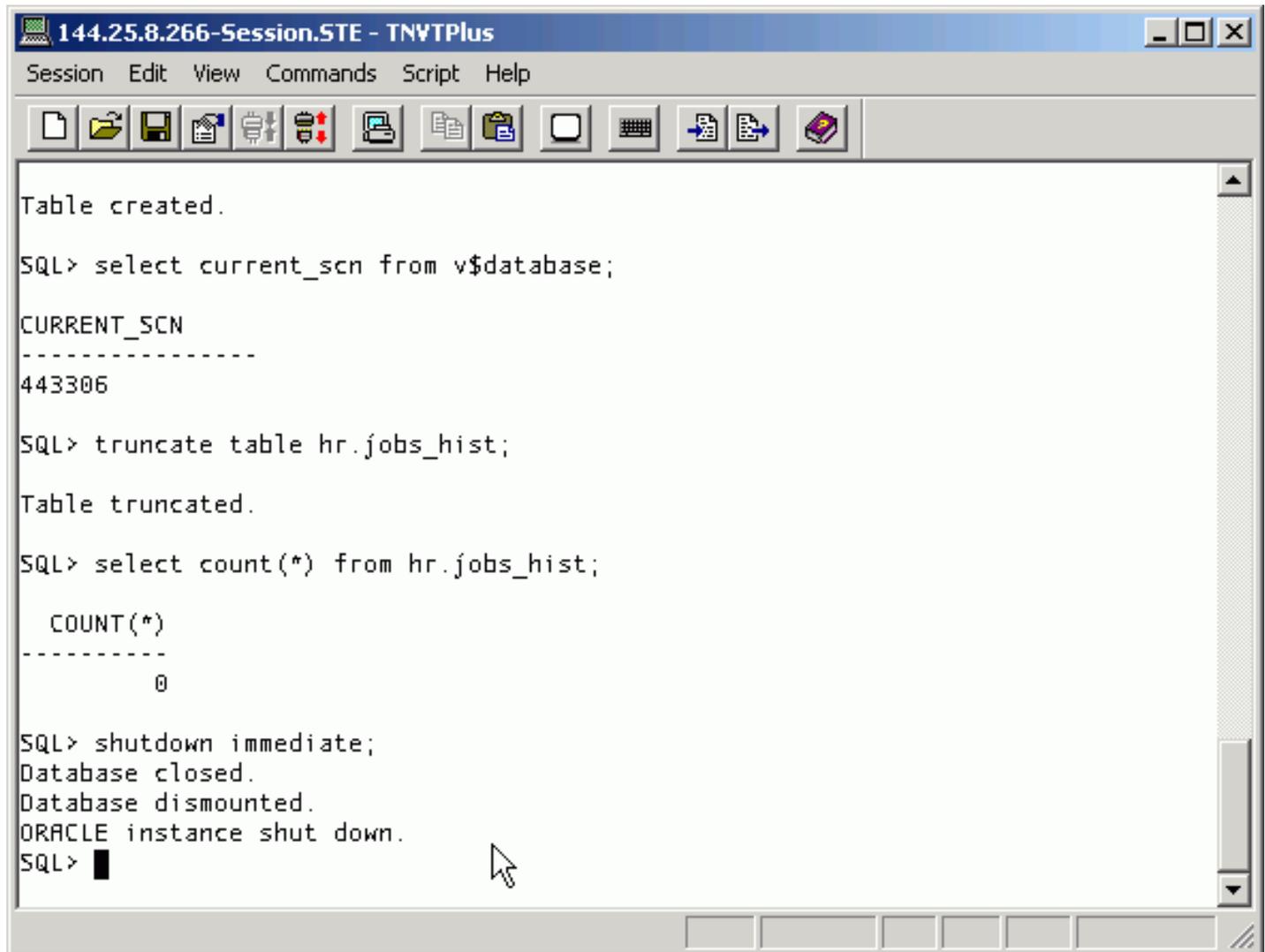
SQL> select count(*) from hr.jobs_hist;

  COUNT(*)
-----
         0

SQL> █
```

4. In preparation for Flashback Database, shut down your instance with the `IMMEDIATE` option:

### SHUTDOWN IMMEDIATE



The screenshot shows a terminal window titled "144.25.8.266-Session.STE - TNSPlus". The window contains the following text:

```
Table created.

SQL> select current_scn from v$database;

CURRENT_SCN
-----
443306

SQL> truncate table hr.jobs_hist;

Table truncated.

