

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

[Back to List](#)

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

[Back to Topic List](#)

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.

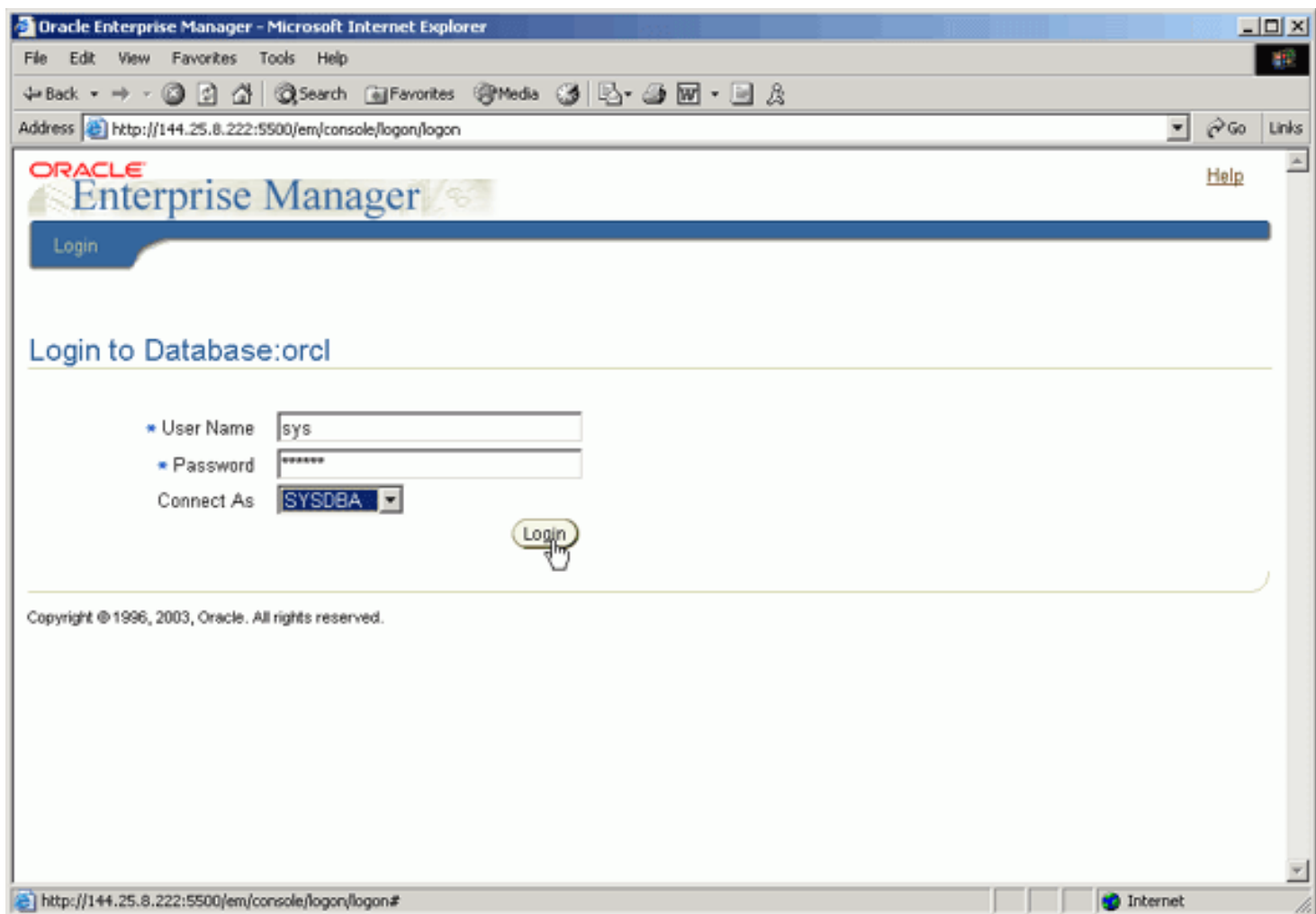
By allocating a storage location and unifying related recovery files within a specific area, the Oracle database server relieves the database administrator from having to manage the disk files created by these components.

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:

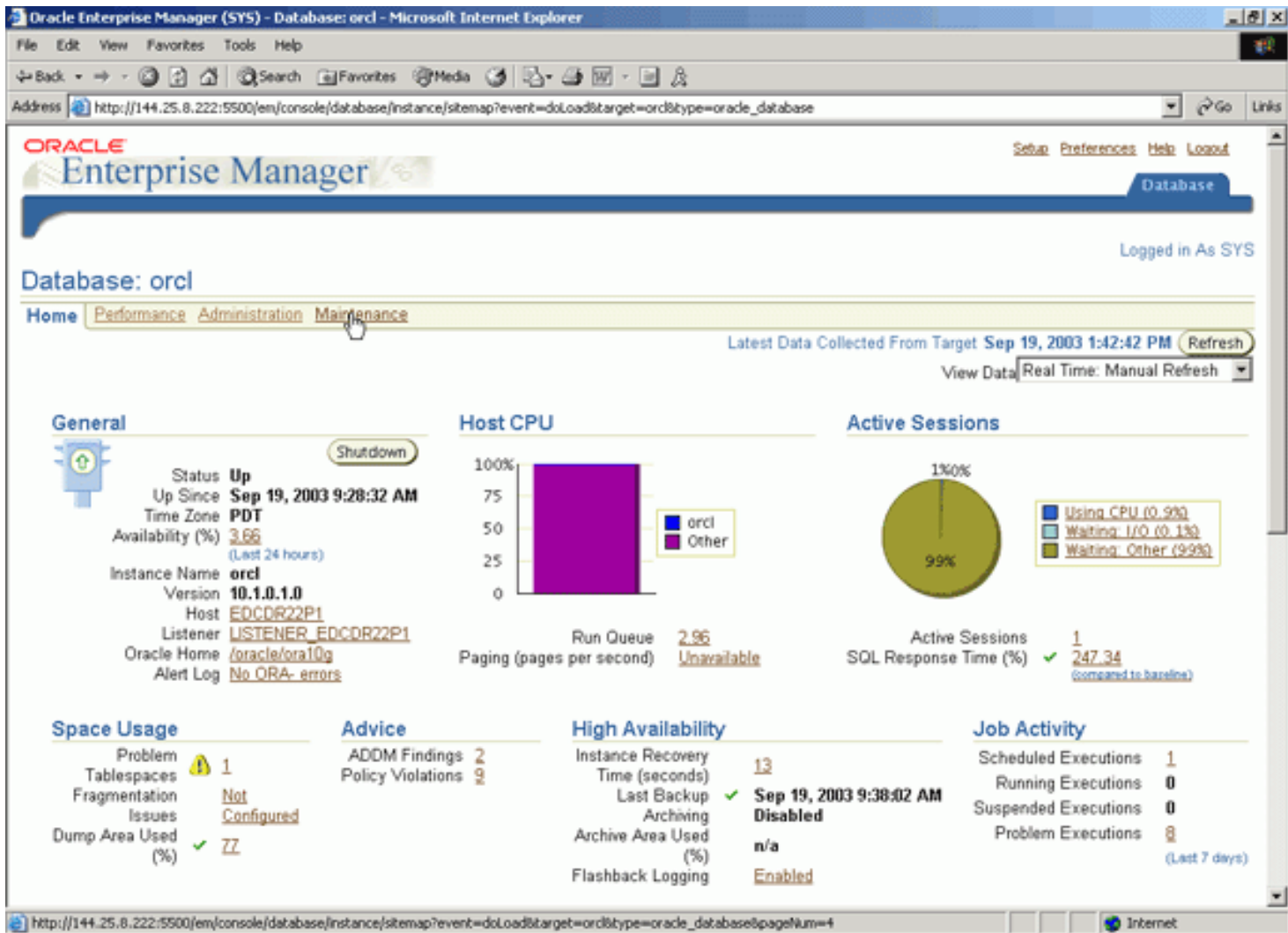
http://<hostname>:5500/em

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

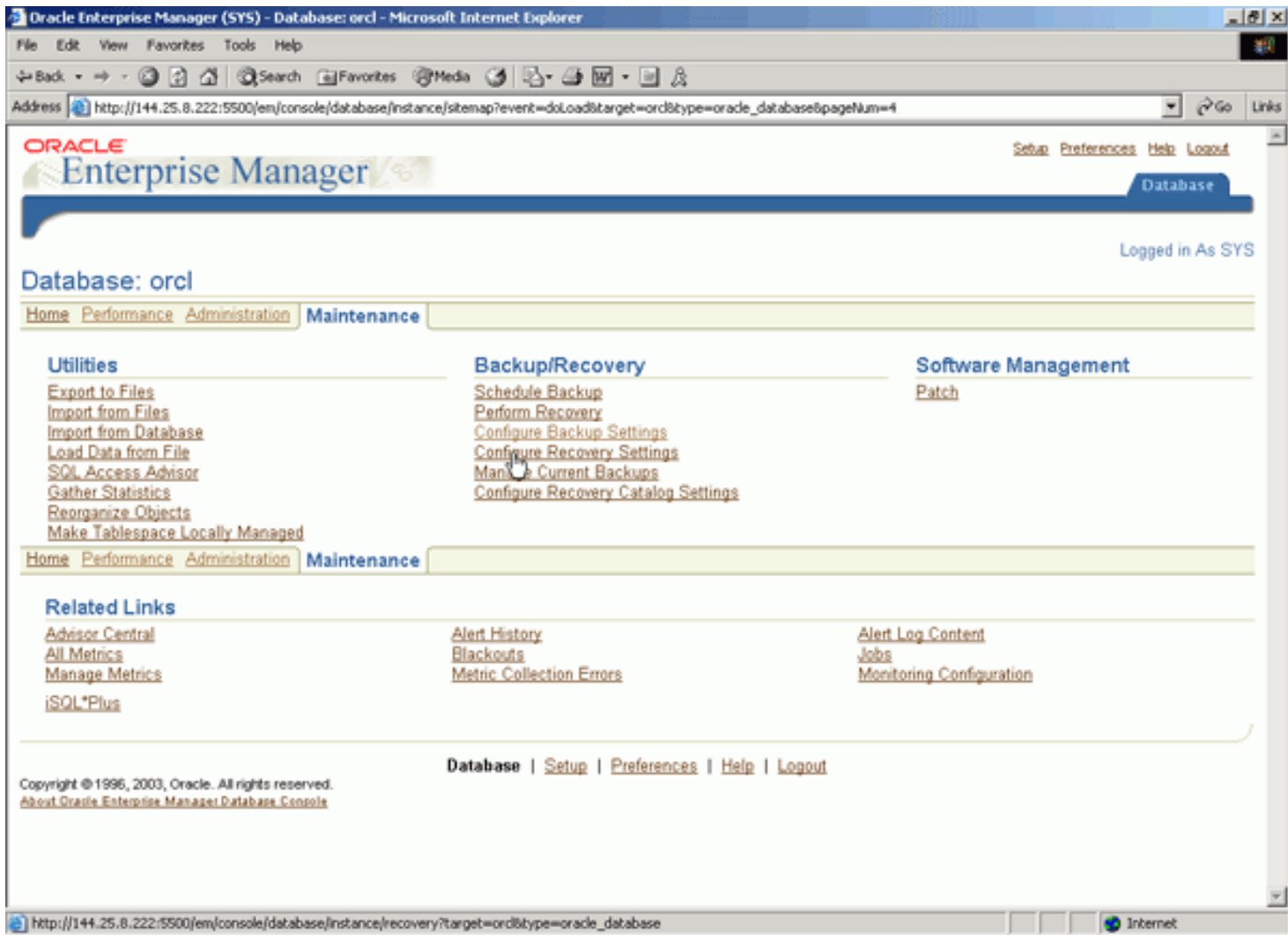


- The **Oracle Database Home** page allows you to view the current state of the database by displaying a series of metrics that portray the overall health of the database. The Oracle Database Home page provides a launch point for the database status and administration and configuration of the database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

Click on the **Maintenance** tab.



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

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Media Print Mail

Address http://144.25.8.222:5500/em/console/database/instance/recovery?target=orcl&type=oracle_database Go Links

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.

[Show SQL](#) [Revert](#) [Apply](#)

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

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

Done Internet

- Click **Database: orcl**.

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

File Edit View Favorites Tools Help

Address http://144.25.8.222:5500/em/console/database/instance/recovery?target=orcl&type=oracle_database Go Links

ORACLE Enterprise Manager Database

Database orcl > Configure Recovery Settings Logged in As SYS

Configure Recovery Settings

Show SQL Revert Apply

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.

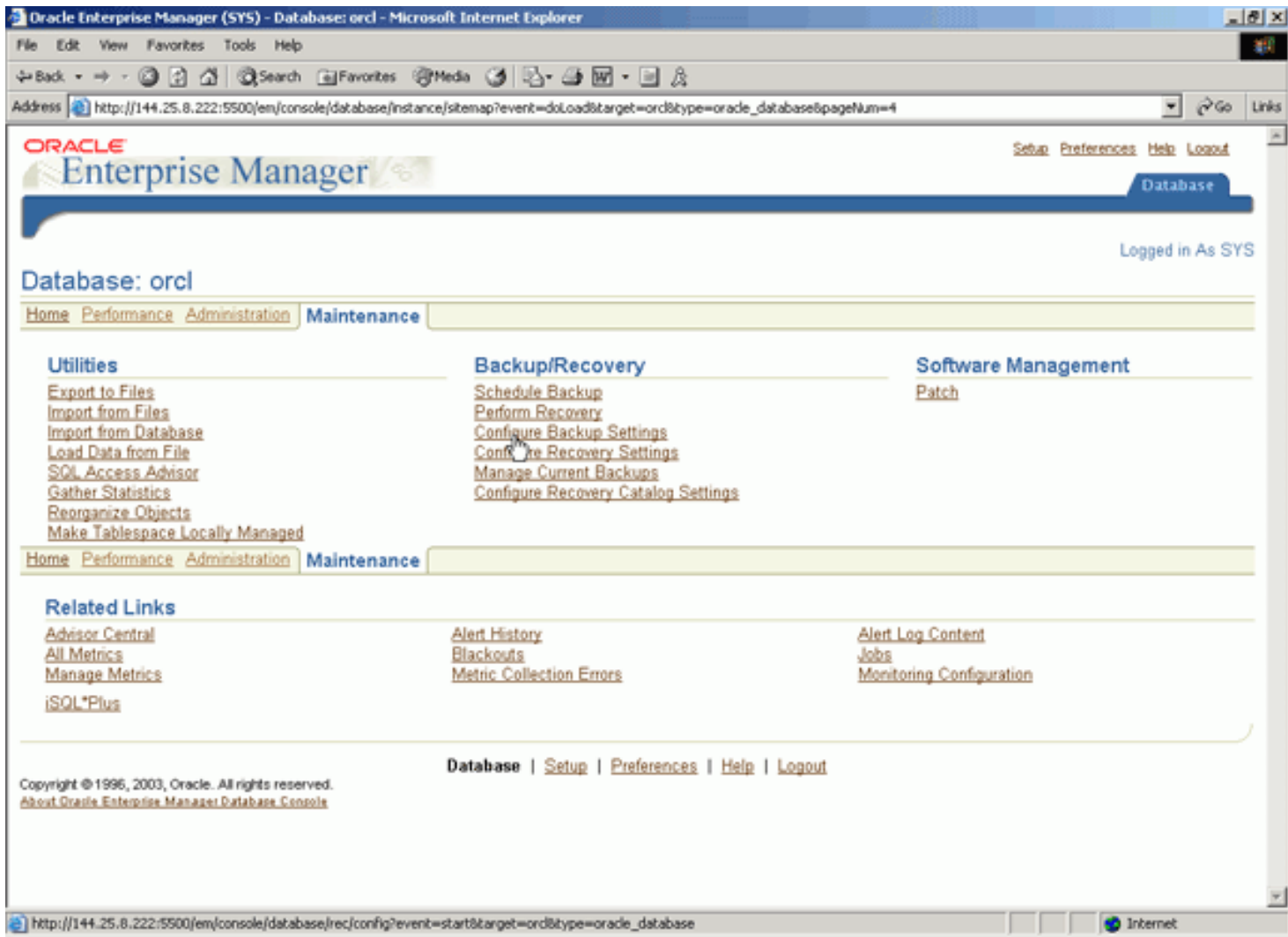
Log Archive Filename Format*

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.

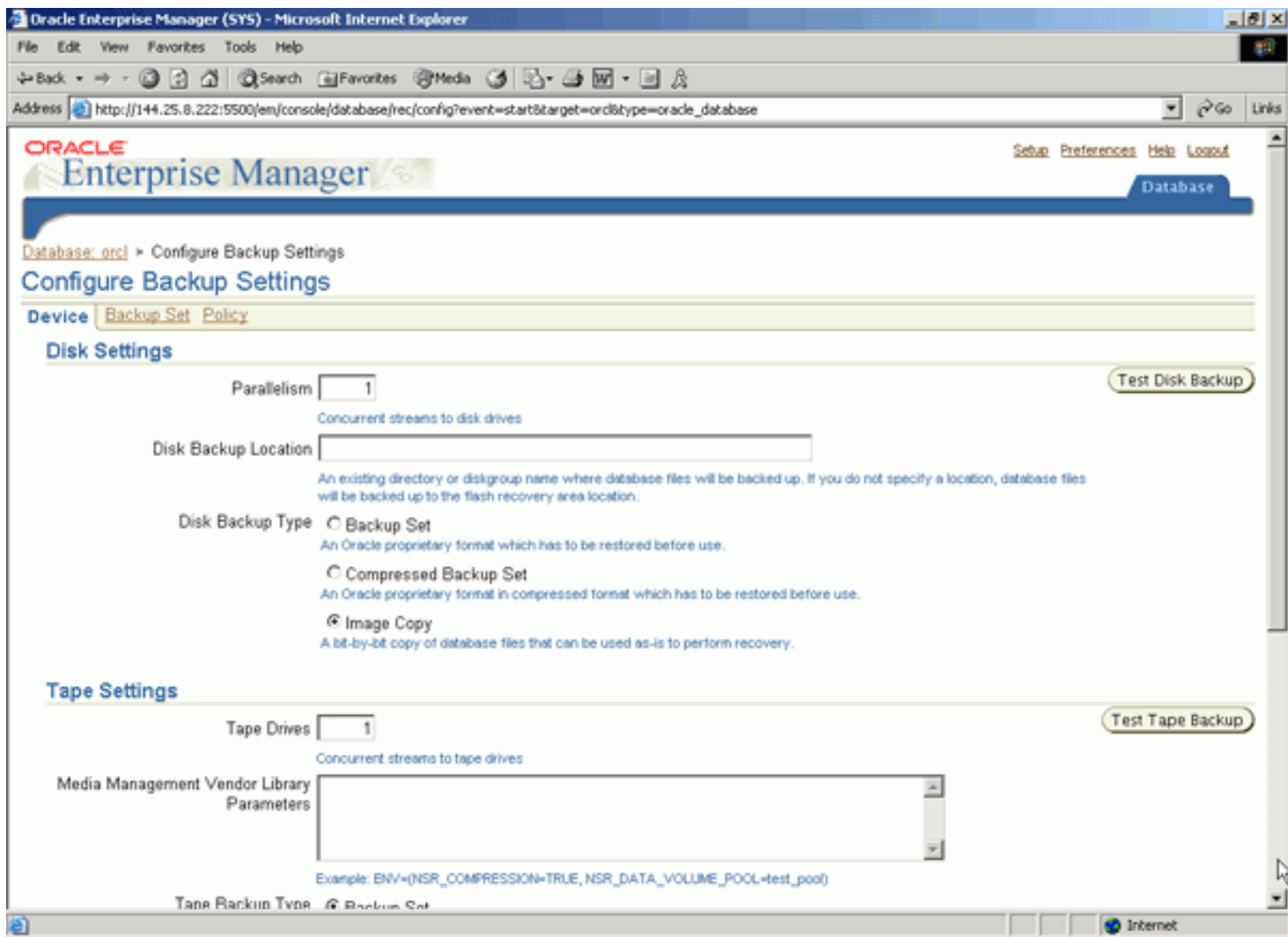
Number	Archive Log Destination	Quota (512B)	Status	Type
1	<input type="text"/>	<input type="text"/>		Local
2	<input type="text"/>	<input type="text"/>		Local
3	<input type="text"/>	<input type="text"/>		Local

http://144.25.8.222:5500/em/console/database/instance/sitemap?event=doLoad&target=orcl&type=oracle_database&pageNum=4 Internet

- 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.