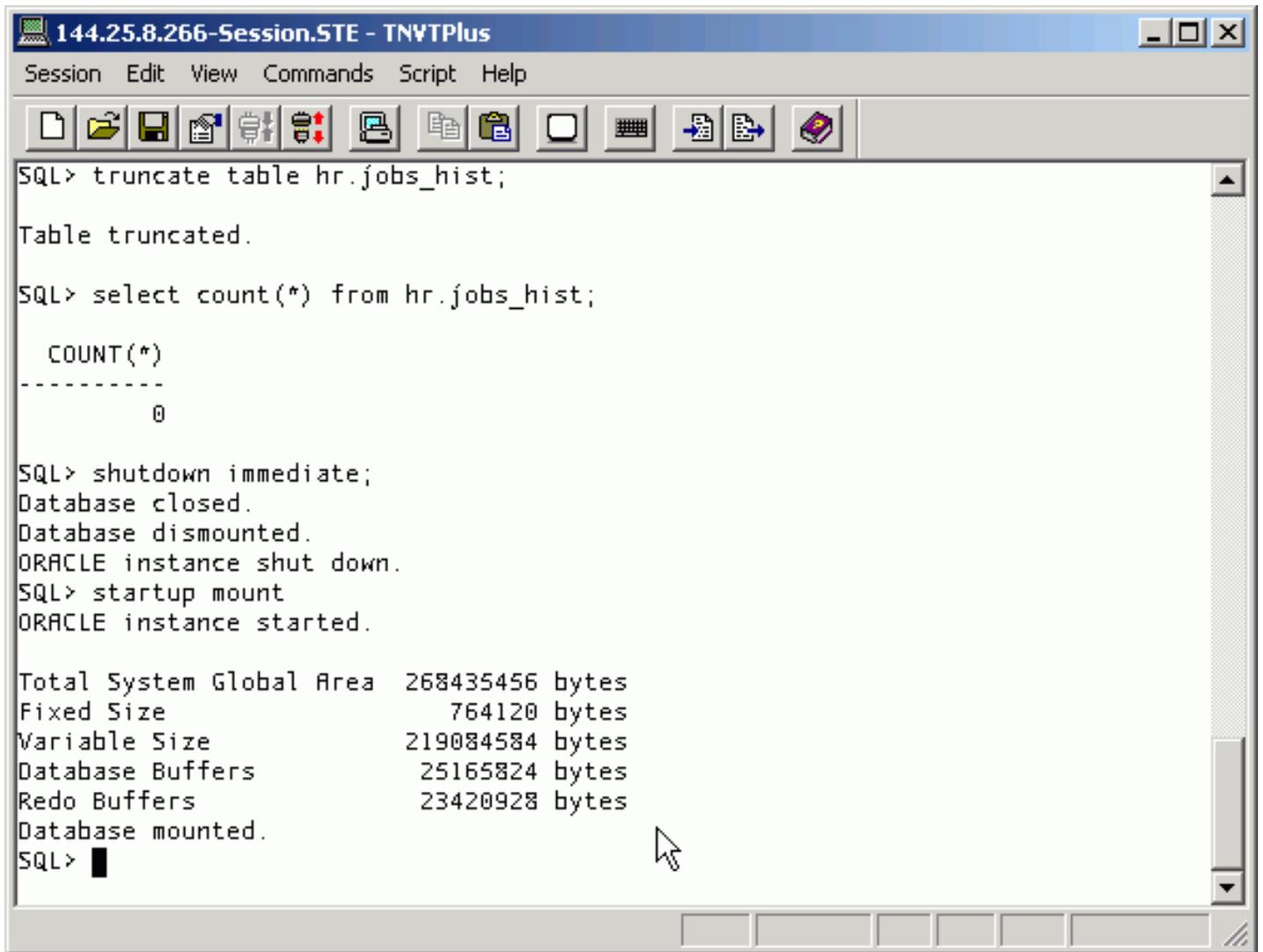
SQL> select count(*) from hr.jobs_hist;

  COUNT(*)
-----
         0

SQL> shutdown immediate;
Database closed.
Database dismounted.
ORACLE instance shut down.
SQL> █
```

5. In preparation for Flashback Database, start your instance and mount the database:

### STARTUP MOUNT



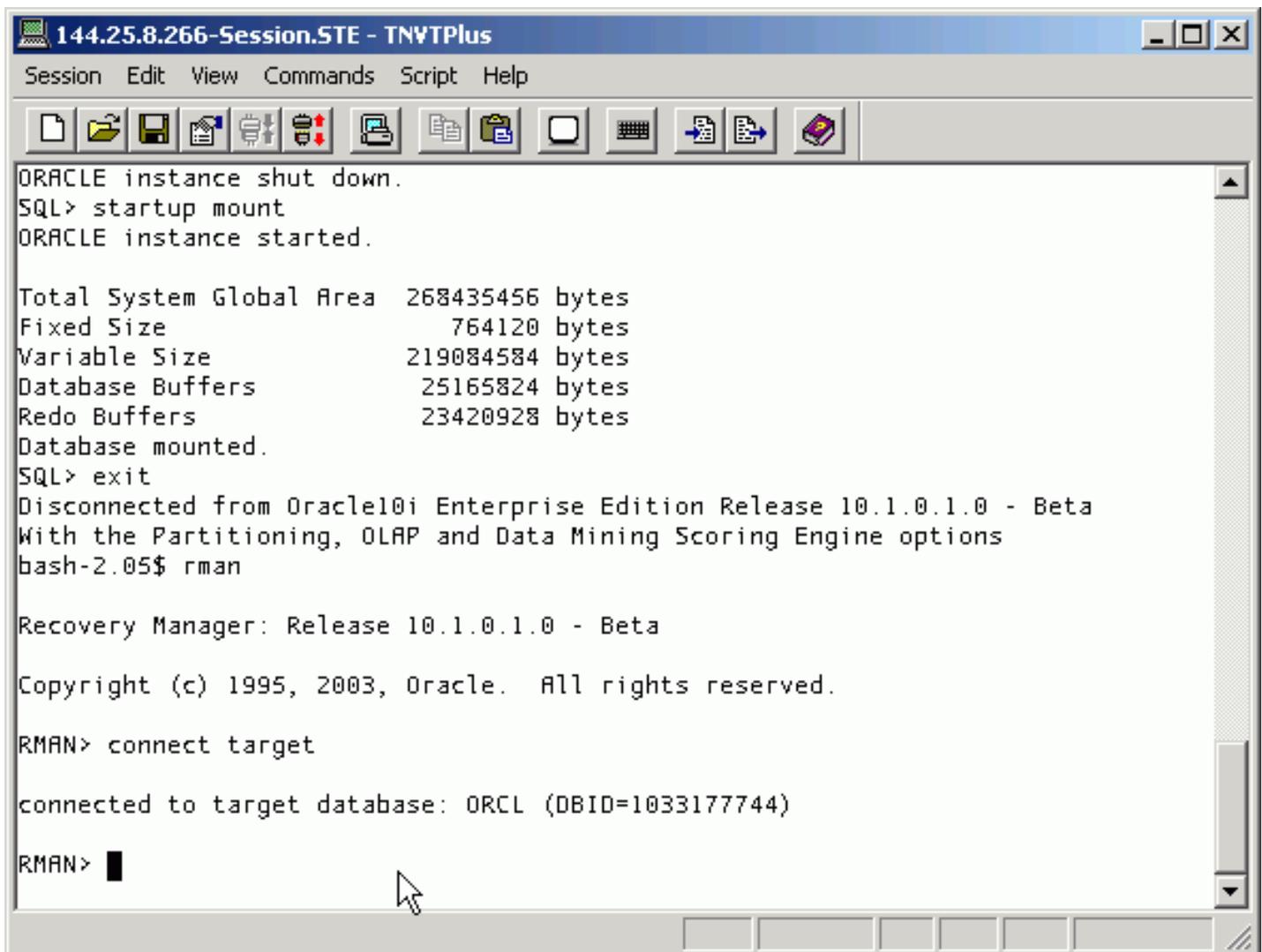
```
144.25.8.266-Session.STE - TNVTPPlus
Session Edit View Commands Script Help
SQL> truncate table hr.jobs_hist;
Table truncated.
SQL> select count(*) from hr.jobs_hist;
COUNT(*)
-----
0
SQL> shutdown immediate;
Database closed.
Database dismounted.
ORACLE instance shut down.
SQL> startup mount
ORACLE instance started.

Total System Global Area 268435456 bytes
Fixed Size 764120 bytes
Variable Size 219084584 bytes
Database Buffers 25165824 bytes
Redo Buffers 23420928 bytes
Database mounted.
SQL> █
```

- Exit from SQL\*Plus. Invoke Recovery Manager and connect to your target database:

```
rman
```

```
connect target
```

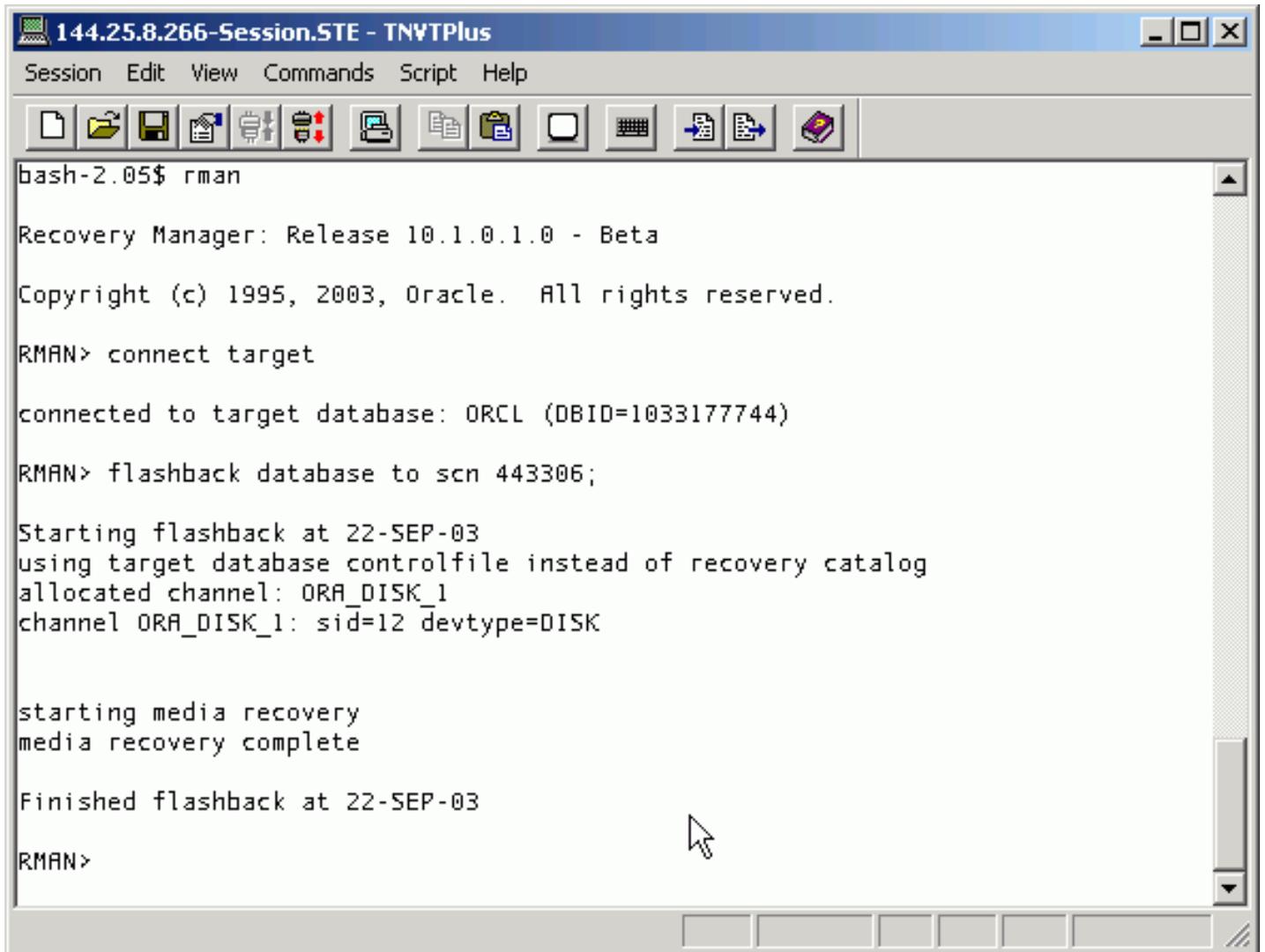


The screenshot shows a terminal window titled "144.25.8.266-Session.STE - TNVTPPlus". The window contains the following text:

```
ORACLE instance shut down.  
SQL> startup mount  
ORACLE instance started.  
  
Total System Global Area 268435456 bytes  
Fixed Size 764120 bytes  
Variable Size 219084584 bytes  
Database Buffers 25165824 bytes  
Redo Buffers 23420928 bytes  
Database mounted.  
SQL> exit  
Disconnected from Oracle10i Enterprise Edition Release 10.1.0.1.0 - Beta  
With the Partitioning, OLAP and Data Mining Scoring Engine options  
bash-2.05$ rman  
  
Recovery Manager: Release 10.1.0.1.0 - Beta  
  
Copyright (c) 1995, 2003, Oracle. All rights reserved.  
  
RMAN> connect target  
  
connected to target database: ORCL (DBID=1033177744)  
  
RMAN> █
```

7. Use Recovery Manager to flashback the database to the SCN you found previously.

**FLASHBACK DATABASE TO SCN <scn>;**

A screenshot of a terminal window titled "144.25.8.266-Session.STE - TNVTPPlus". The window has a menu bar with "Session", "Edit", "View", "Commands", "Script", and "Help". Below the menu bar is a toolbar with various icons. The terminal content shows a user running the 'rman' command in a 'bash-2.05\$' prompt. The output shows the RMAN version (10.1.0.1.0 - Beta), copyright information, and the execution of 'connect target' and 'flashback database to scn 443306;'. The flashback process starts at 22-SEP-03, uses the target database controlfile, allocates channel ORA\_DISK\_1, and completes media recovery. The process finishes at 22-SEP-03, and the prompt returns to 'RMAN>'.

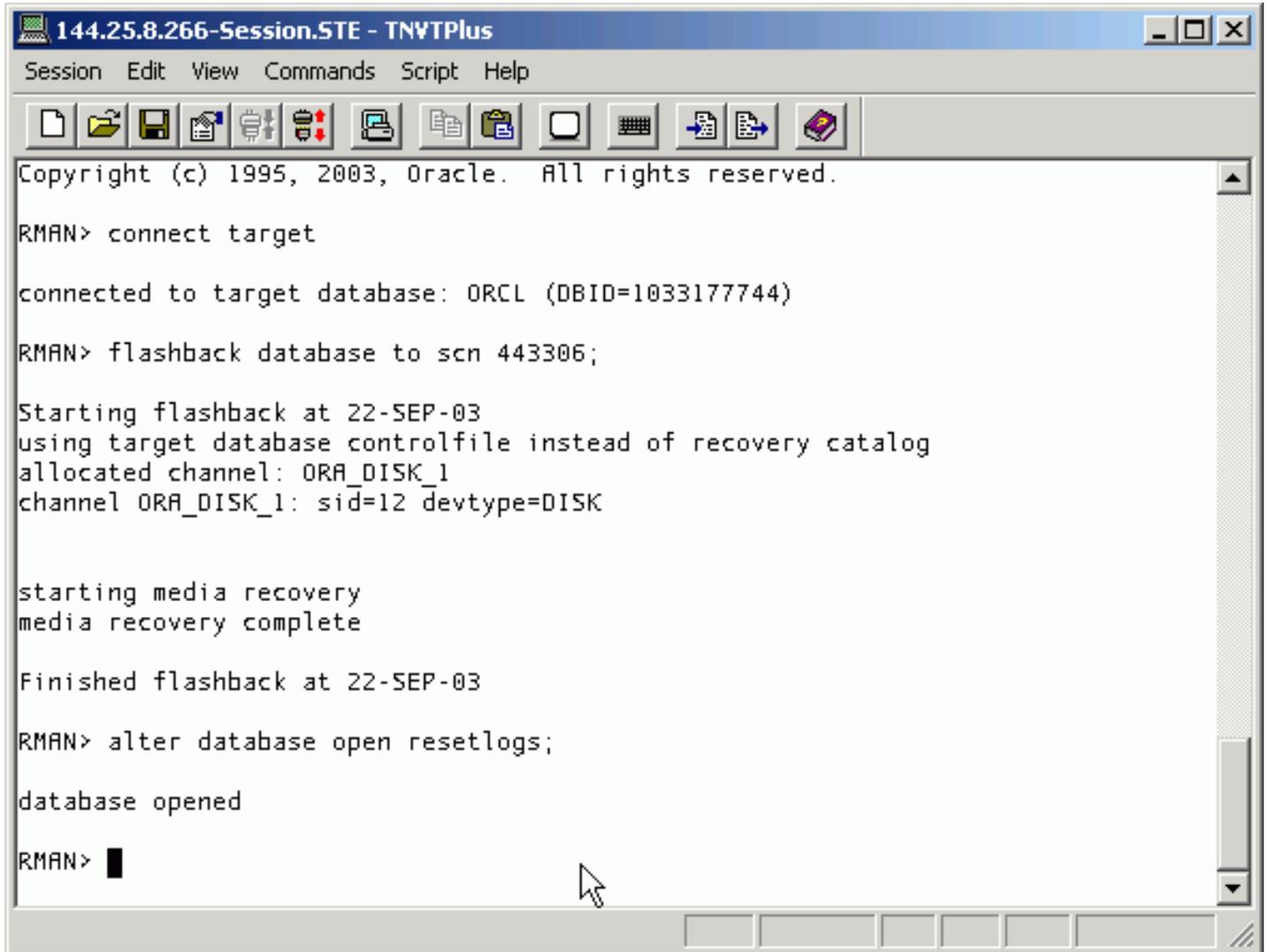
```
bash-2.05$ rman
Recovery Manager: Release 10.1.0.1.0 - Beta
Copyright (c) 1995, 2003, Oracle. All rights reserved.
RMAN> connect target
connected to target database: ORCL (DBID=1033177744)
RMAN> flashback database to scn 443306;
Starting flashback at 22-SEP-03
using target database controlfile instead of recovery catalog
allocated channel: ORA_DISK_1
channel ORA_DISK_1: sid=12 devtype=DISK