Oracle Enterprise Manager (SYS) - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Reload Search Favorites Media Print Mail

Address http://144.25.8.222:5500/em/console/database/rec/config?event=start&target=orcl&type=oracle_database Go Links

An Oracle proprietary format which has to be restored before use.

☐ Compressed Backup Set
An Oracle proprietary format in compressed format which has to be restored before use.

☐ Image Copy
A bit-by-bit copy of database files that can be used as-is to perform recovery.

Tape Settings

Tape Drives Test Tape Backup

Concurrent streams to tape drives

Media Management Vendor Library Parameters

Example: ENV=(NSR_COMPRESSION=TRUE, NSR_DATA_VOLUME_POOL=test_pool)

Tape Backup Type ☒ Backup Set
An Oracle proprietary format which has to be restored before use.

☐ Compressed Backup Set
An Oracle proprietary format in compressed format which has to be restored before use.

☒ TIP Tape drives must be mounted before performing a backup test

Host Credentials

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

• Username

• Password

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

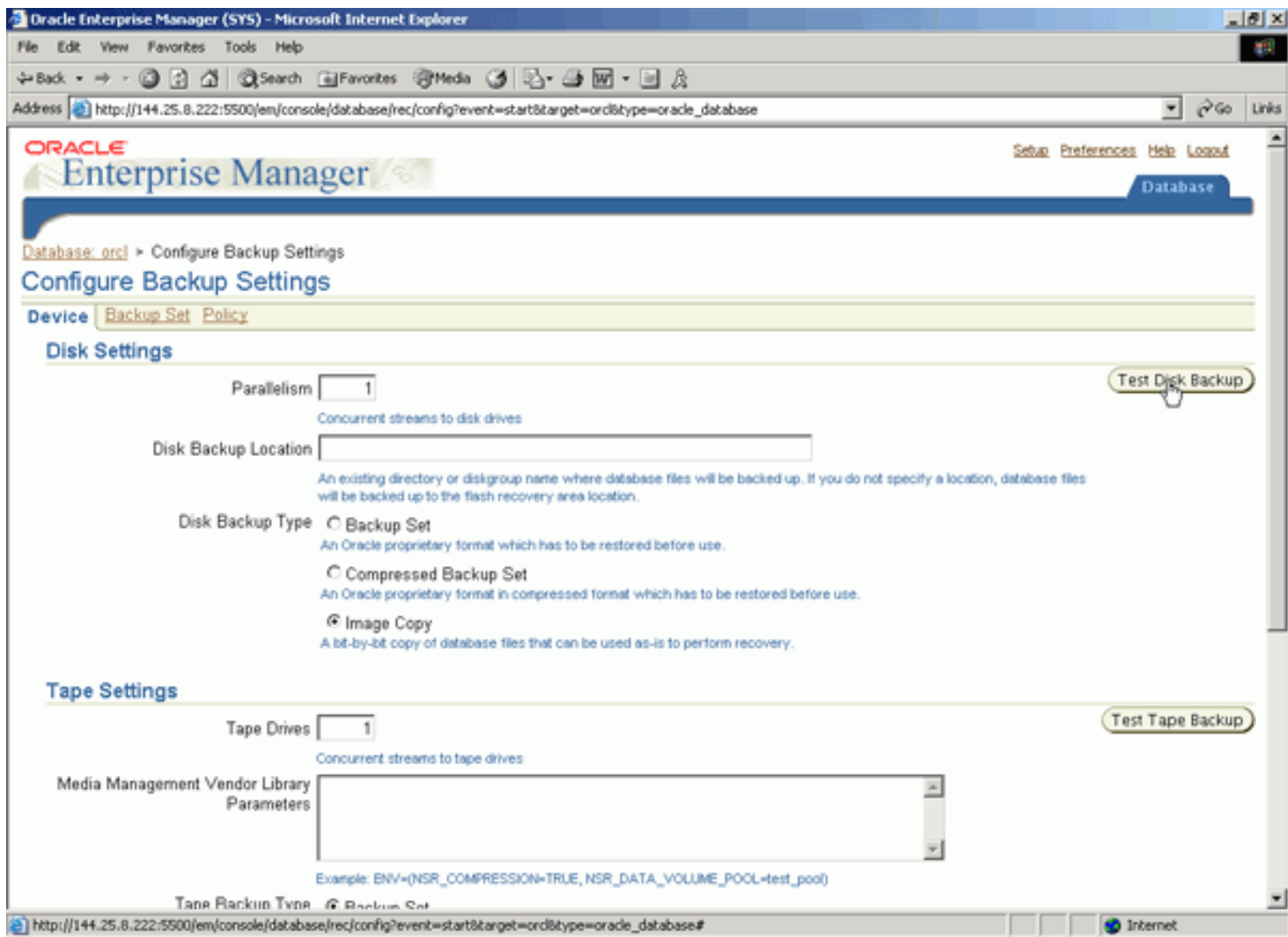
Cancel OK

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

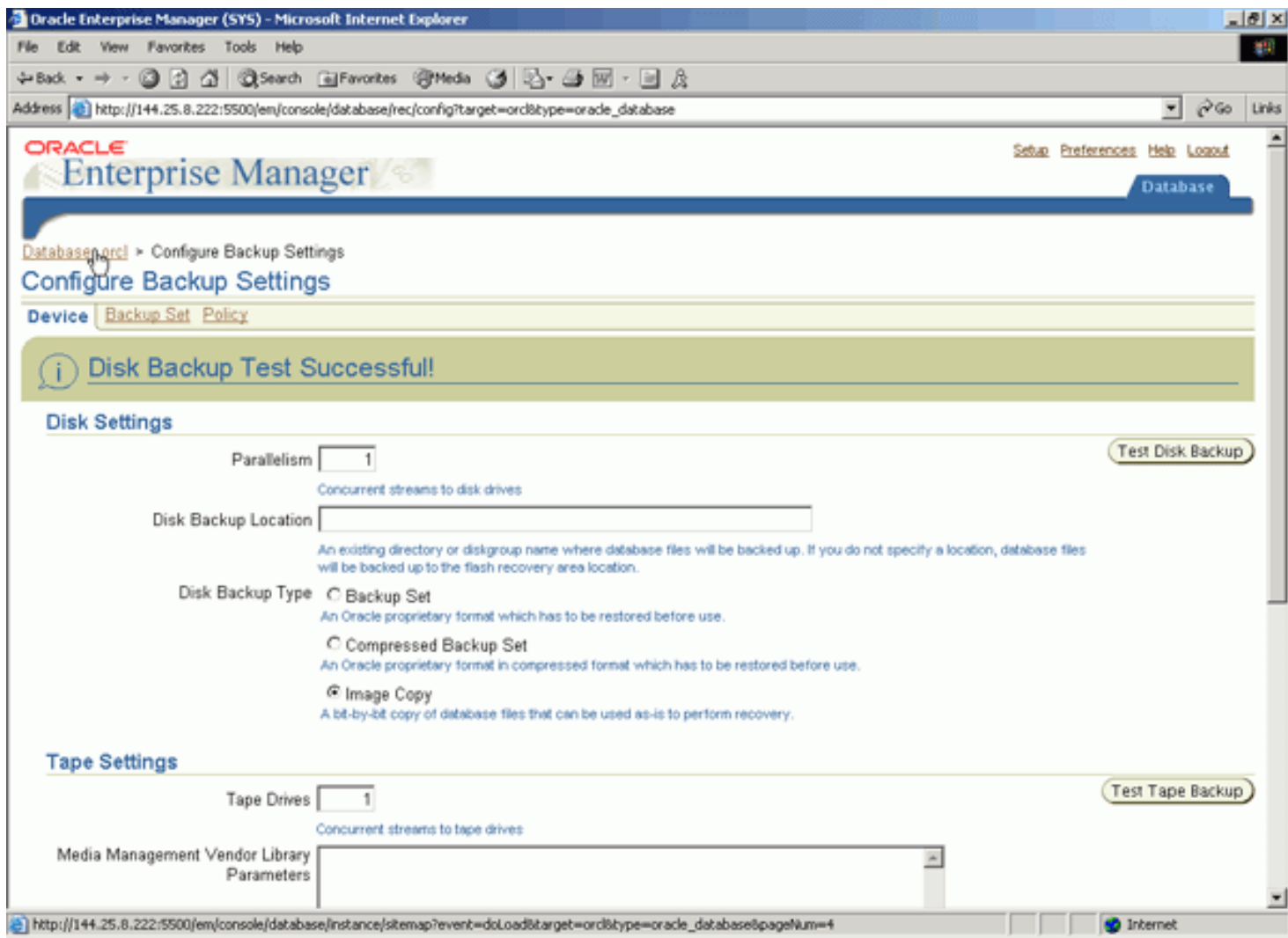
Copyright © 1996, 2003, Oracle. All rights reserved.
[About Oracle Enterprise Manager Database Console](#)

Internet

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**.

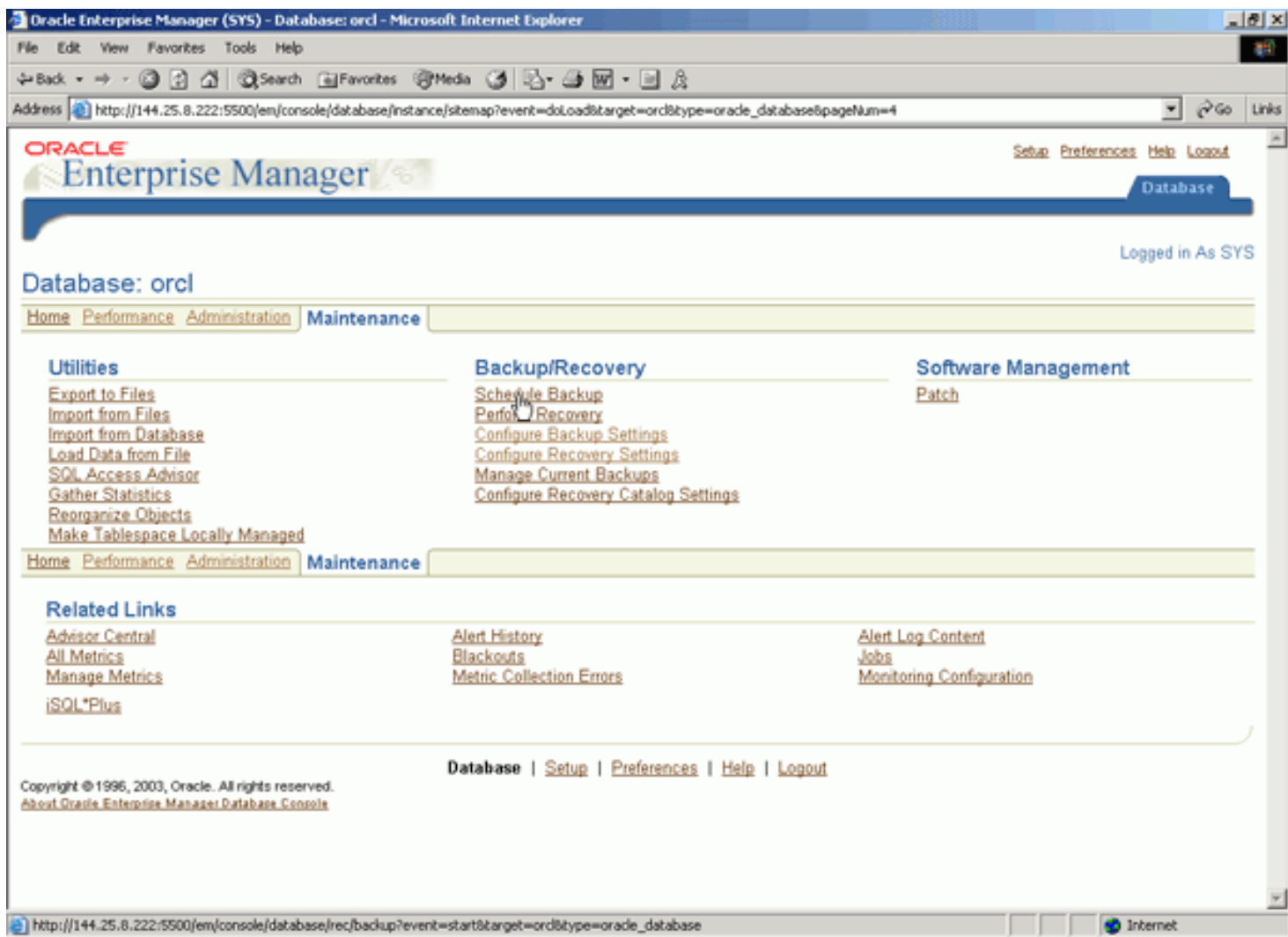


Backing Up the Database

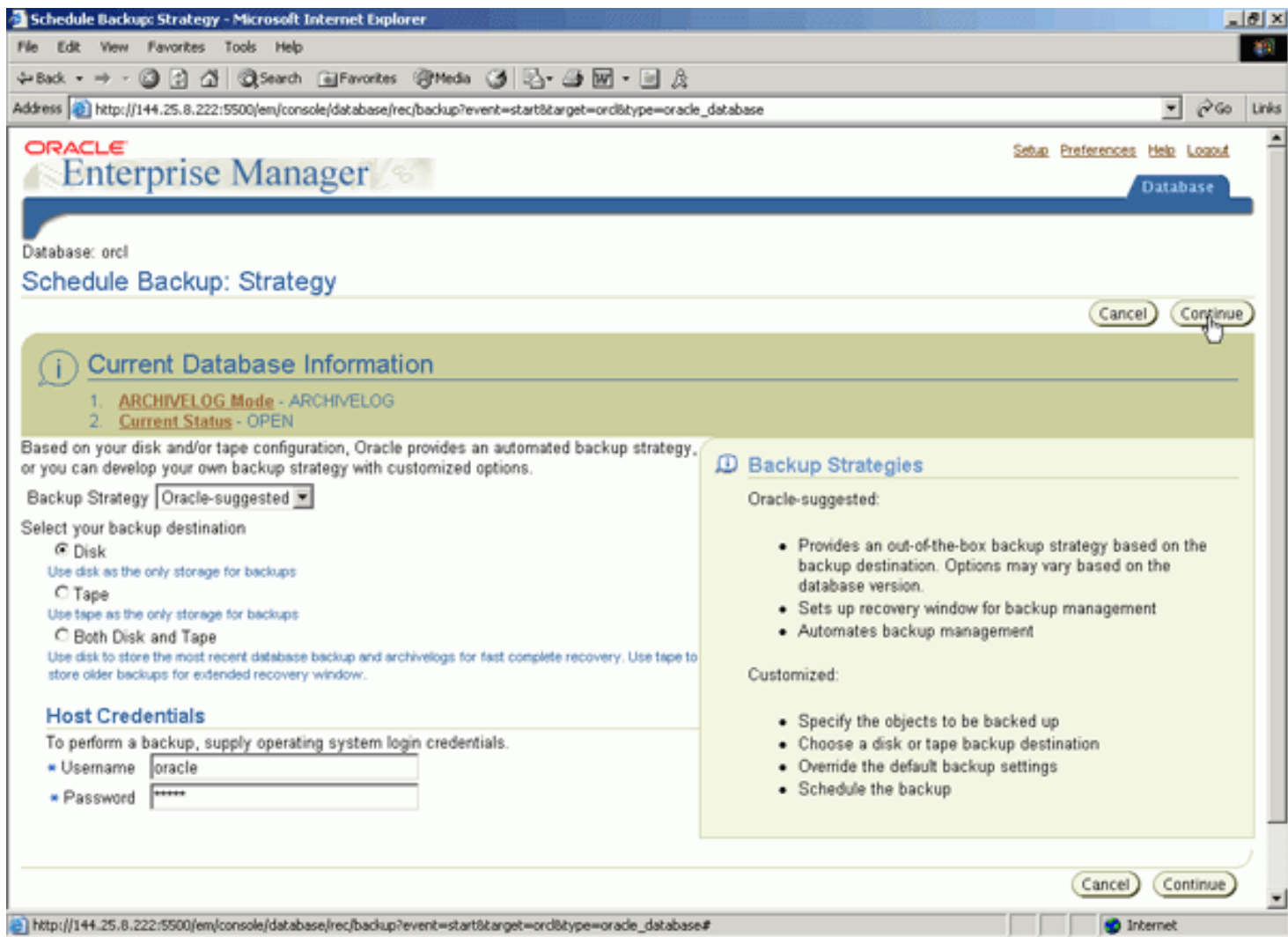
[Back to Topic List](#)

Follow the steps below to take a whole database backup.

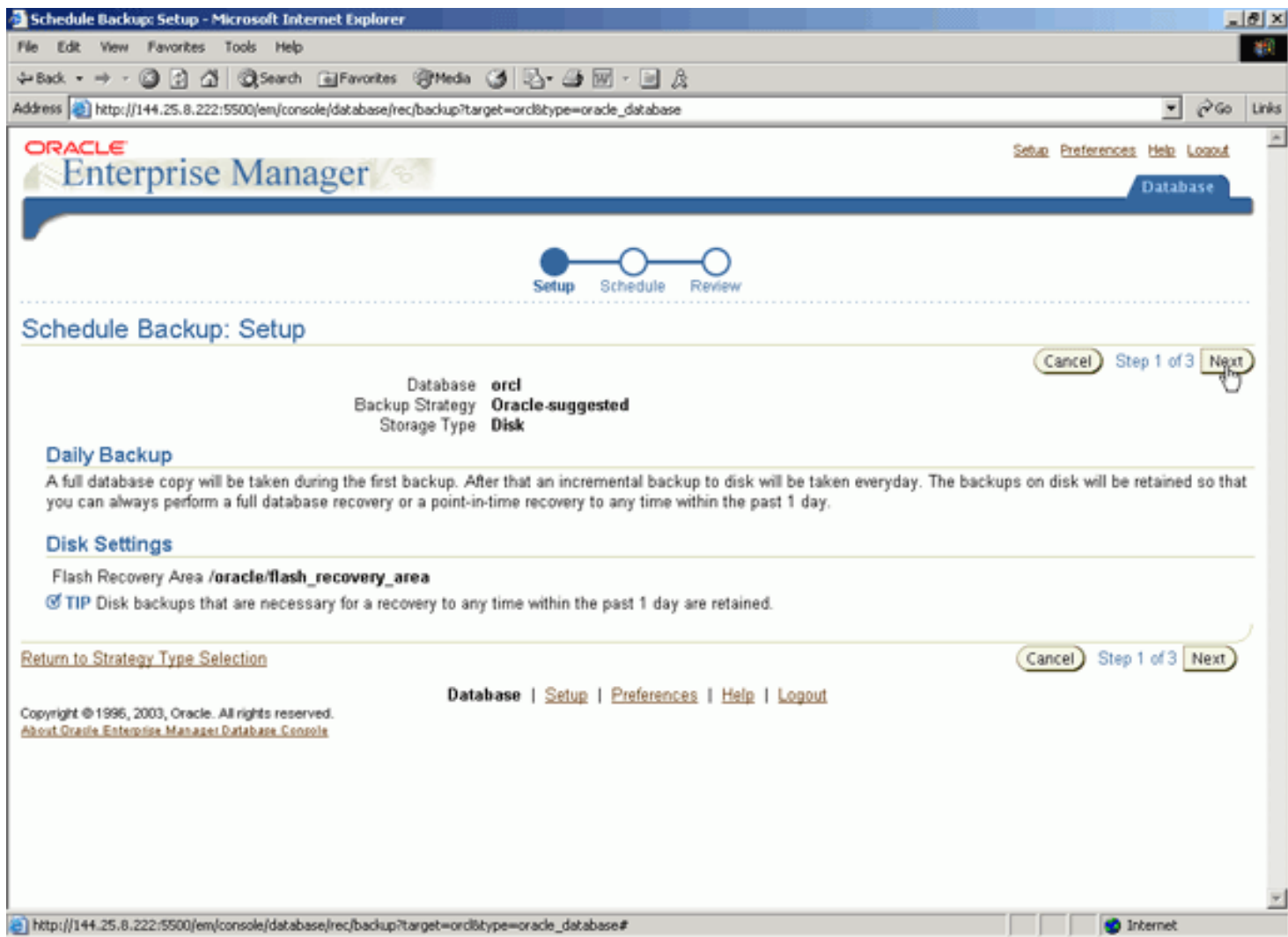
1. Click **Schedule Backup** in the Backup/Recovery section.