starting media recovery
media recovery complete

Finished flashback at 22-SEP-03
RMAN>
```

8. Open your database with the RESETLOGS option.

**ALTER DATABASE OPEN RESETLOGS;**



The screenshot shows a terminal window titled "144.25.8.266-Session.STE - TNSPlus". The window contains the following text:

```
Copyright (c) 1995, 2003, Oracle. All rights reserved.

RMAN> connect target

connected to target database: ORCL (DBID=1033177744)

RMAN> flashback database to scn 443306;

Starting flashback at 22-SEP-03
using target database controlfile instead of recovery catalog
allocated channel: ORA_DISK_1
channel ORA_DISK_1: sid=12 devtype=DISK

starting media recovery
media recovery complete

Finished flashback at 22-SEP-03

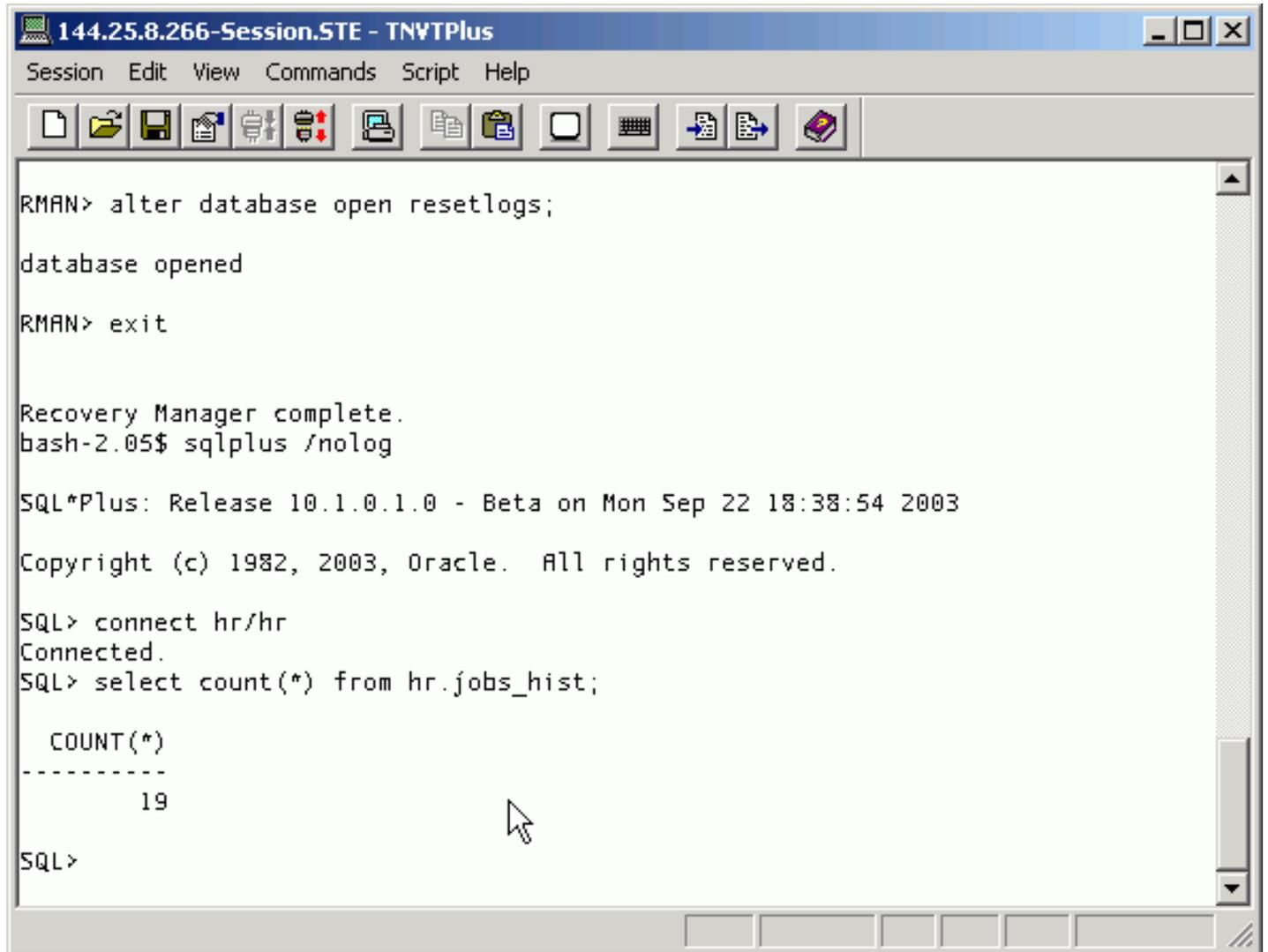
RMAN> alter database open resetlogs;

database opened

RMAN> █
```

9. Verify that you have restored the rows in the HR.JOBS\_HIST table.

```
SELECT count(*) FROM hr.jobs_hist;
```



The screenshot shows a terminal window titled "144.25.8.266-Session.STE - TNSPlus". The window contains the following text:

```
RMAN> alter database open resetlogs;
database opened
RMAN> exit

Recovery Manager complete.
bash-2.05$ sqlplus /nolog

SQL*Plus: Release 10.1.0.1.0 - Beta on Mon Sep 22 18:38:54 2003

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

SQL> connect hr/hr
Connected.
SQL> select count(*) from hr.jobs_hist;

  COUNT(*)
-----
         19

SQL>
```

## Change Tracking for Incremental Backups

[Back to Topic List](#)

### Overview

[Back to Topic List](#)

In previous releases of the Oracle database when you backed up the database using incremental backups, RMAN had to

examine the entire data file to determine which blocks had changed. Therefore, the time that RMAN took to perform an incremental backup was proportional to the size of the data files involved in the backup.

In Oracle Database 10 *g* , you can create a block change tracking file that records the blocks modified since the last backup. RMAN uses the tracking file to determine which blocks to include in the incremental backup. The change tracking file enables RMAN to make the incremental backup time proportional to the amount of content modified since the last backup.