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** .

Schedule Backup: Schedule - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://144.25.8.222:5500/em/console/database/rec/backup?target=orcl&type=oracle_database Go Links

ORACLE Enterprise Manager Database

Setup Schedule Review

Schedule Backup: Schedule

Cancel Back Step 2 of 3 Next

Database **orcl**
Backup Strategy **Oracle-suggested**
Storage Type **Disk**

Backup Time

Specify a date to start the backup. The first backup could be time consuming as it is a whole database backup. You might want to start the backup when the database is least active.

Date

(example: Dec-12-2002)

Specify a time to start the backup. An appropriate time would be when the database is least active during a day.

Time Zone

Backup Time ☒ AM ☐ PM

[Return to Strategy Type Selection](#)

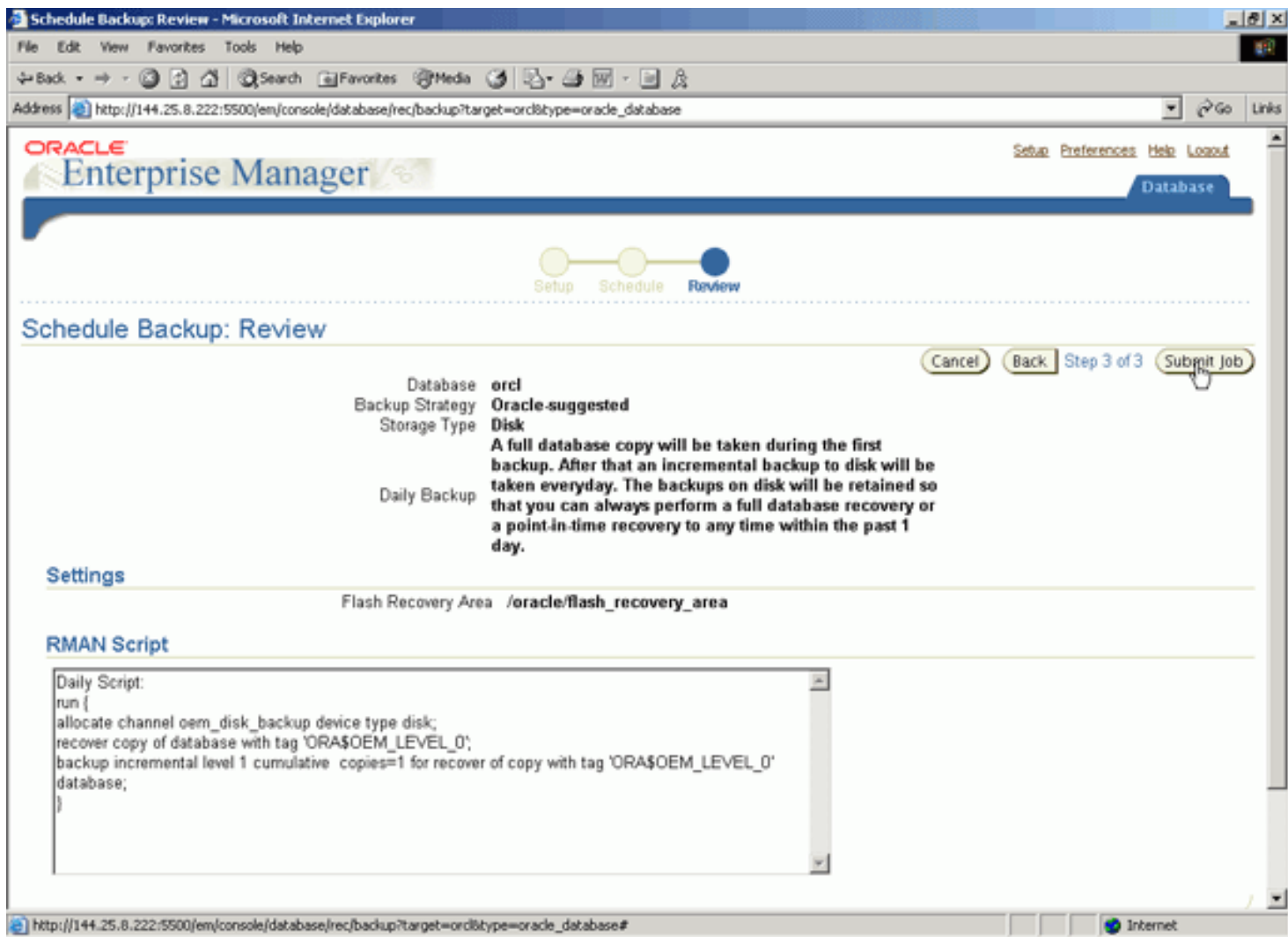
Cancel Back Step 2 of 3 Next

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

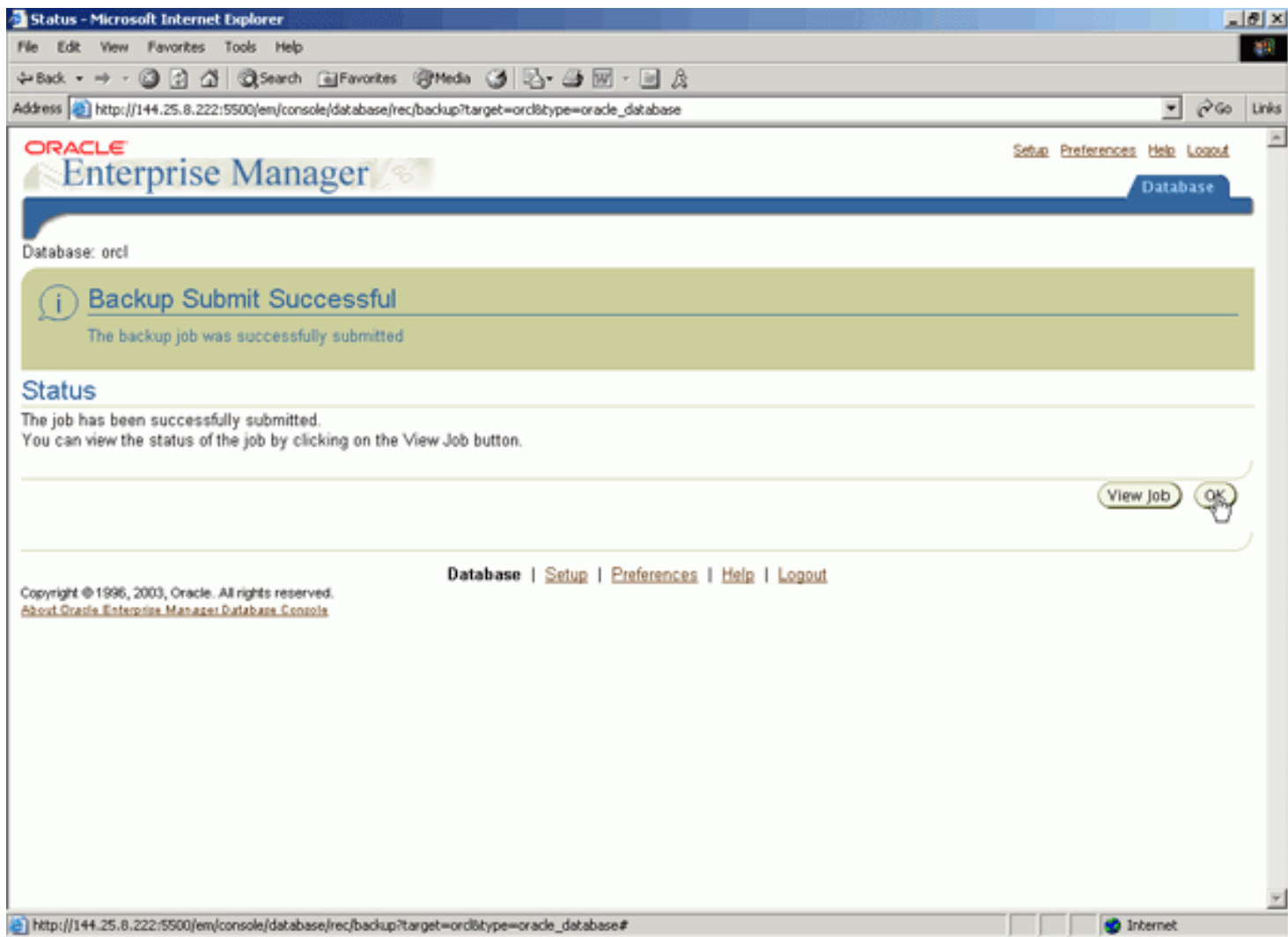
Copyright © 1996, 2003, Oracle. All rights reserved.
[About Oracle Enterprise Manager Database Console](#)

http://144.25.8.222:5500/em/console/database/rec/backup?target=orcl&type=oracle_database# Internet

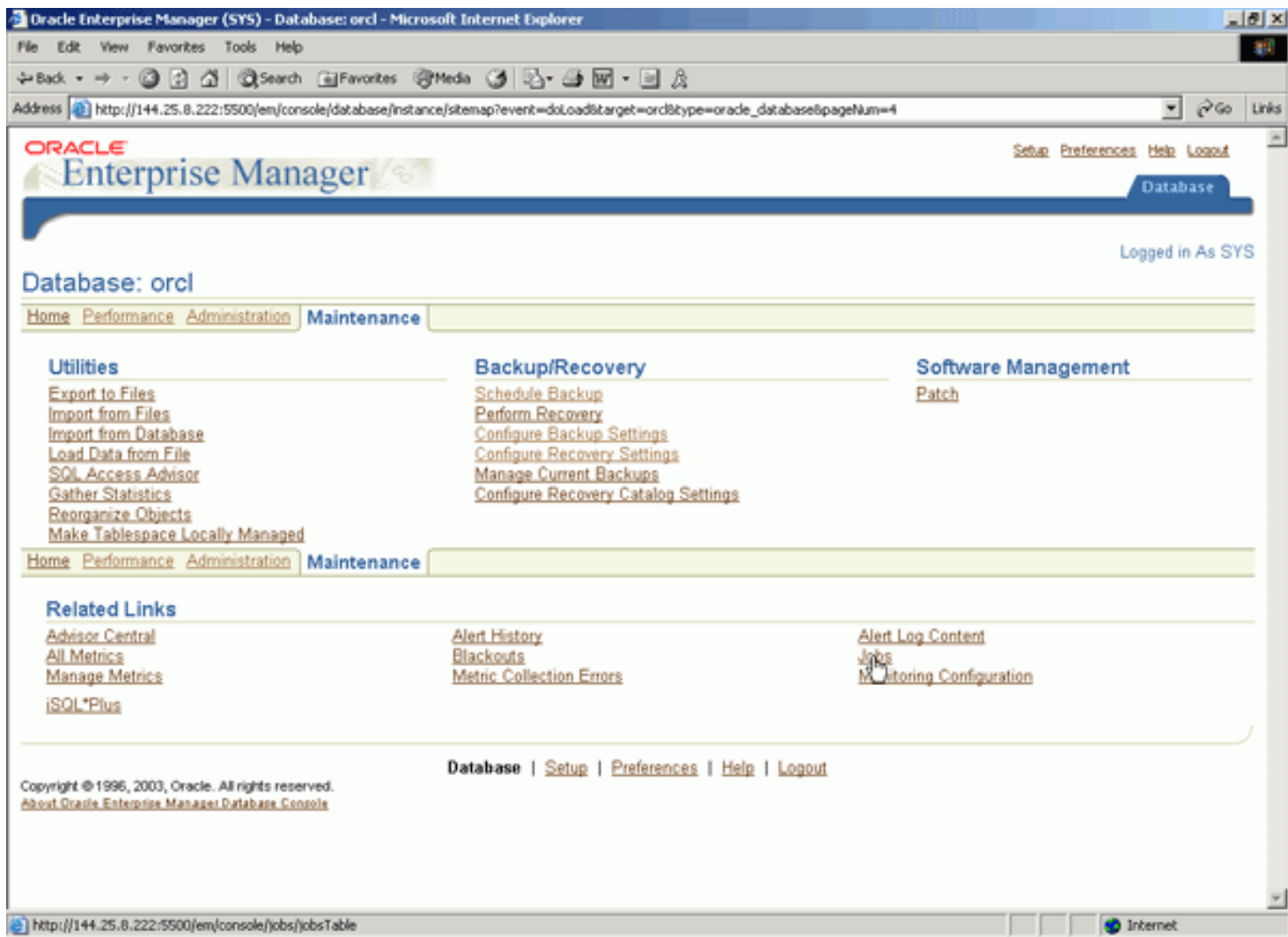
5. Review the **Review** page, then click **Submit Job** .



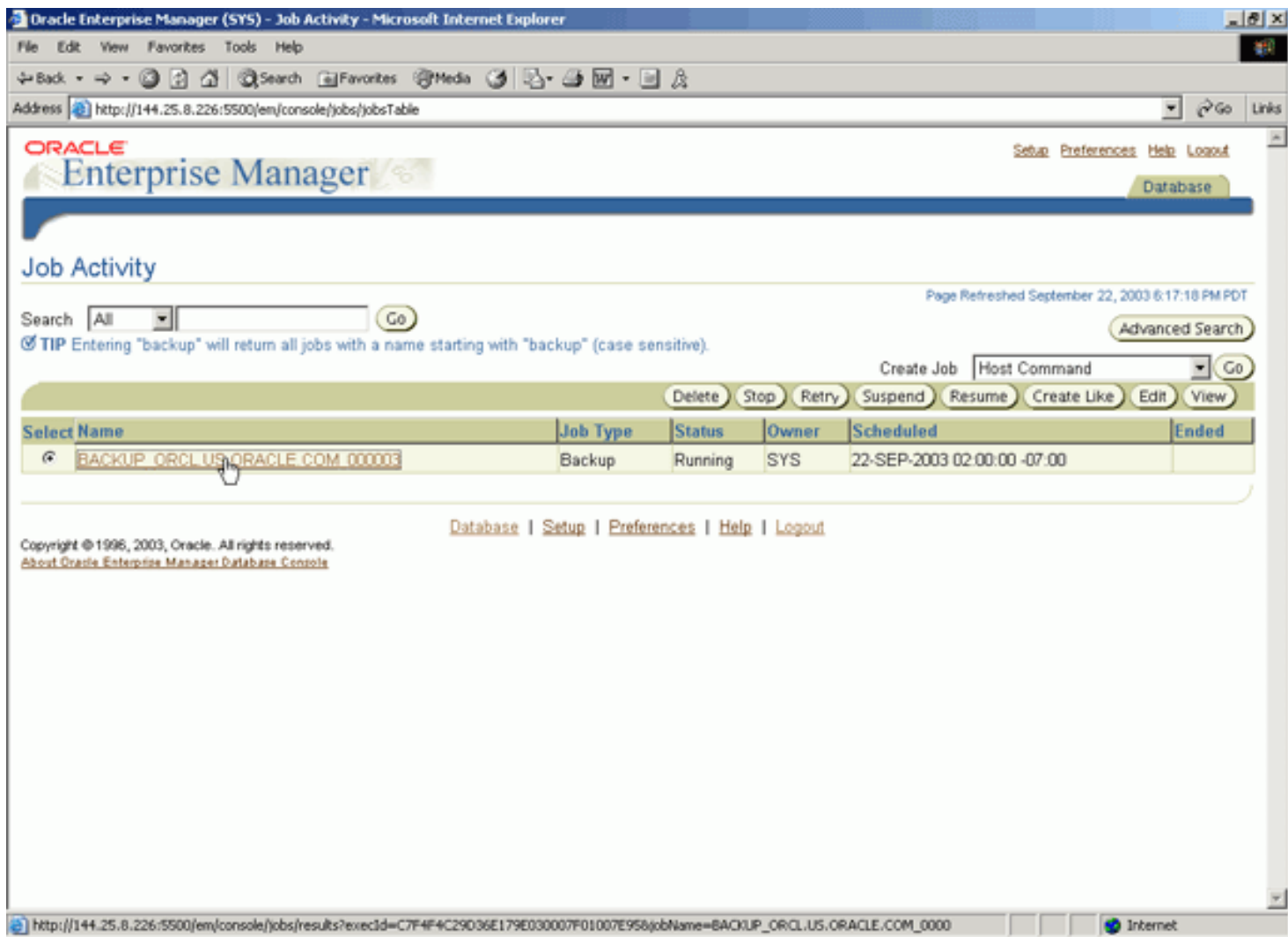
6. Your backup job has been submitted. Click **OK**.



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 (SYS) - Job Activity page in Microsoft Internet Explorer. The browser address bar shows the URL: <http://144.25.8.226:5500/em/console/jobs/jobsTable>. The page title is "Oracle Enterprise Manager (SYS) - Job Activity - Microsoft Internet Explorer". The Oracle logo and "Enterprise Manager" text are at the top. A "Database" button is visible. The main heading is "Job Activity". Below it, there is a search bar with a dropdown menu set to "All" and a "Go" button. A tip message states: "TIP Entering 'backup' will return all jobs with a name starting with 'backup' (case sensitive)." To the right of the tip is an "Advanced Search" button. Below the search bar, there is a "Create Job" button and a "Host Command" dropdown menu with a "Go" button. A row of action buttons (Delete, Stop, Retry, Suspend, Resume, Create Like, Edit, View) is displayed. A table lists the job activity:

Select	Name	Job Type	Status	Owner	Scheduled	Ended
<input type="checkbox"/>	BACKUP_ORCL_US.Oracle.COM_000003	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 browser status bar at the bottom shows the URL: http://144.25.8.226:5500/em/console/jobs/results?execId=C7F4F4C29D36E179E030007F01007E95&jobName=BACKUP_ORCL_US.Oracle.COM_0000 and the "Internet" icon.