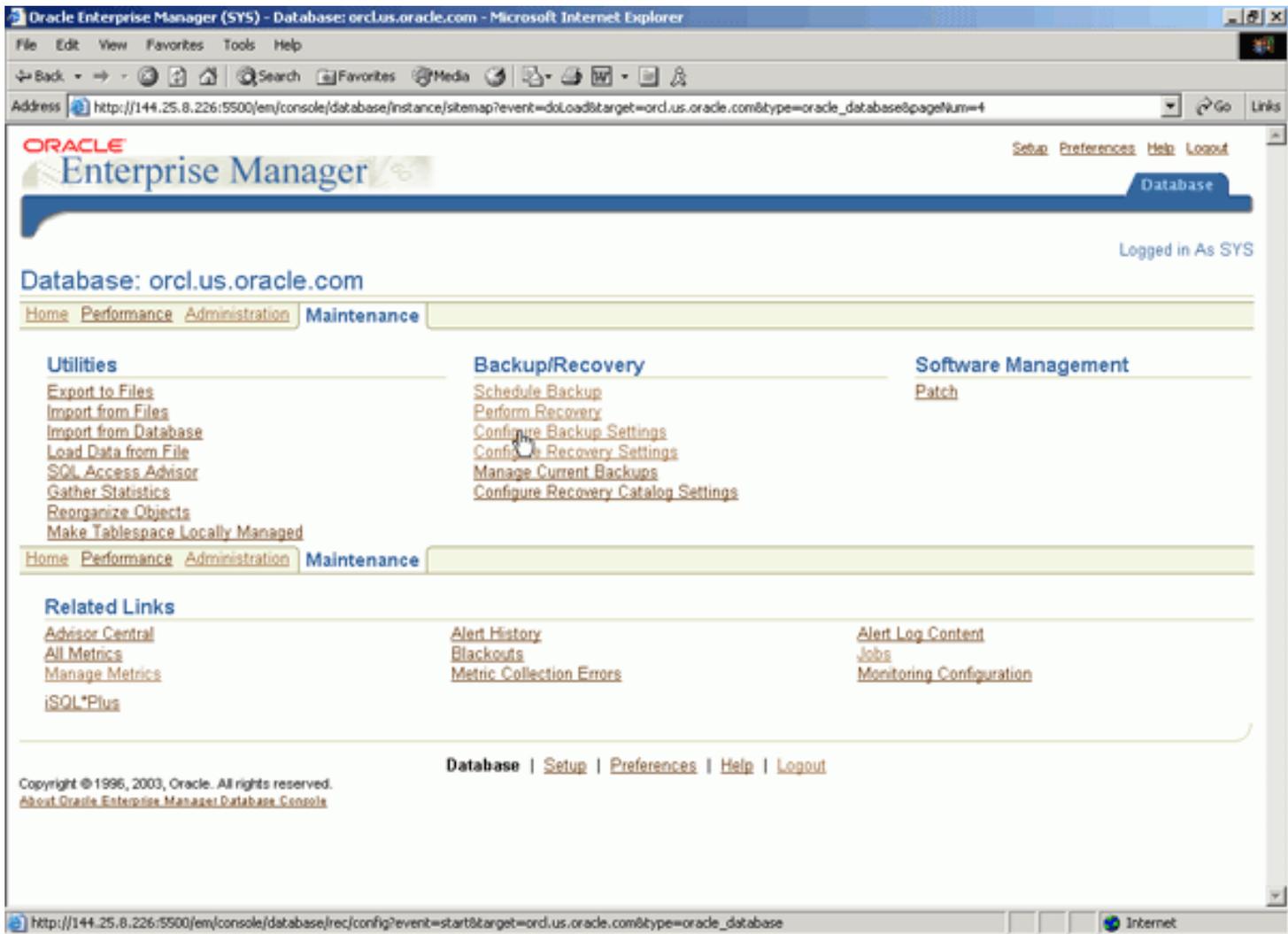
## Enabling Change Tracking

[Back to Topic List](#)

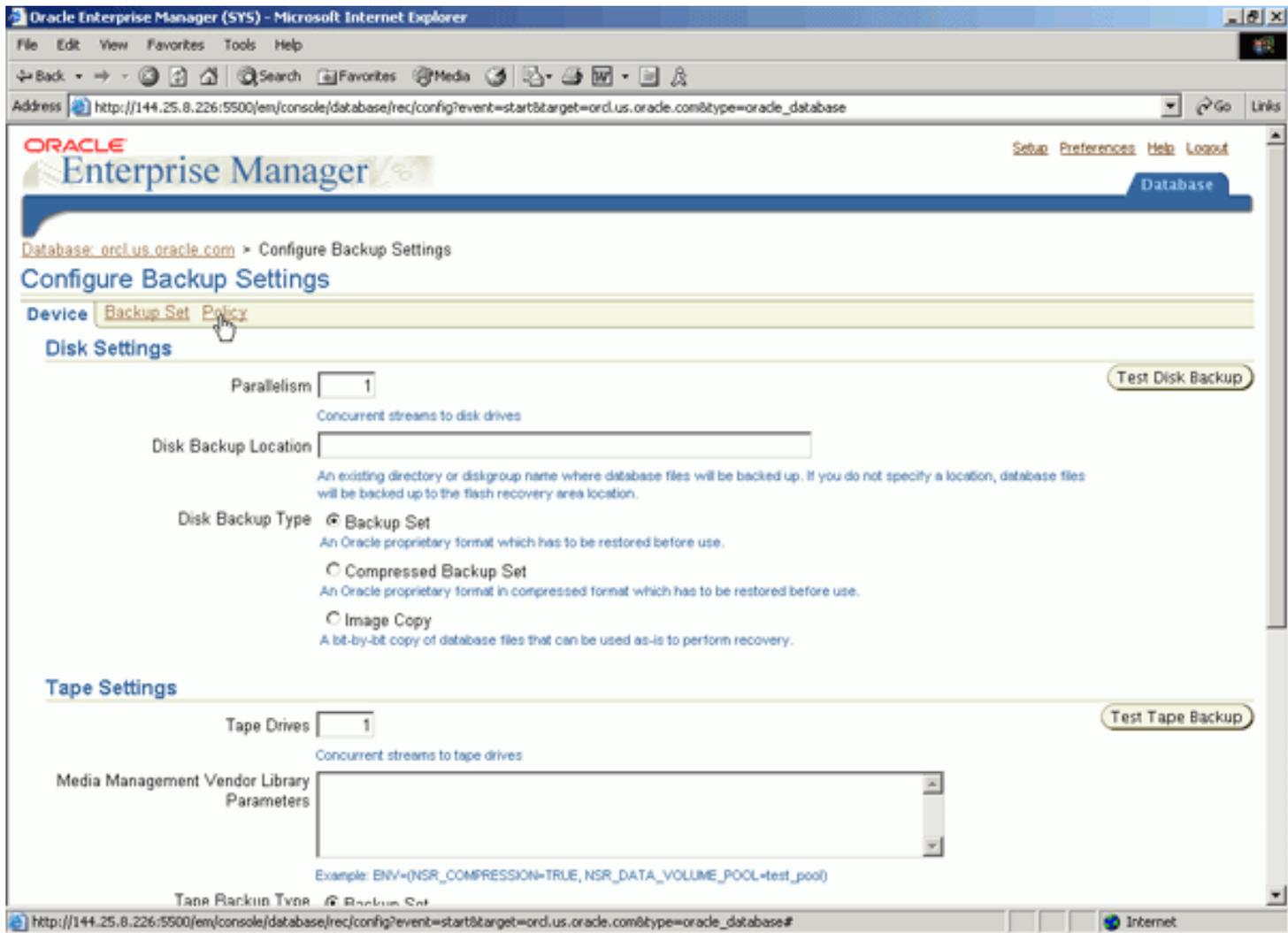
When you enable change tracking, Oracle automatically tracks which datafile blocks have changed in change tracking files. When you execute `BACKUP INCREMENTAL` , RMAN uses the change tracking file to more quickly identify the blocks changed since the previous incremental backup. As a result, RMAN creates incremental backups much faster than in releases prior to Oracle Database 10 *g* .

By default, the change tracking file is created as an Oracle managed file in the location specified by the `DB_CREATE_FILE_DEST` or `DB_RECOVERY_FILE_DEST` initialization parameters.

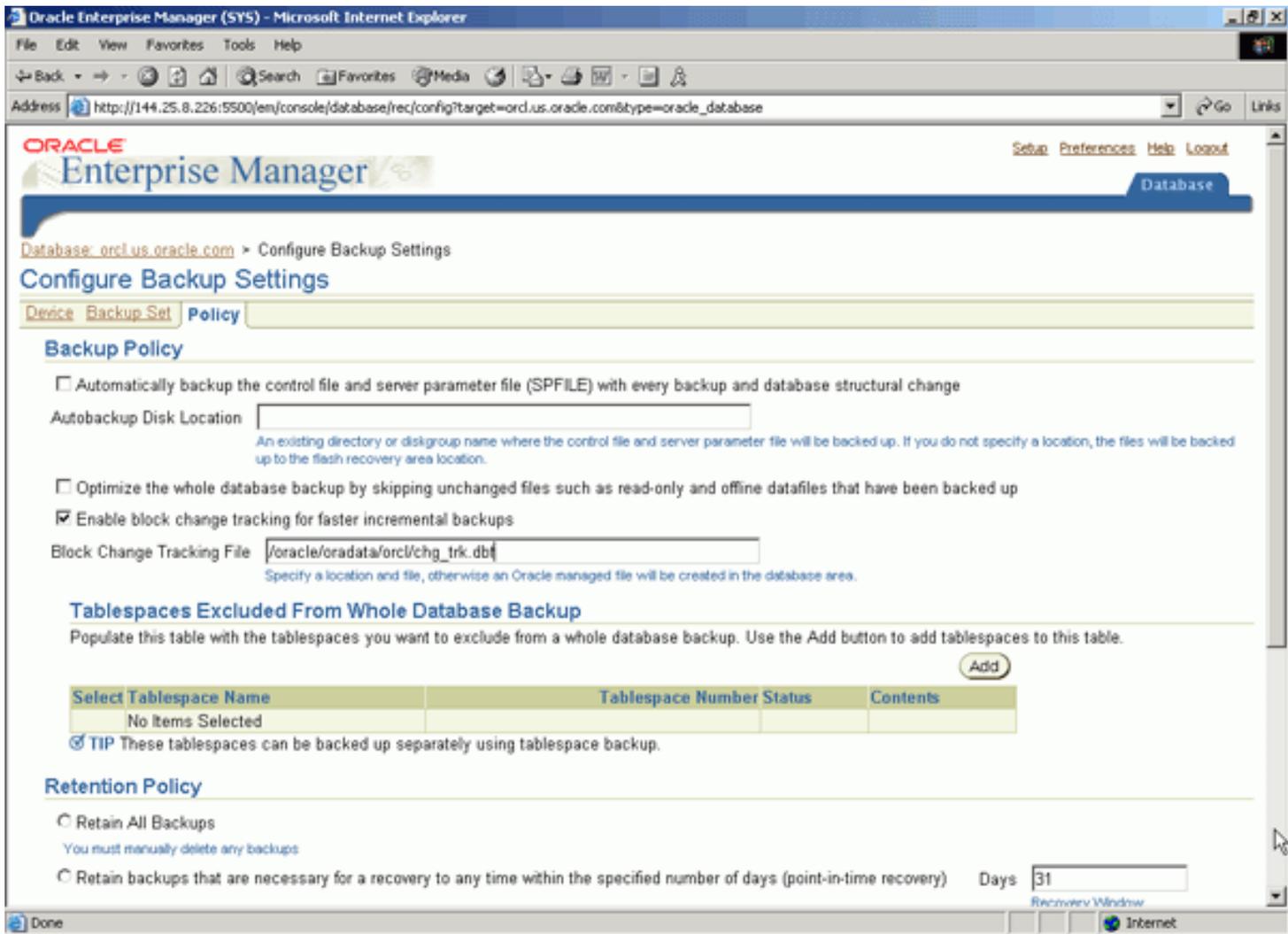
1. From the **Maintainance** tab in Enterprise Manager, select **Configure Backup Settings** in the Backup/Recovery section.



2. Click on the **Policy** tab.



3. Check "Enable block change tracking for faster incremental backups ". Specify the following as the name of the change tracking file: /oracle/oradata/orcl/chg\_trk.dbf . Scroll to the **Host Credentials** section.



4. Enter your OS username and password and click **OK** .

Oracle Enterprise Manager (SYS) - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address [http://144.25.8.226:5500/em/console/database/rec/config?target=ord.us.oracle.com&type=oracle\\_database](http://144.25.8.226:5500/em/console/database/rec/config?target=ord.us.oracle.com&type=oracle_database)

Enable block change tracking for faster incremental backups

Block Change Tracking File   
Specify a location and file, otherwise an Oracle managed file will be created in the database area.

### Tablespaces Excluded From Whole Database Backup

Populate this table with the tablespaces you want to exclude from a whole database backup. Use the Add button to add tablespaces to this table.

Select Tablespace Name	Tablespace Number	Status	Contents
No Items Selected			

TIP These tablespaces can be backed up separately using tablespace backup.

### Retention Policy

Retain All Backups  
*You must manually delete any backups*

Retain backups that are necessary for a recovery to any time within the specified number of days (point-in-time recovery) Days   
Recovery Window

Retain at least the specified number of full backups for each datafile Backups   
Redundancy

### Host Credentials

To save the backup settings, supply operating system login credentials.

- Username
- Password

[Device](#) [Backup Set](#) [Policy](#)

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

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[About Oracle Enterprise Manager Database Controls](#)

Address [http://144.25.8.226:5500/em/console/database/rec/config?target=ord.us.oracle.com&type=oracle\\_database#](http://144.25.8.226:5500/em/console/database/rec/config?target=ord.us.oracle.com&type=oracle_database#)