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

Oracle Enterprise Manager (SYS) - Job: BACKUP_ORCL.US.ORACLE.COM_000003 - 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/jobs/results?ctxType=ctxSummary&execId=C7F4F4C29D36E179E030007F01007E95 Go Links

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

Logs

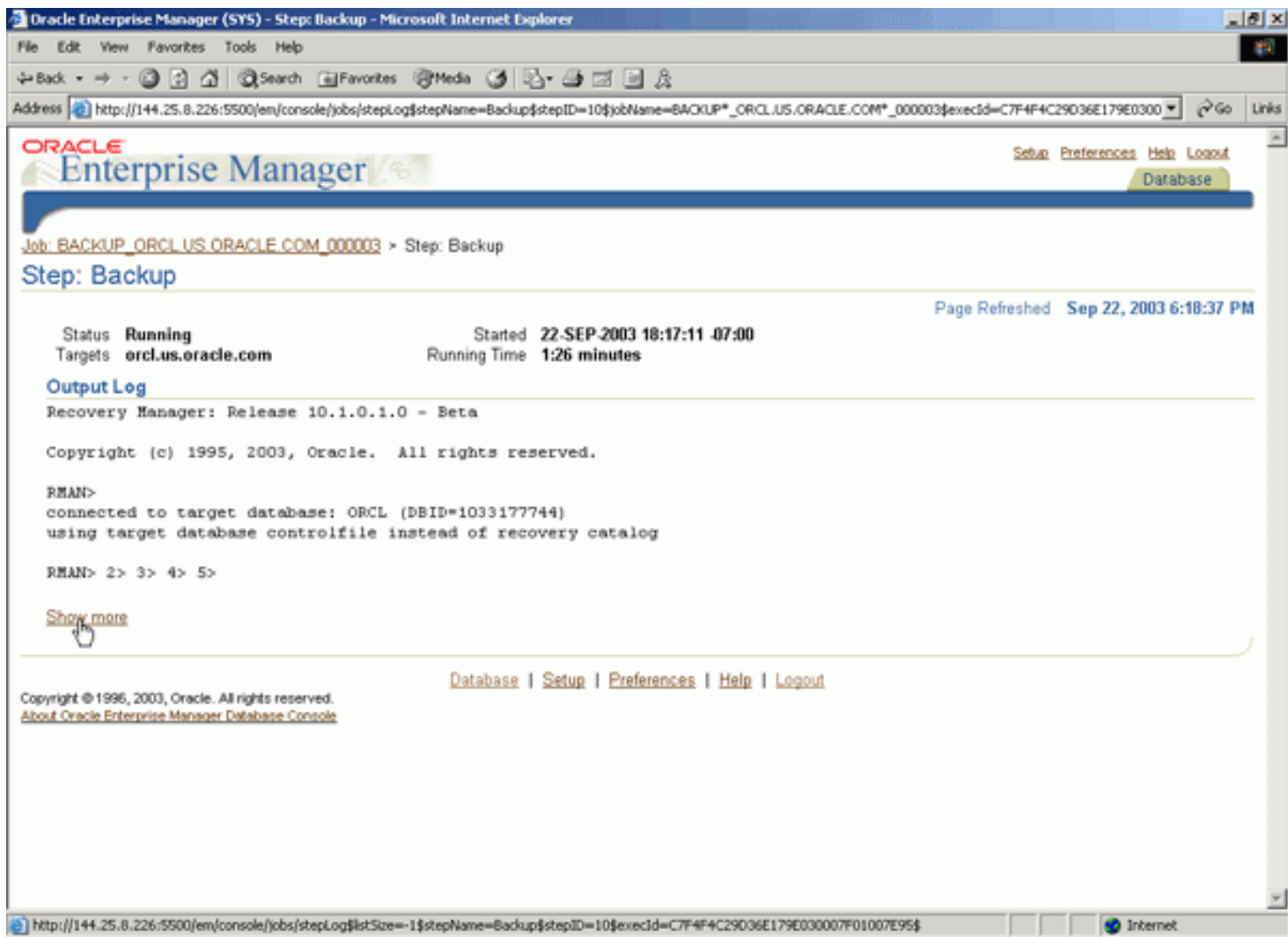
Search [Go](#) [Advanced Search](#)

Name	Targets	Status	Started	Ended	Running (sec)
PreBackup	orcl.us.oracle.com	Succeeded	22-SEP-2003 18:17:04 -07:00	22-SEP-2003 18:17:05 -07:00	1
Backup	orcl.us.oracle.com	Running	22-SEP-2003 18:17:11 -07:00		64

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

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

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 shows a URL starting with "http://144.25.8.226:5500/em/console/jobs/stepLog...". The main content area displays the following log text:

```

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/o1_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/o1_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/o1_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/o1_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/o1_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

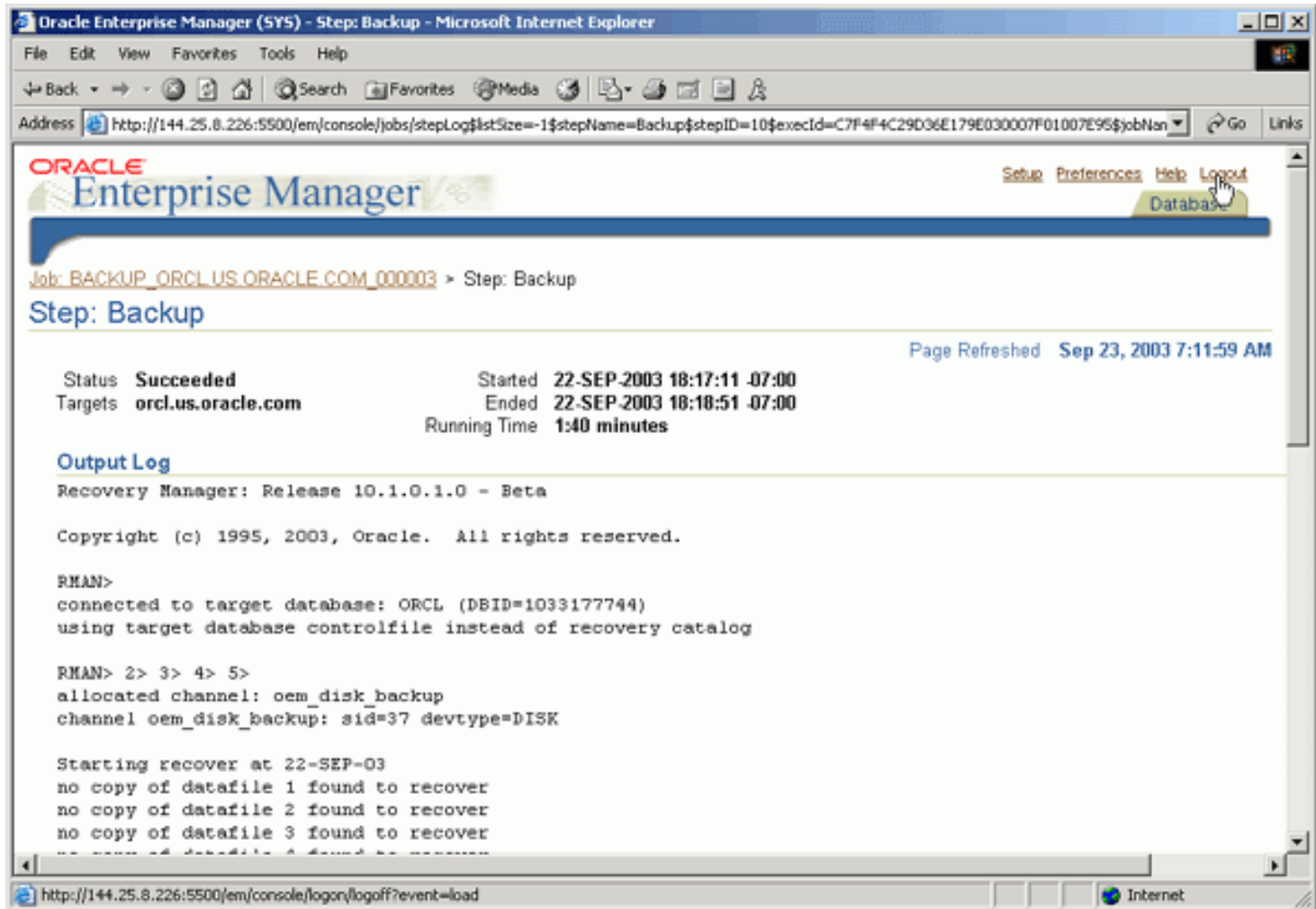
RMAN>

Recovery Manager complete.

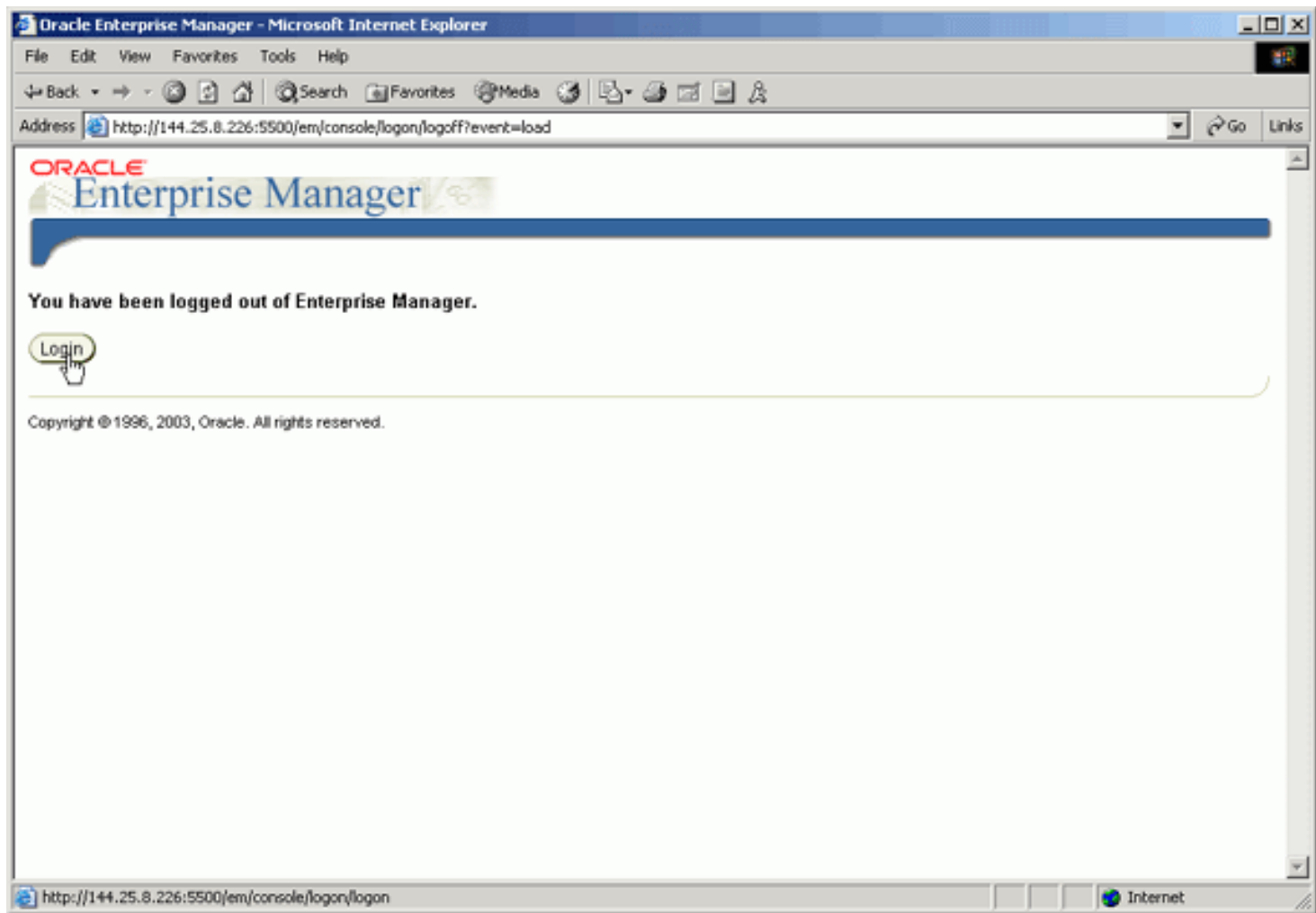
```

The browser window has a status bar at the bottom showing "Done" and "Internet".

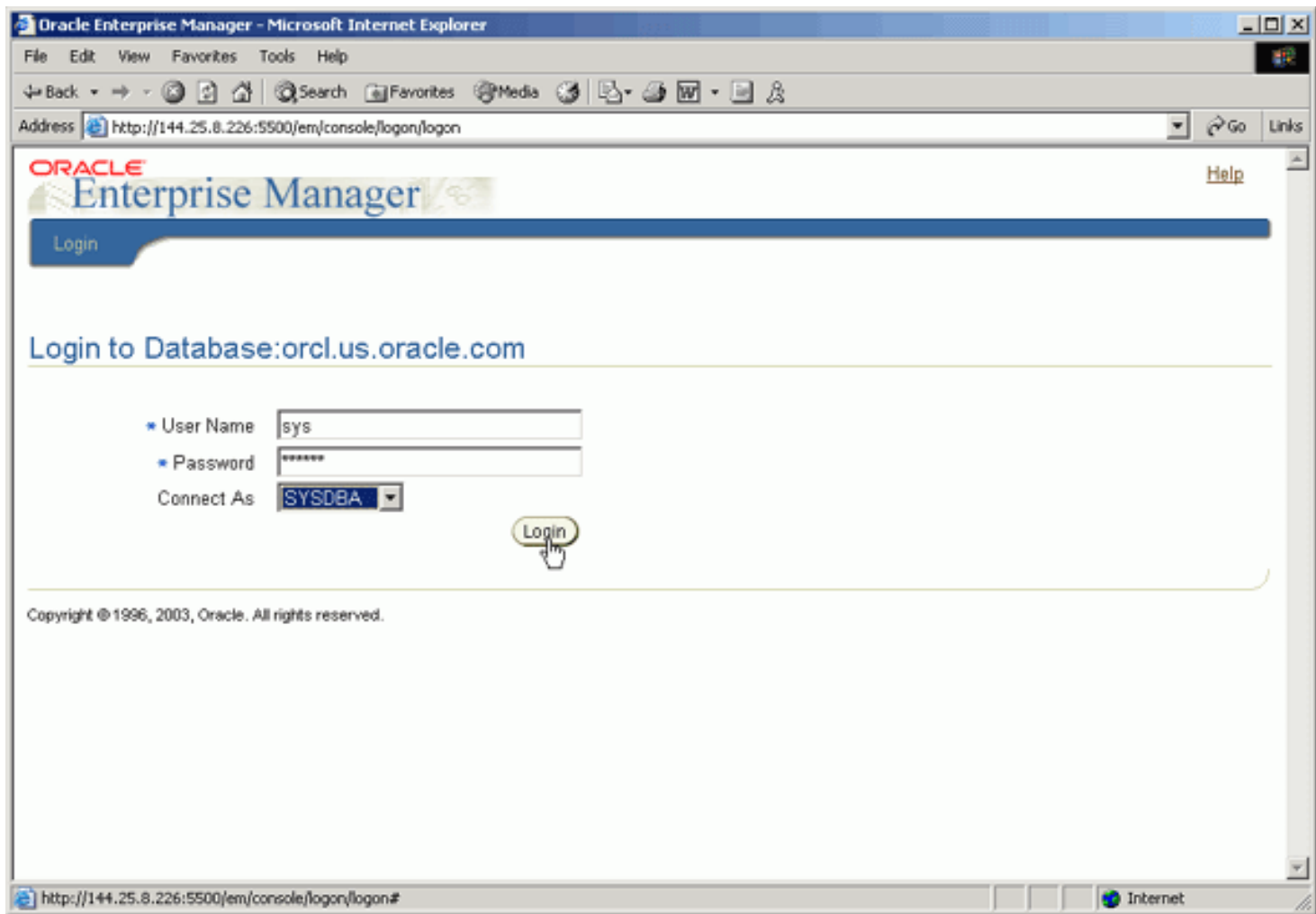
12. Click **Logout** .



13. Click **Login** .



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



Performing Recovery of a Datafile

[Back to Topic List](#)

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

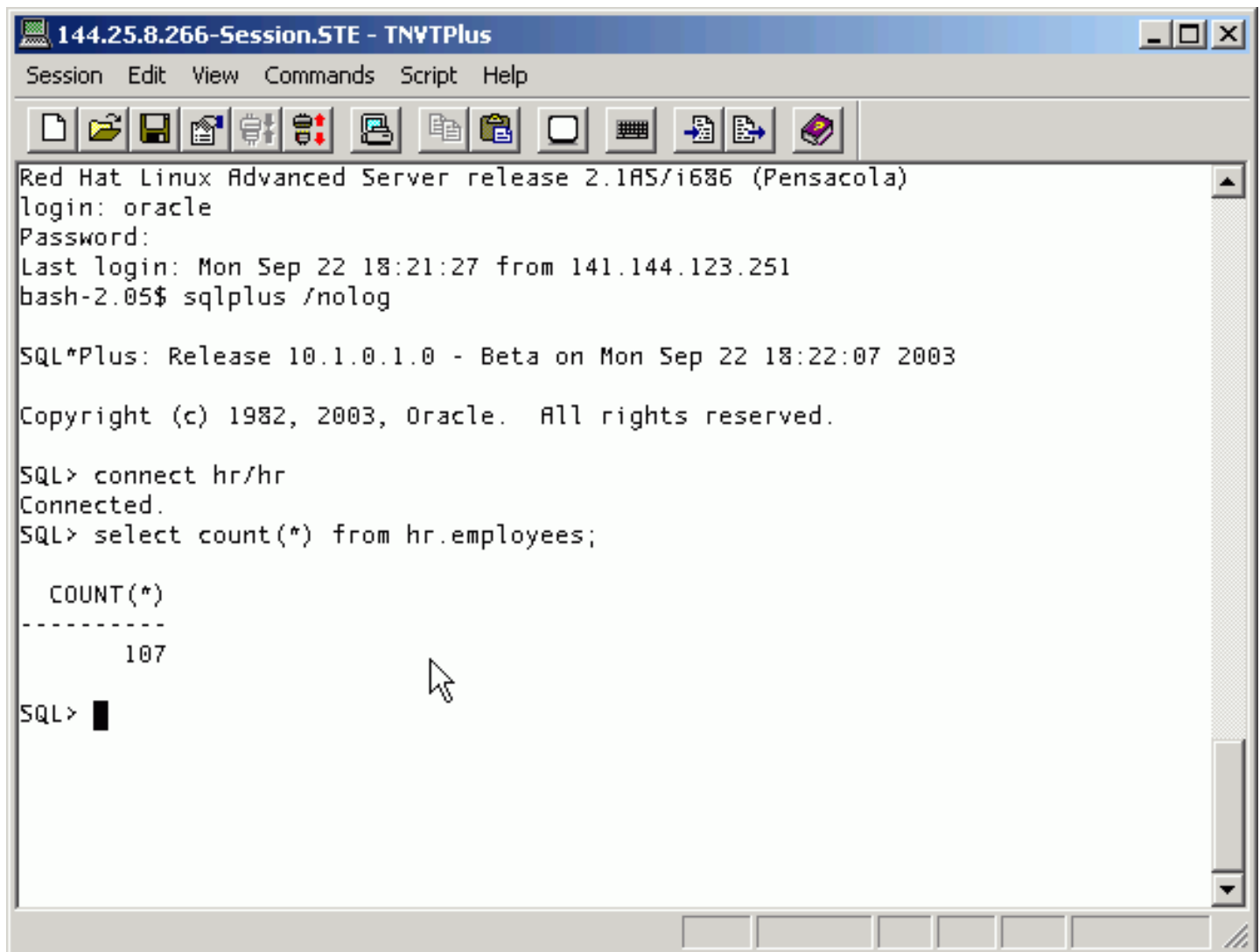
You can use the Flashback Database feature to quickly revert an Oracle database to the state it was in at a previous time without restoring datafiles and performing media recovery. You can use Enterprise Manager or the FLASHBACK DATABASE command to flashback your database.

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:

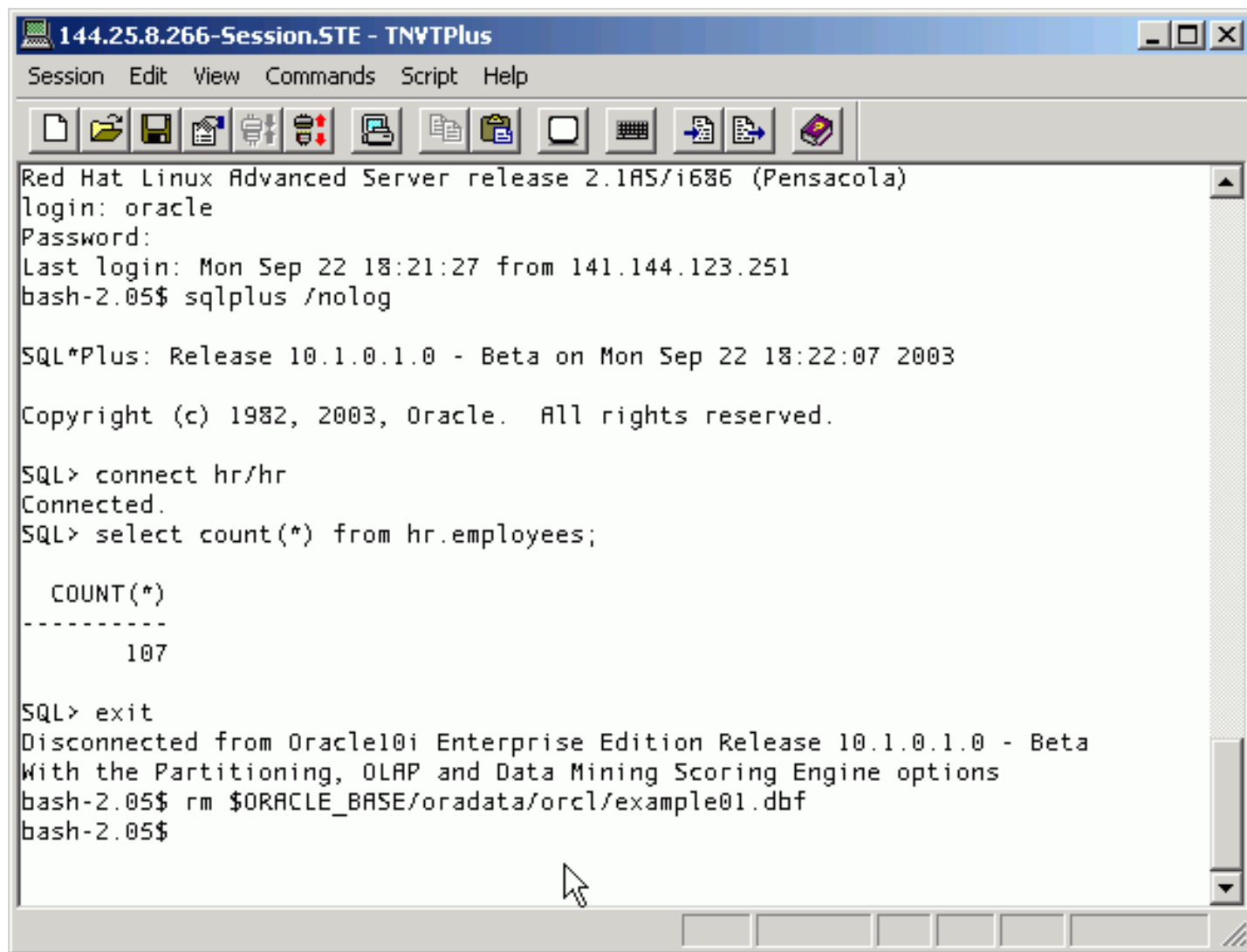
1. Invoke SQL*Plus and connect as the HR user. Query the EMPLOYEES table as follows:

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



2. 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
```



```
144.25.8.266-Session.STE - TNVTPPlus
Session Edit View Commands Script Help

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.

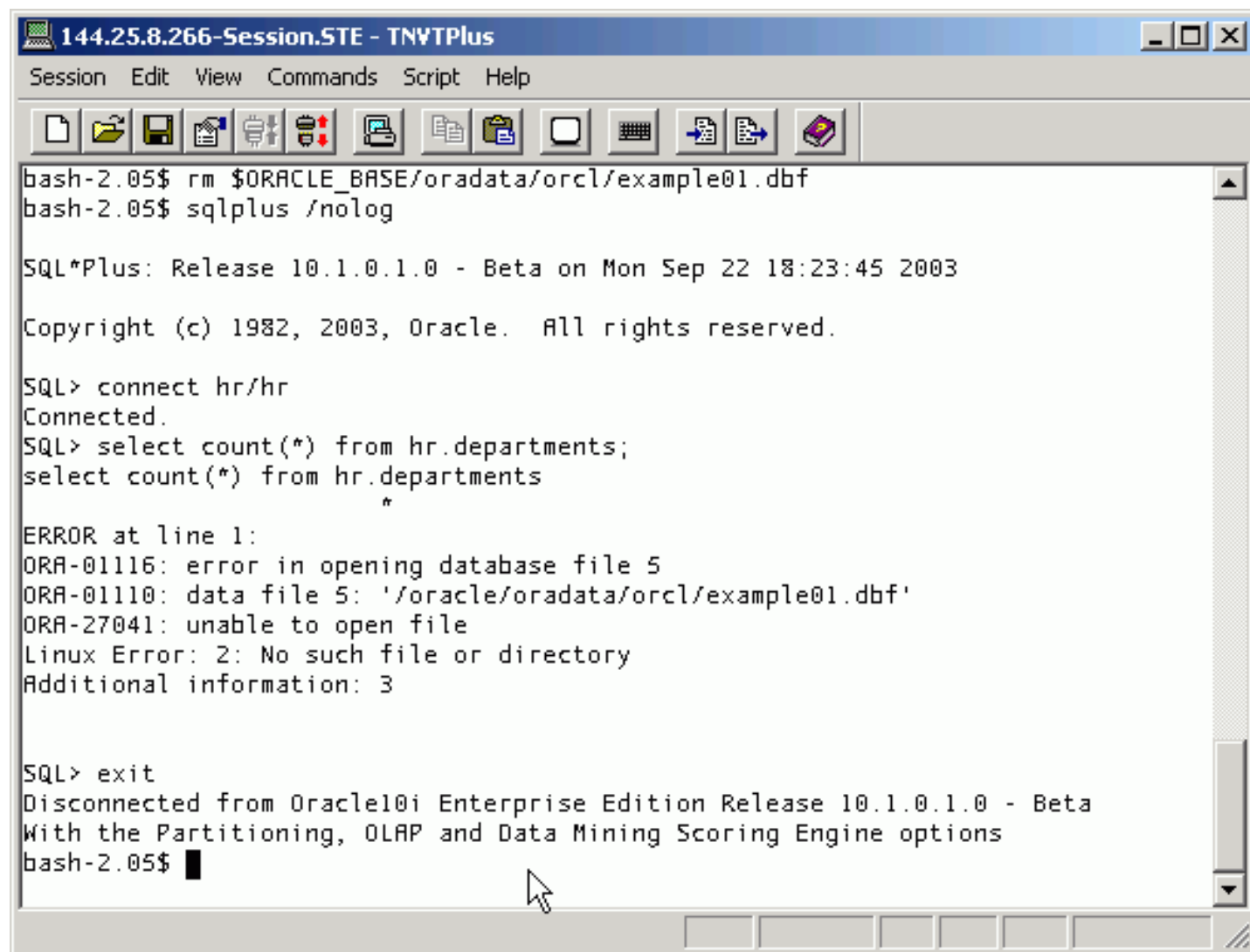
SQL> connect hr/hr
Connected.
SQL> select count(*) from hr.employees;

  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 with the title bar "144.25.8.266-Session.STE - TNYTPlus". The window contains a menu bar with "Session", "Edit", "View", "Commands", "Script", and "Help". Below the menu bar is a toolbar with various icons. The terminal text shows the following sequence of commands and output:

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

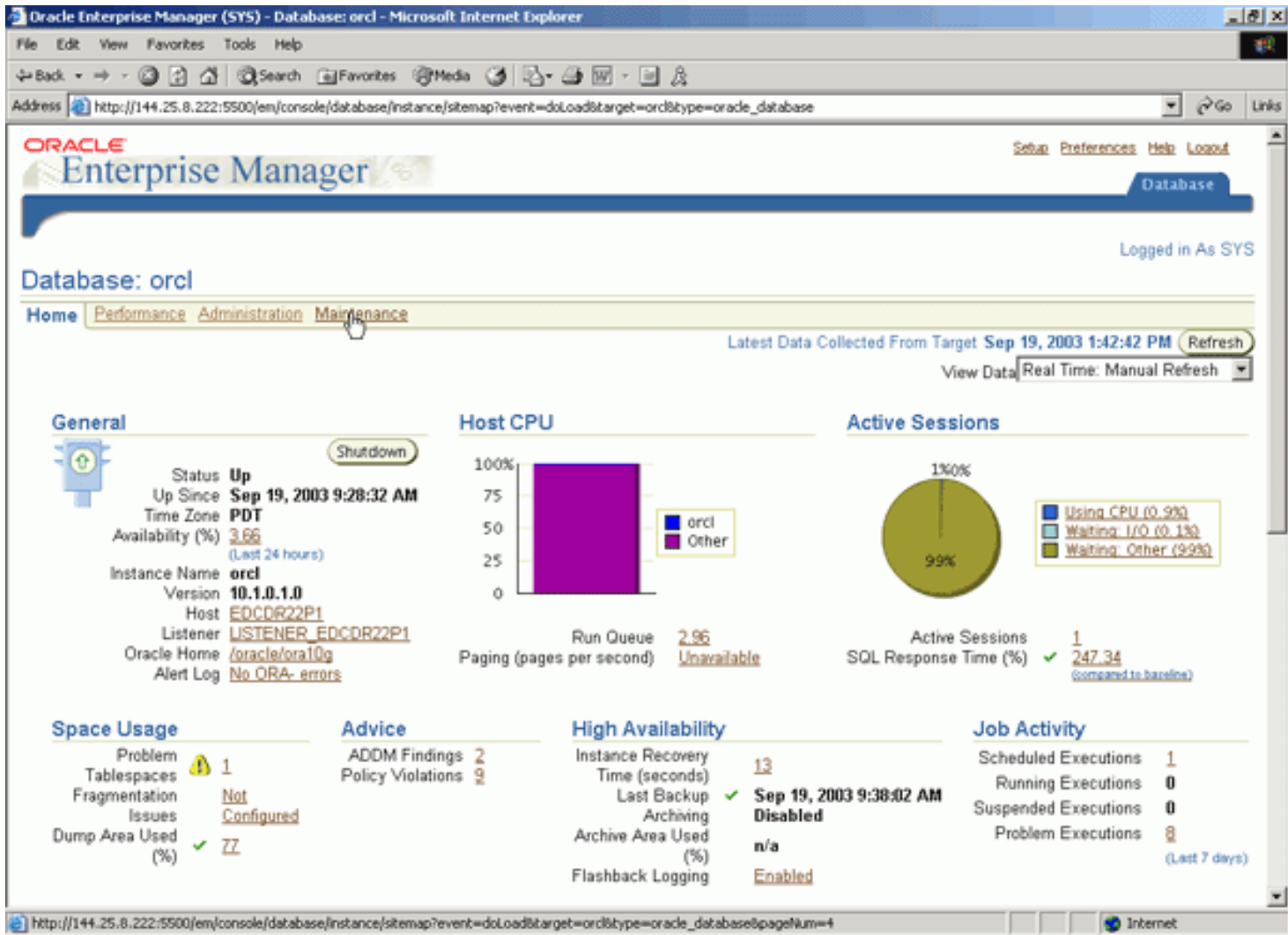
SQL*Plus: Release 10.1.0.1.0 - Beta on Mon Sep 22 18:23:45 2003

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

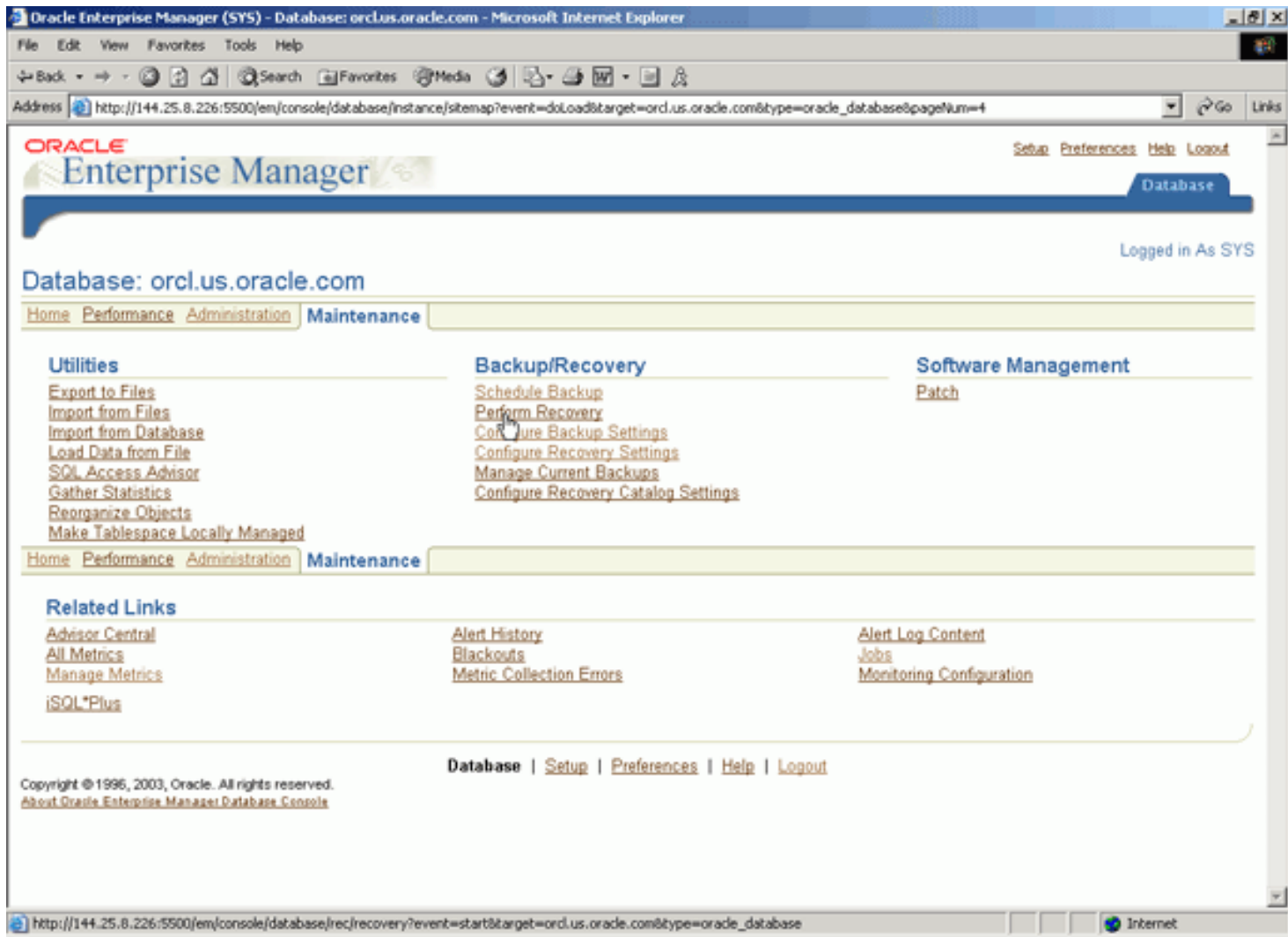
SQL> connect hr/hr
Connected.
SQL> select count(*) from hr.departments;
select count(*) from hr.departments
*
ERROR at line 1:
ORA-01116: error in opening database file 5
ORA-01110: data file 5: '/oracle/oradata/orcl/example01.dbf'
ORA-27041: unable to open file
Linux Error: 2: No such file or directory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

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



5. 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** .

Perform Recovery: Type - 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/rec/recovery?event=start&target=orcl.us.oracle.com&type=oracle_database Go Links

ORACLE
Enterprise Manager

Setup Preferences Help Logout

Database

Database: orcl.us.oracle.com

Perform Recovery: Type

Cancel Continue

Current Database Information

1. ARCHIVELOG Mode - ARCHIVELOG
2. Datafiles Need Media Recovery - 1
3. Current Status - OPEN

Type

Object Type Datafiles

Operation Type

☒ Restore and Recover

☐ Restore Only

☐ Recover Only

☐ Block Recovery

Host Credentials

To perform recovery, supply operating system login credentials.

Username oracle

Password *****

Overview

- Restore and/or recover the entire database or selected objects
- Restore files to a new location
- Recover tablespaces to a point-in-time based on a timestamp, system change number (SCN), or log sequence number
- Recover datafile data blocks that are marked as corrupted, or based on datafile block IDs or tablespace block addresses
- Flashback database or tables to a specific system change number (SCN) or timestamp

Cancel Continue

Database | Setup | Preferences | Help | Logout

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

http://144.25.8.226:5500/em/console/database/rec/recovery?event=start&target=orcl.us.oracle.com&type=oracle_database# Internet

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

Perform Recovery: Type - 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/rec/recovery?event=start&target=orcl.us.oracle.com&type=oracle_database Go Links

ORACLE Enterprise Manager Database

Database: orcl.us.oracle.com

Perform Recovery: Type

Cancel Continue

Current Database Information

1. ARCHIVELOG Mode - ARCHIVELOG
2. Datafiles Need Media Recovery - 1
3. Current Status - OPEN

Type

Object Type Datafiles

Operation Type

☒ Restore and Recover

☐ Restore Only

☐ Recover Only

☐ Block Recovery

Host Credentials

To perform recovery, supply operating system login credentials.

Username oracle

Password *****

Overview

- Restore and/or recover the entire database or selected objects
- Restore files to a new location
- Recover tablespaces to a point-in-time based on a timestamp, system change number (SCN), or log sequence number
- Recover datafile data blocks that are marked as corrupted, or based on datafile block IDs or tablespace block addresses
- Flashback database or tables to a specific system change number (SCN) or timestamp

Cancel Continue

Database | Setup | Preferences | Help | Logout

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

http://144.25.8.226:5500/em/console/database/rec/recovery?event=start&target=orcl.us.oracle.com&type=oracle_database# Internet

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

Perform Recovery: Rename - 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/rec/recovery?target=orcl.us.oracle.com&type=oracle_database Go Links

ORACLE Enterprise Manager Database

Setup Preferences Help Logout

Datfiles Rename Review

Perform Recovery: Rename

Database **orcl.us.oracle.com**
Object Type **Datfiles**
Operation Type **Restore and Recover**

Do you want to restore the files to a different location? If so, the control file will be updated to use the renamed files.

☒ No. Restore the files to the default location.
☐ Yes. Restore the files to a new location.

Specify a common location

Cancel Back Step 2 of 3 Next

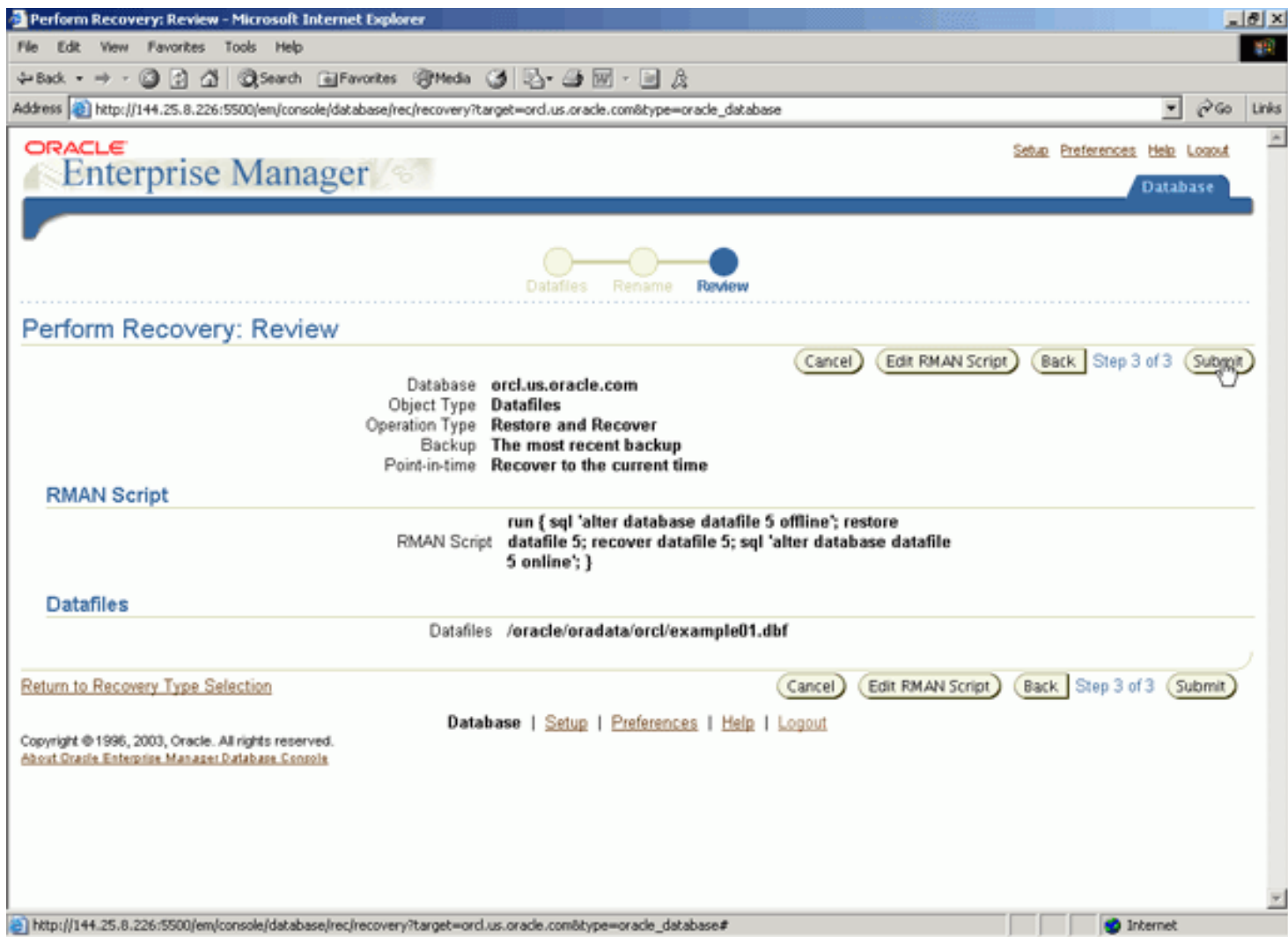
[Return to Recovery Type Selection](#)

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

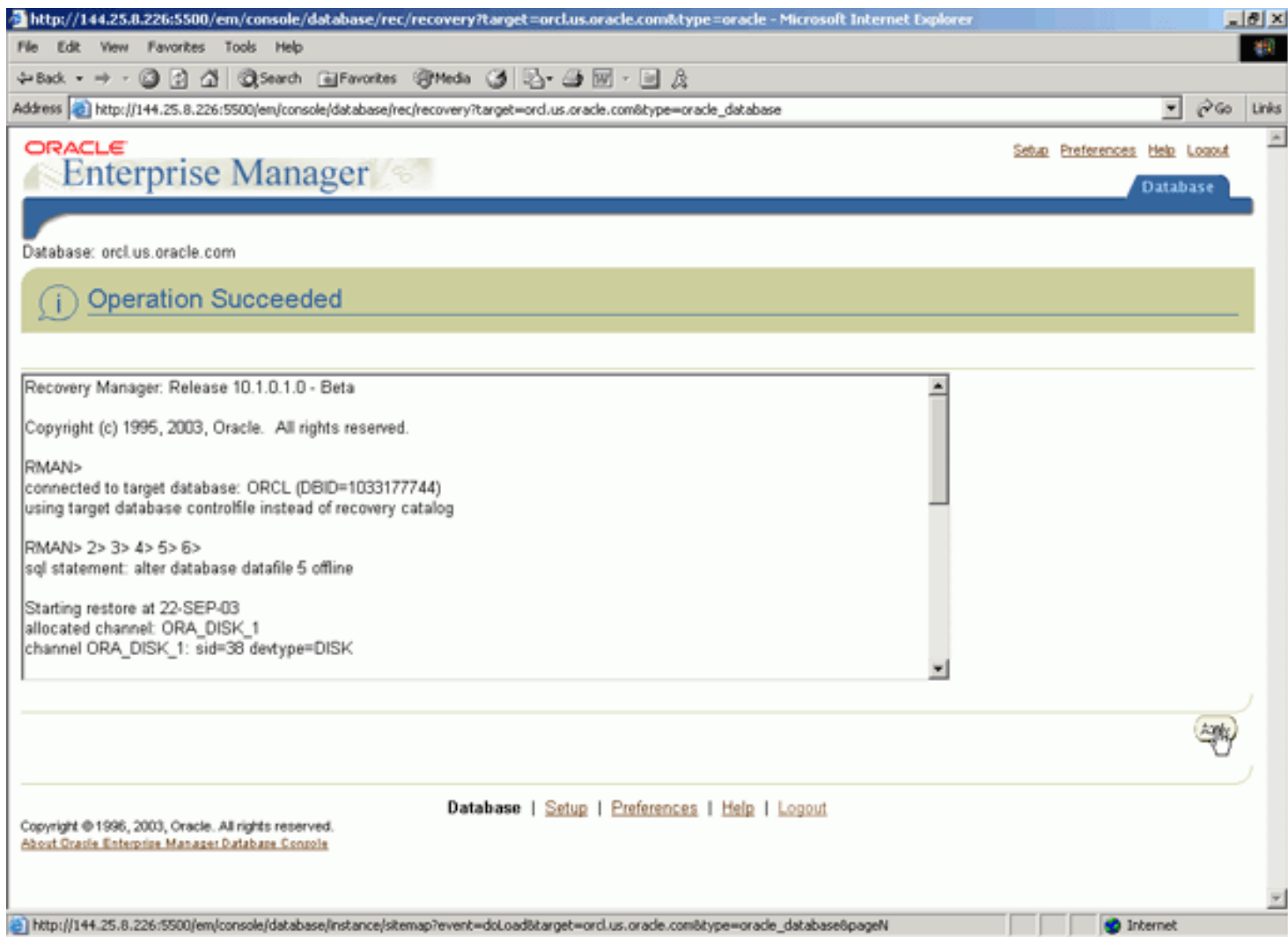
Copyright © 1996, 2003, Oracle. All rights reserved.
[About Oracle Enterprise Manager Database Console](#)

http://144.25.8.226:5500/em/console/database/rec/recovery?target=orcl.us.oracle.com&type=oracle_database# Internet

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

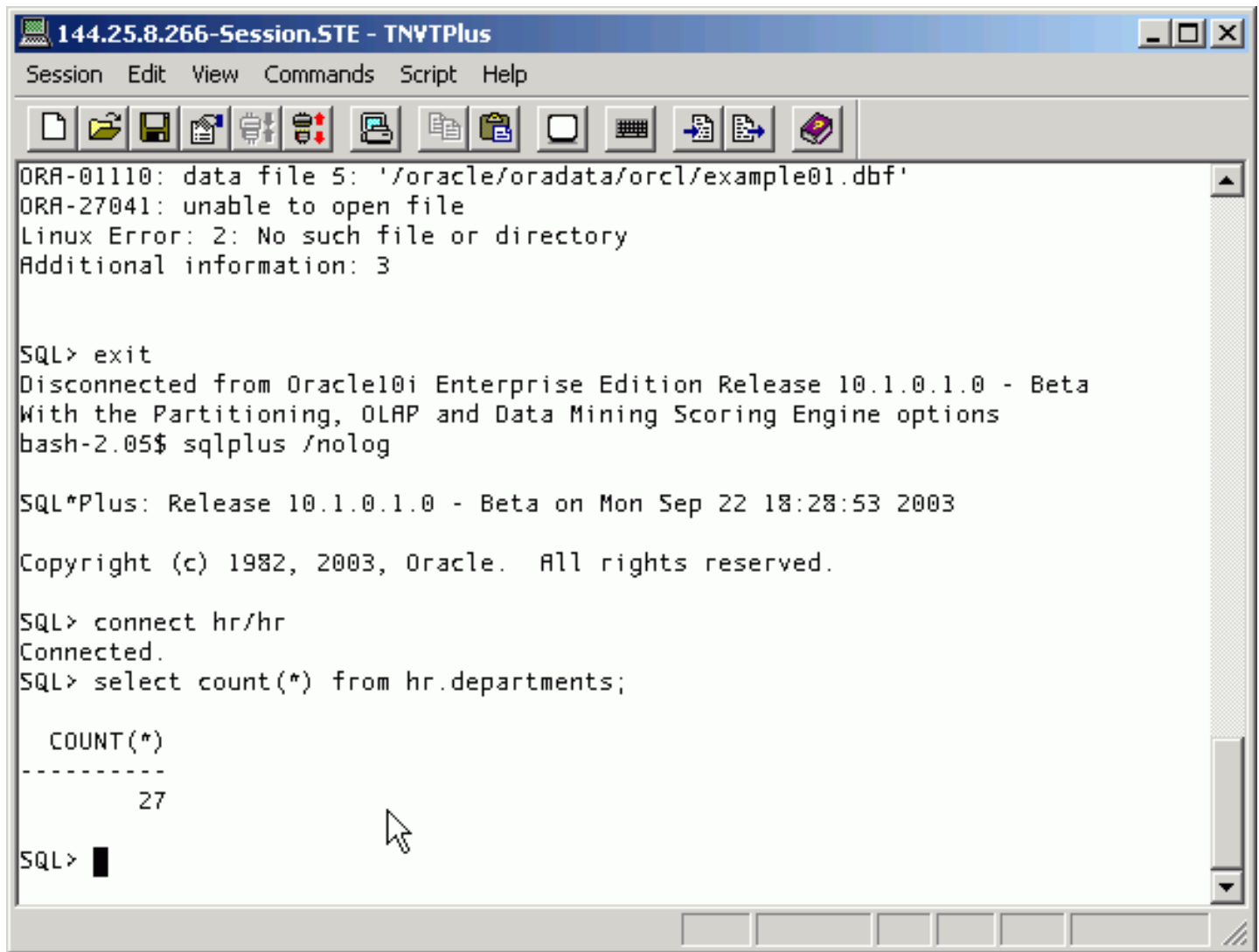


10. View the **Operation Succeeded** page. Click **OK** .



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
```



```
144.25.8.266-Session.STE - TNVTPPlus
Session Edit View Commands Script Help

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.

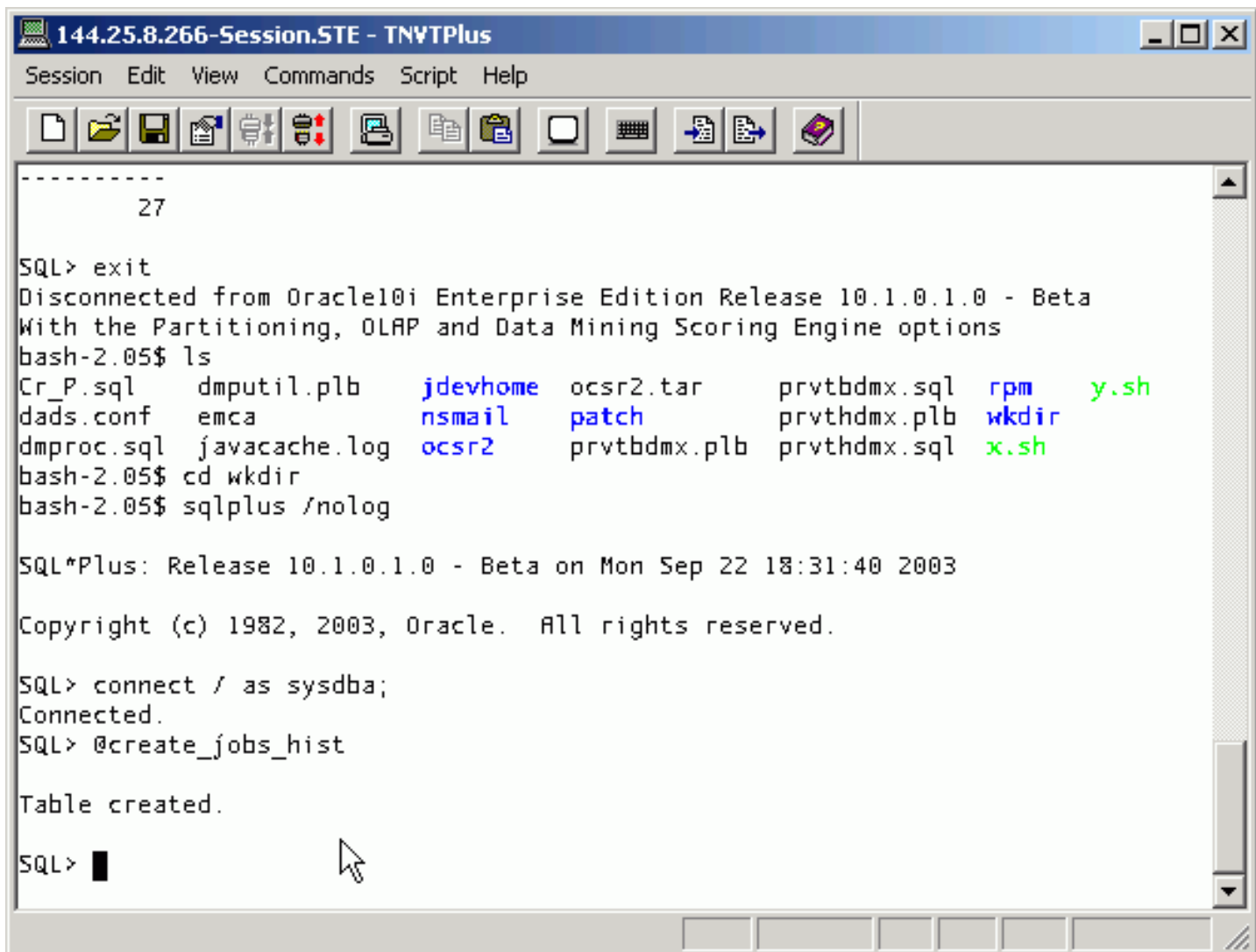
Flashback Database is implemented using a new type of log file called a Flashback Database log. Flashback Database logs contain data block images for changed blocks and other information that enables the operation. The data block images are used to quickly back out changes to the database during the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



```
-----
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

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

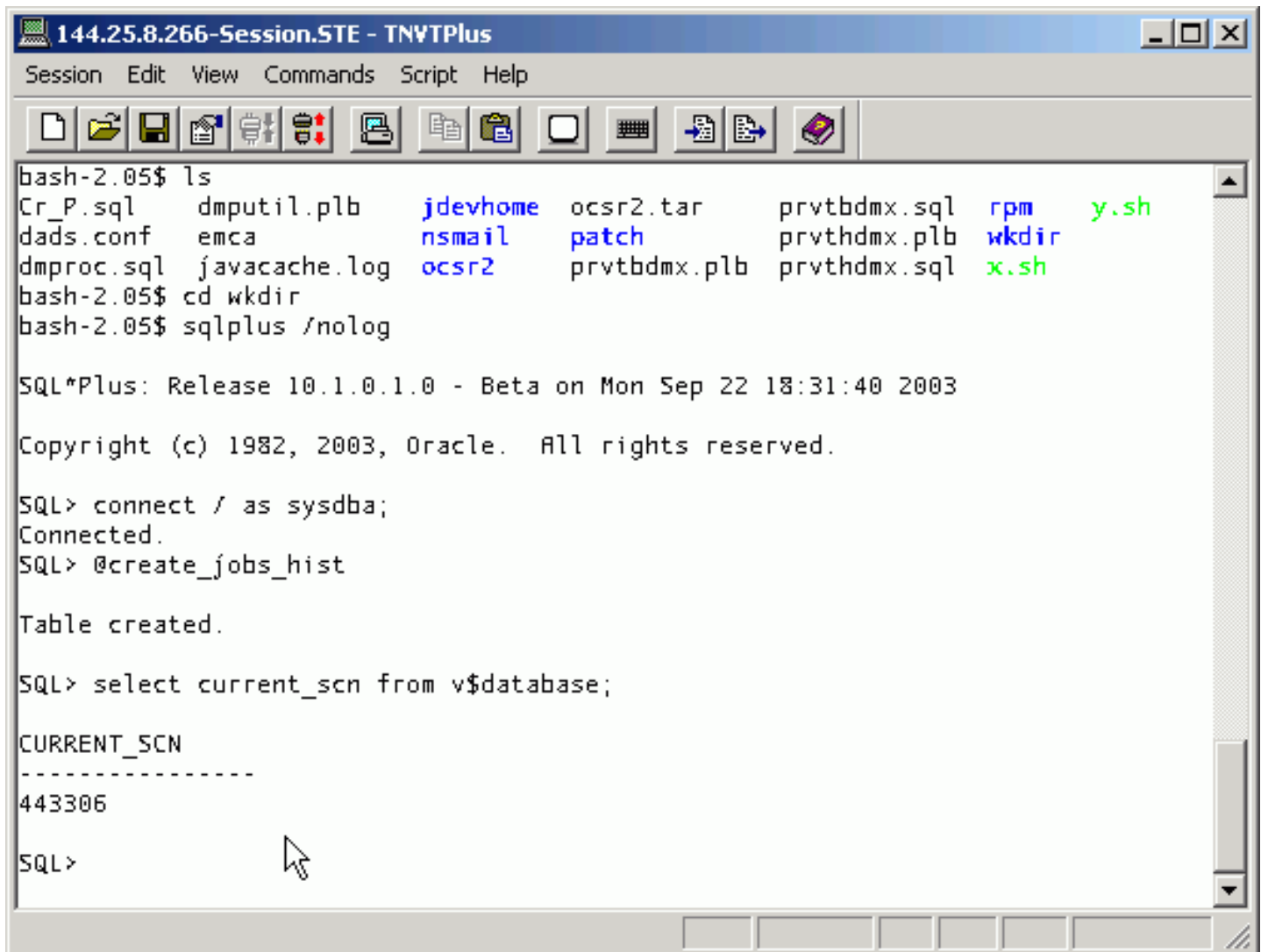
SQL> connect / as sysdba;
Connected.
SQL> @create_jobs_hist

Table created.

SQL> █
```

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

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



```
144.25.8.266-Session.STE - TNVTPlus
Session Edit View Commands Script Help

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

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;

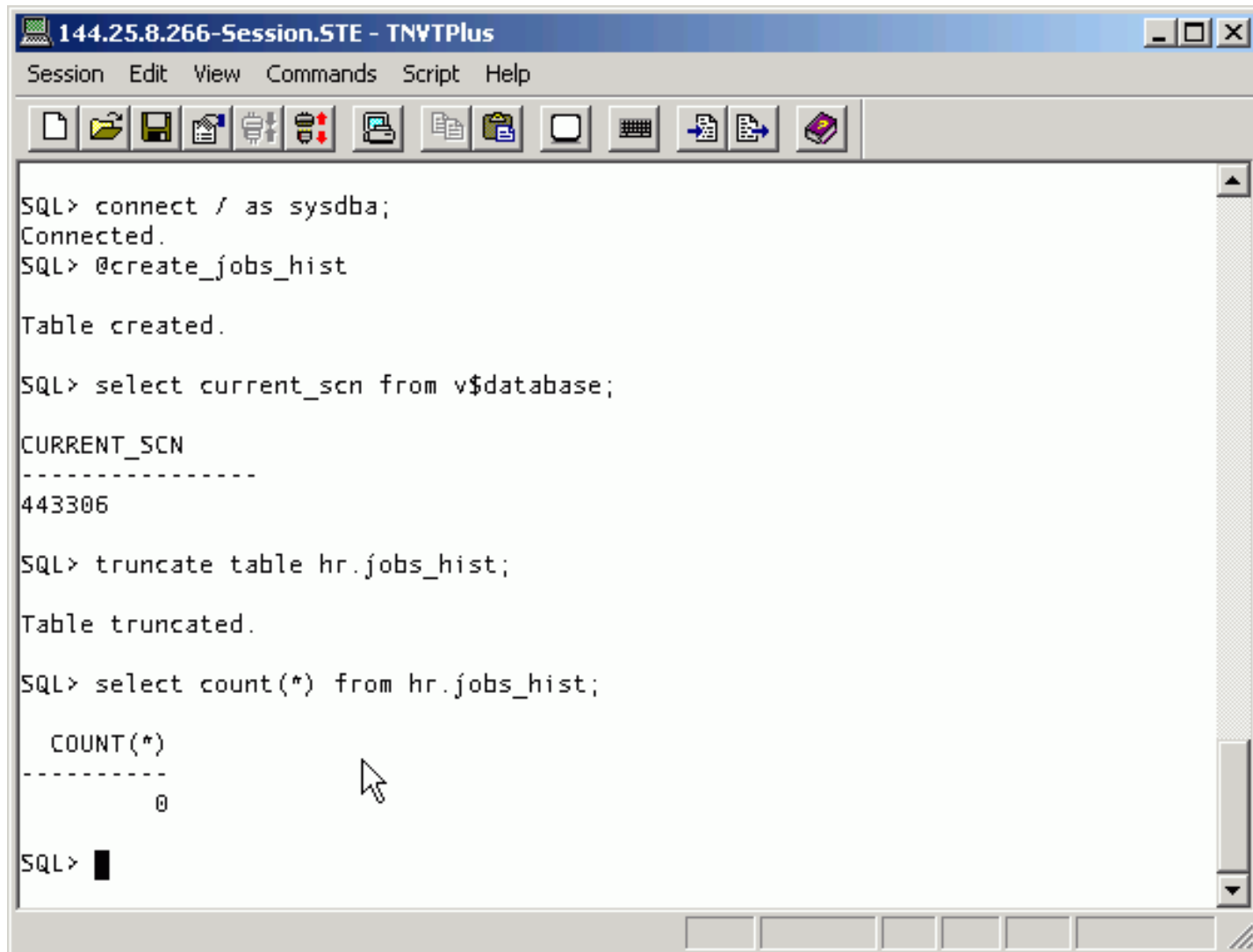
CURRENT_SCN
-----
443306

SQL>
```

3. Truncate the HR.JOBS_HIST table to simulate user error.

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

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



The screenshot shows a 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 main text area contains the following SQL commands and their output:

```
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.

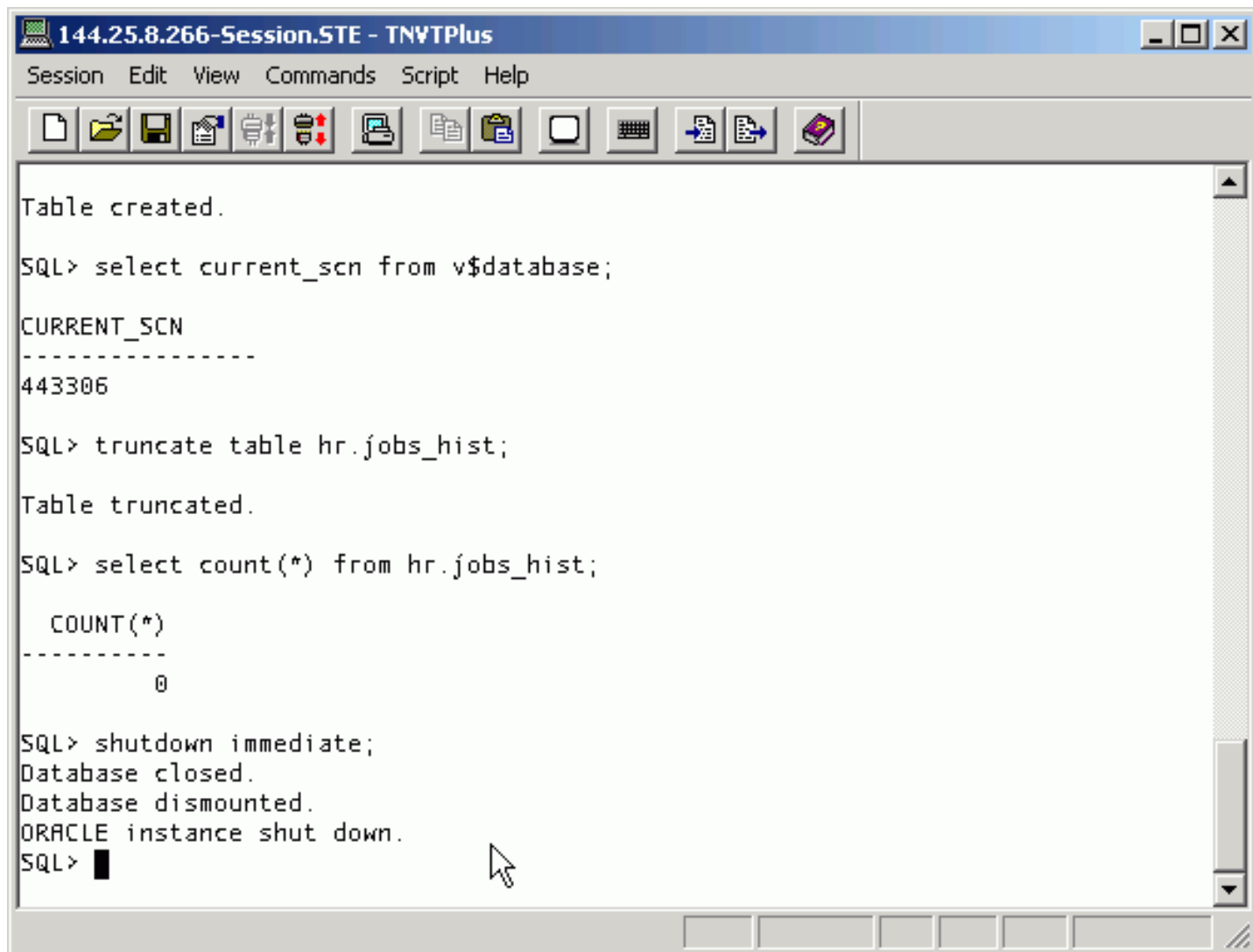
SQL> select count(*) from hr.jobs_hist;

COUNT(*)
-----
0

SQL> 
```

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

SHUTDOWN IMMEDIATE

The screenshot shows a window titled "144.25.8.266-Session.STE - TNSPlus1". The menu bar includes "Session", "Edit", "View", "Commands", "Script", and "Help". The toolbar contains icons for file operations (new, open, save, print, etc.) and database functions. The main text area displays the following SQL commands and their outputs:

```
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;

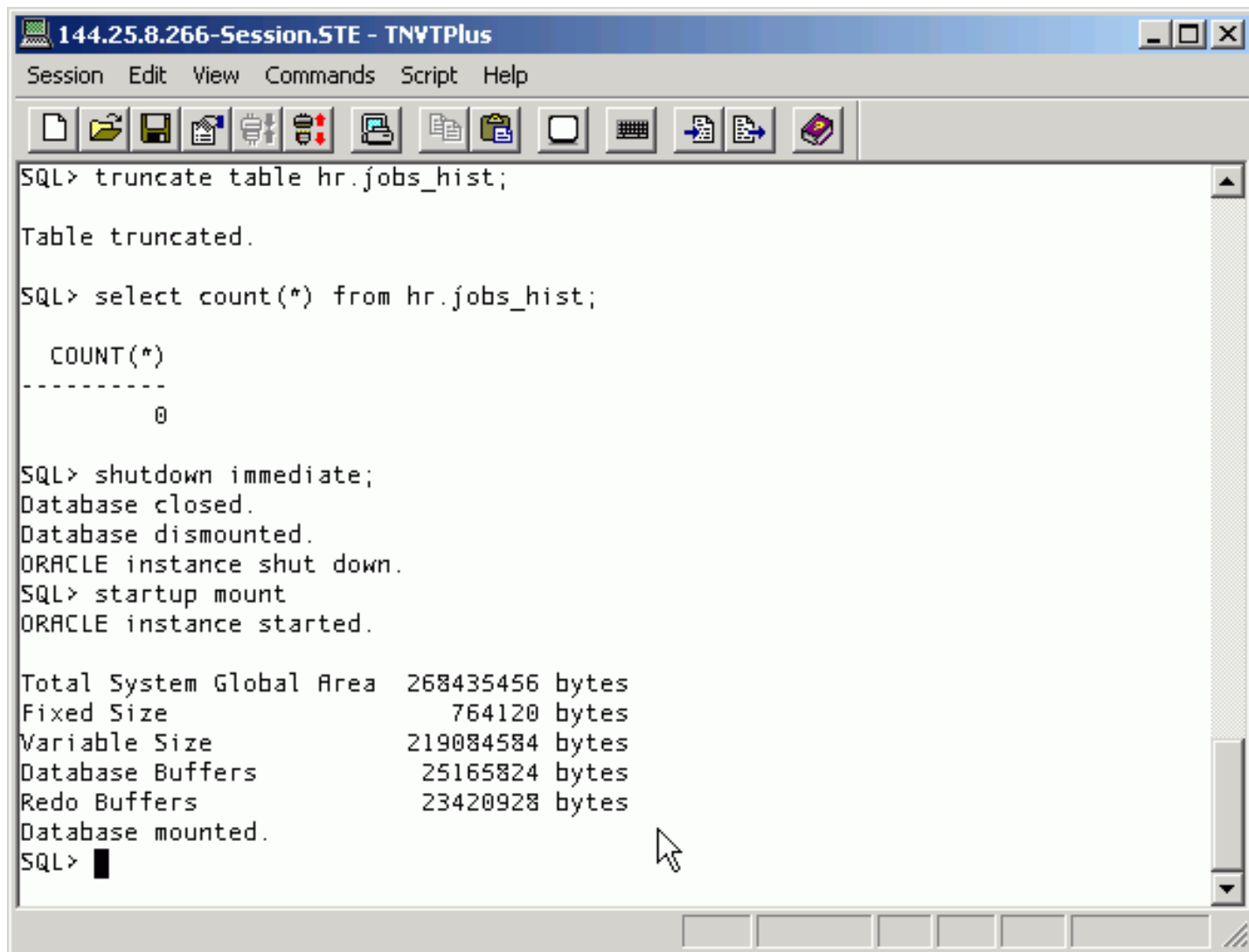
COUNT(*)
-----
0

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

A mouse cursor is visible over the prompt "SQL>". The status bar at the bottom of the window shows several empty buttons and a refresh icon.

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

STARTUP MOUNT

A screenshot of a TNVTPlus terminal window. The title bar reads "144.25.8.266-Session.STE - TNVTPlus". The menu bar includes "Session", "Edit", "View", "Commands", "Script", and "Help". The toolbar contains icons for file operations (new, open, save, print, etc.). The terminal text shows the following sequence of commands and output:

```
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.

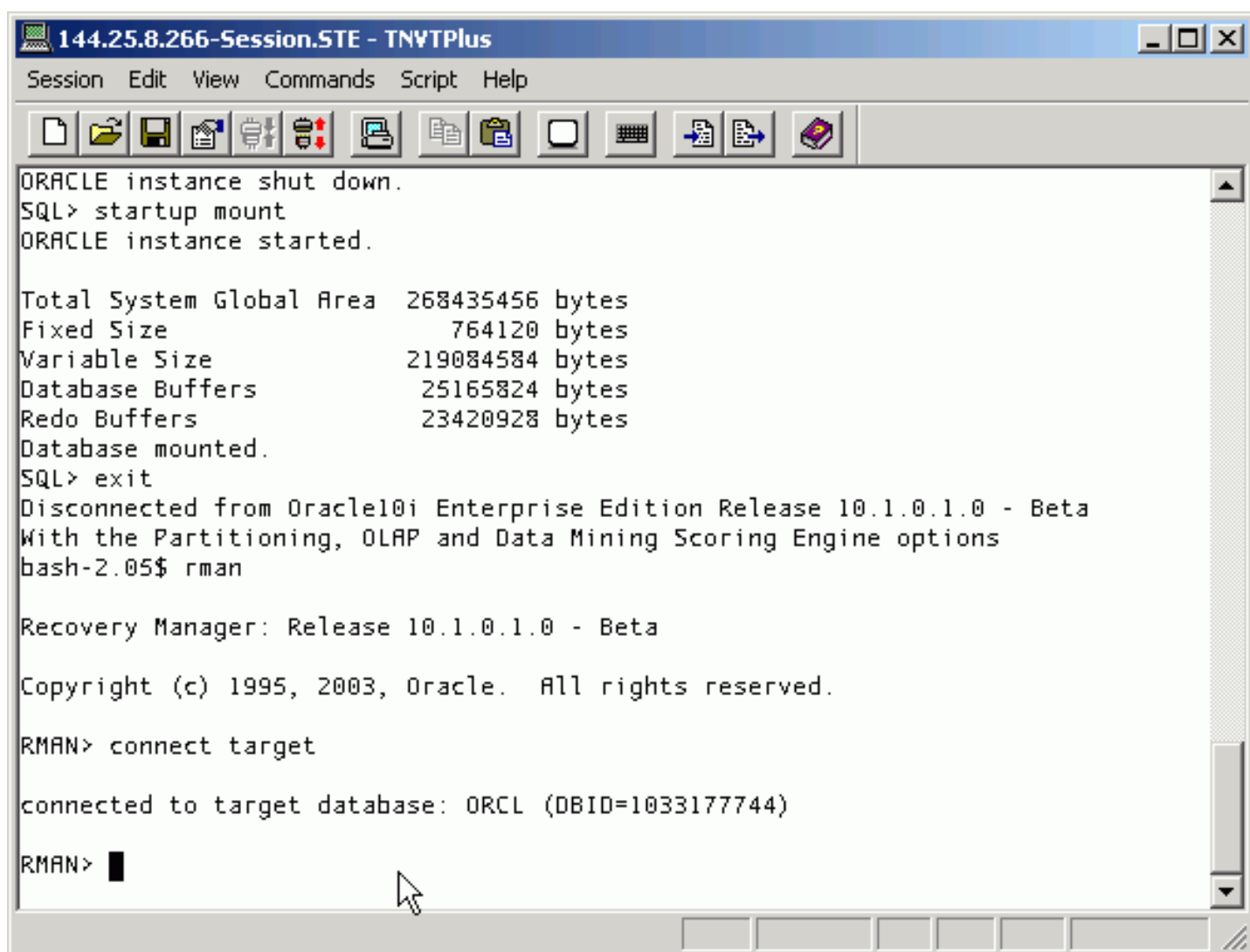
Total System Global Area 268435456 bytes
Fixed Size 764120 bytes
Variable Size 219084584 bytes
Database Buffers 25165824 bytes
Redo Buffers 23420928 bytes
Database mounted.
SQL> █
```

A mouse cursor is visible over the prompt "SQL>".

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

```
rman
```

```
connect target
```



```
144.25.8.266-Session.STE - TNVTPPlus
Session Edit View Commands Script Help

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.

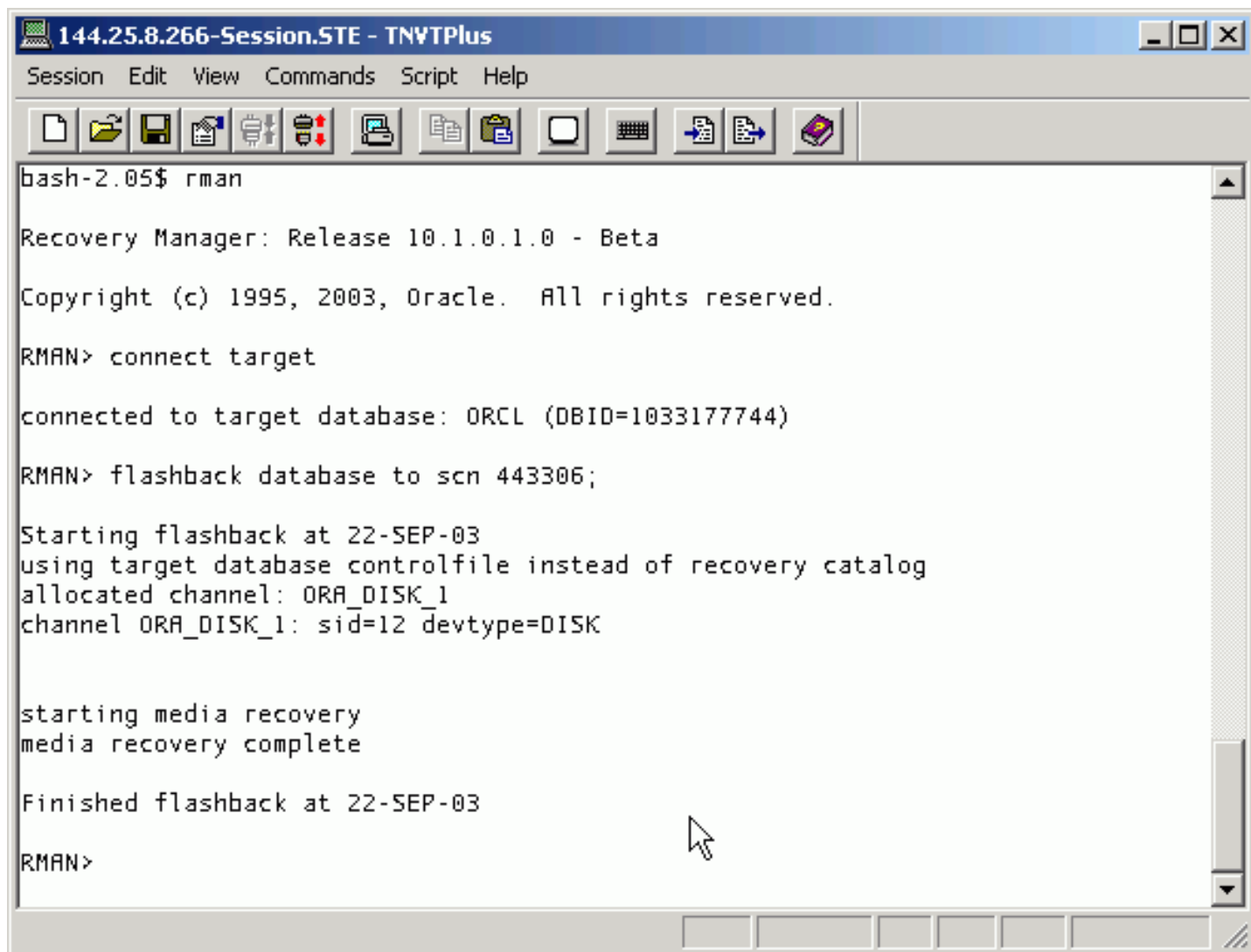
RMAN> connect target

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>;



The screenshot shows 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 text shows the following sequence of commands and output:

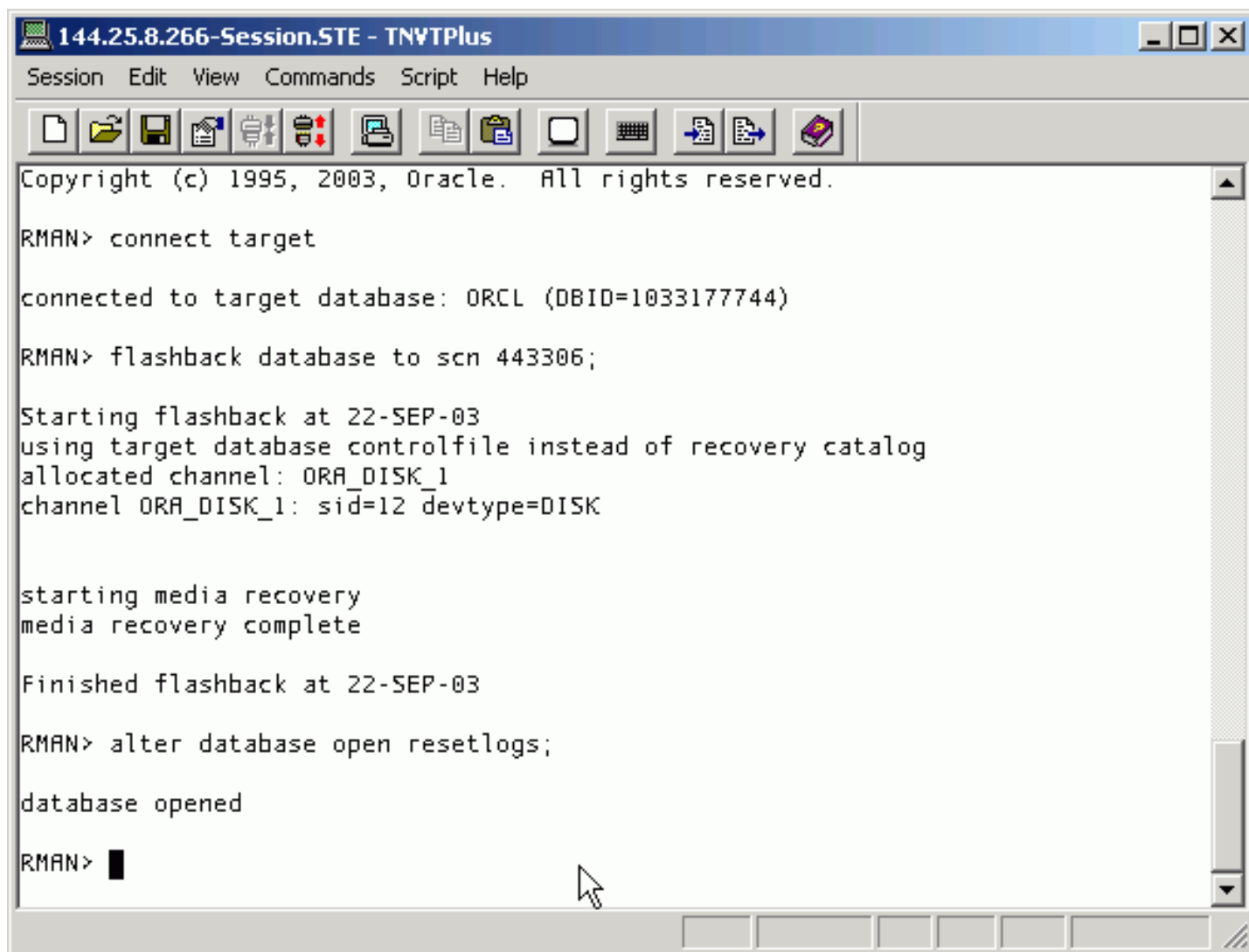
```
bash-2.05$ rman
Recovery Manager: Release 10.1.0.1.0 - Beta
Copyright (c) 1995, 2003, Oracle. All rights reserved.
RMAN> connect target
connected to target database: ORCL (DBID=1033177744)
RMAN> flashback database to scn 443306;
Starting flashback at 22-SEP-03
using target database controlfile instead 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 - 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 main text area displays the following output:

```
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;

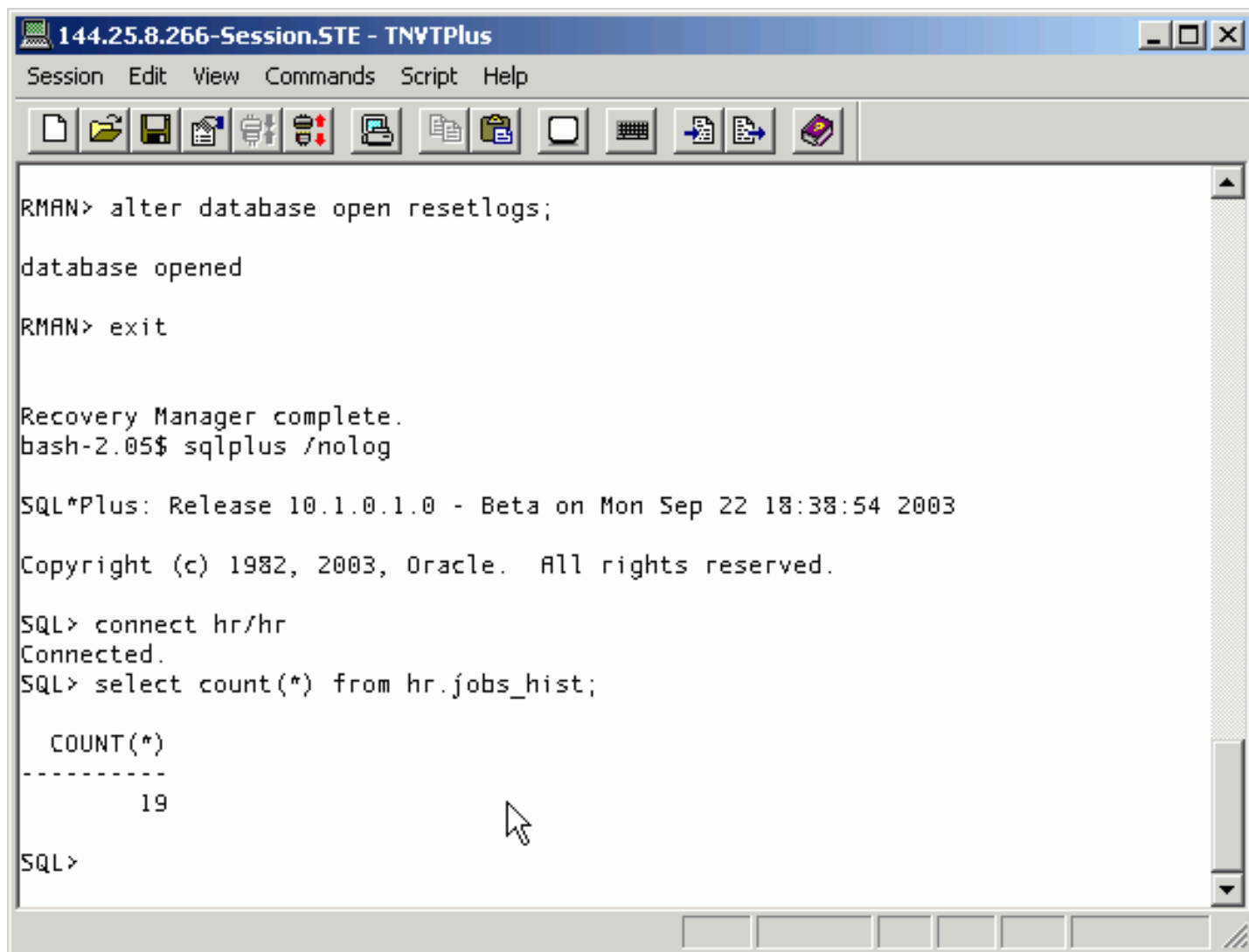
database opened

RMAN> █
```

A mouse cursor is visible over the prompt "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 menu bar includes "Session", "Edit", "View", "Commands", "Script", and "Help". The toolbar contains icons for file operations, database management, and execution. The terminal text shows the following sequence of commands and output:

```
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.

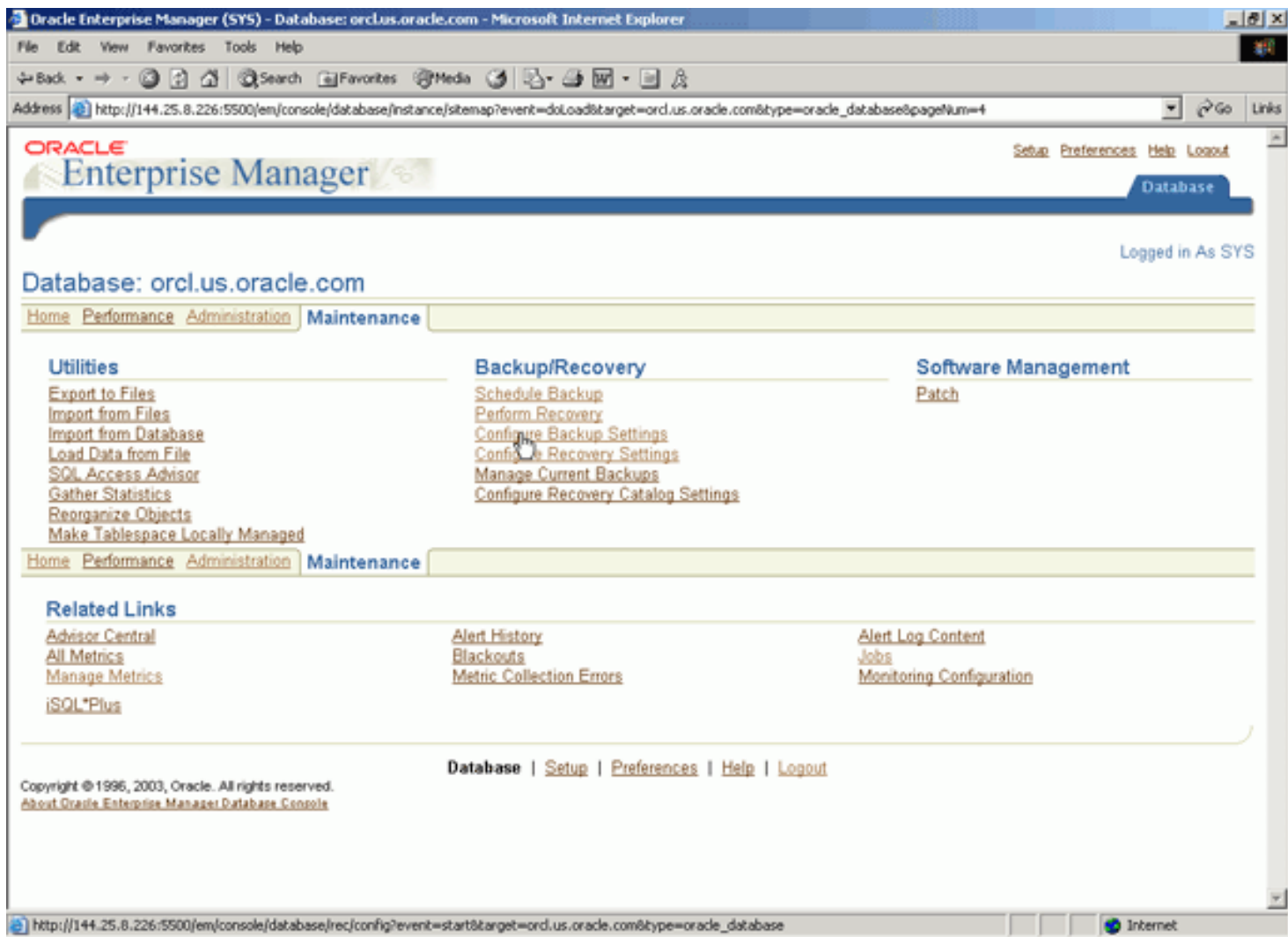
Enabling Change Tracking

[Back to Topic List](#)

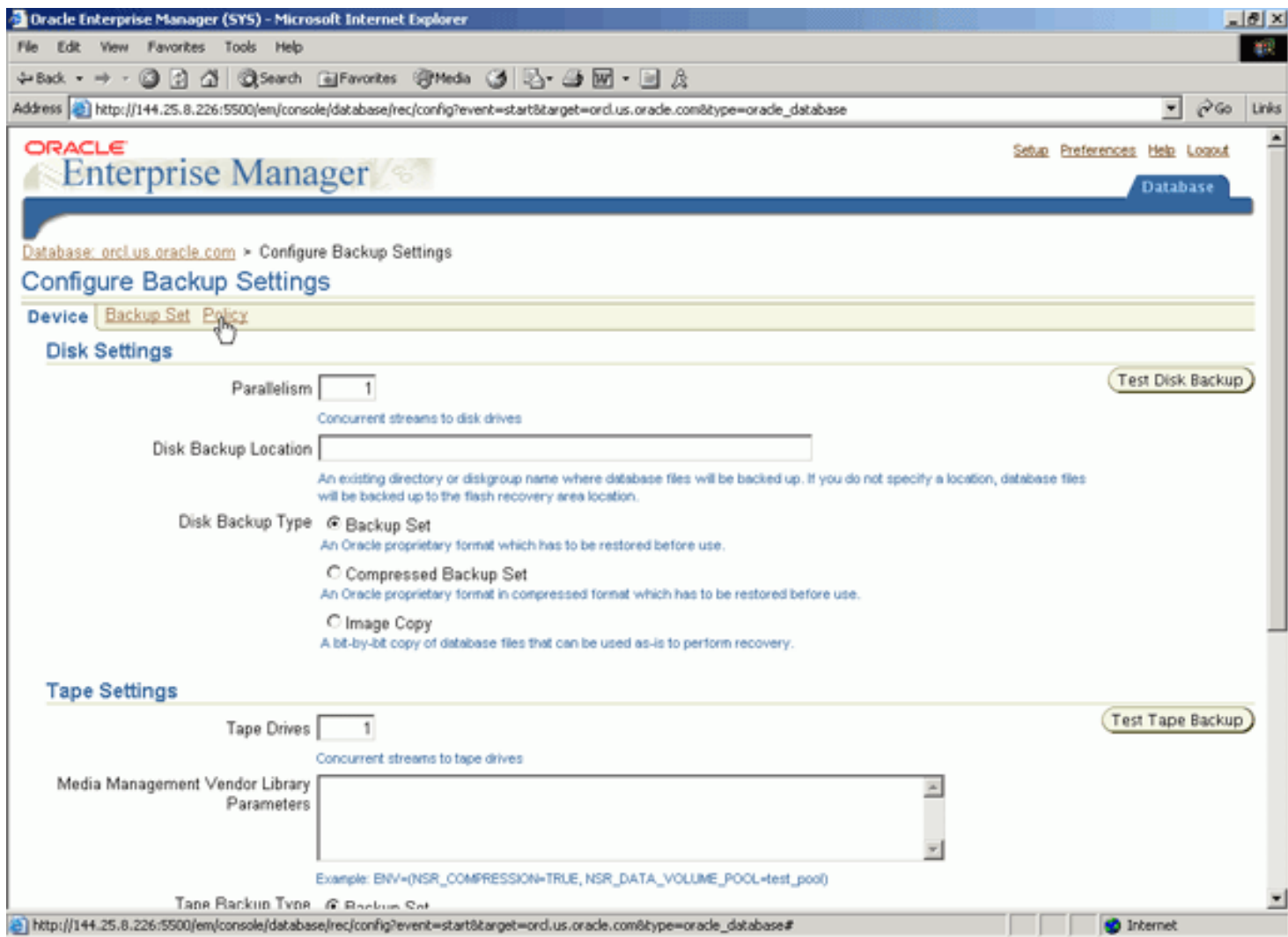
When you enable change tracking, Oracle automatically tracks which datafile blocks have changed in change tracking files. When you execute `BACKUP INCREMENTAL` , RMAN uses the change tracking file to more quickly identify the blocks changed since the previous incremental backup. As a result, RMAN creates 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.

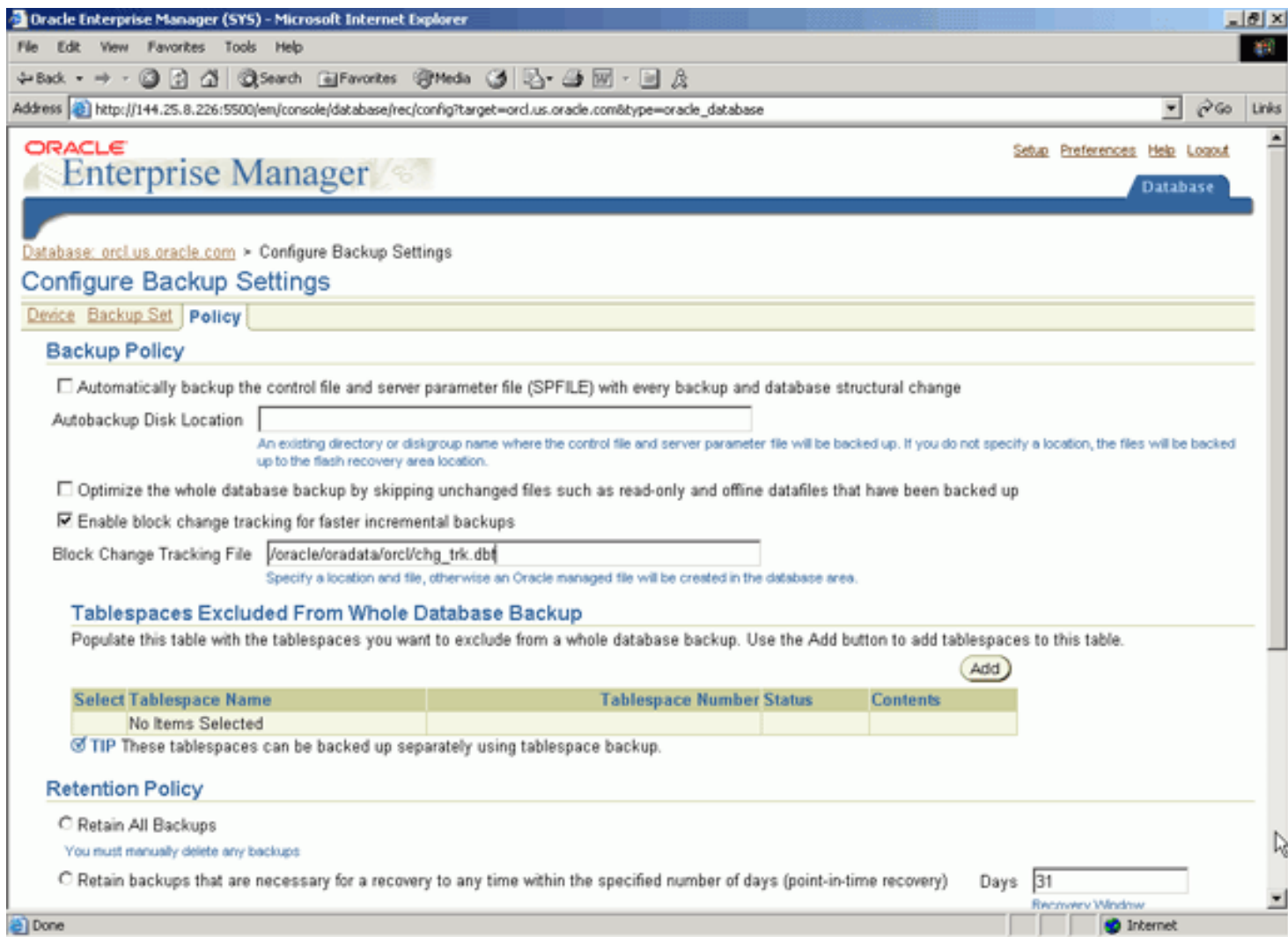
1. From the **Maintenance** tab in Enterprise Manager, select **Configure Backup Settings** in the Backup/Recovery section.



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.



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

Oracle Enterprise Manager (SYS) - 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/rec/config?target=orc.us.oracle.com&type=oracle_database Go Links

☒ 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
<input type="checkbox"/>	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](#)

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

http://144.25.8.226:5500/em/console/database/rec/config?target=orc.us.oracle.com&type=oracle_database# Internet