Using the TUNE_MVIEW Advisor

Purpose

This module shows you how to use the TUNE_MVIEW Advisor to make recommendations on what parameters to specify when creating a materialized view to optimize performance.

Topics

This module will discuss the following topics:

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Overview

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Oracle9i Database introduced the DBMS_MVIEW.EXPLAIN_MVIEW API which is used to explain whether a materialized view is fast refreshable or eligible for general query rewrite. Oracle Database 10g introduces the new PL/SQL API, DBMS_ADVISOR.TUNE_MVIEW, to facilitate the materialized view creation process by delivering a set of SQL statements that can be used to:

- Automatically fix any materialized view log problems such as non-existence of the materialized view log, or missing columns in the materialized view log required for materialized view fast refresh.
- Redefine fast refreshable materialized view with optimized defining queries to enable fast refresh and general query rewrite.
- Redefine, if possible, a non-fast refreshable materialized view by decomposing its original defining query into a number of fast refreshable sub-materialized views referenced by the original one.

The new TUNE_MVIEW API advises what changes you need to make to a materialized view to make it fast refreshable and eligible for advanced query rewrite techniques.

Prerequisites

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Before starting this module, you should have:

☐ **1.** Completed the Configuring Linux for the Installation of Oracle Database 10g lesson

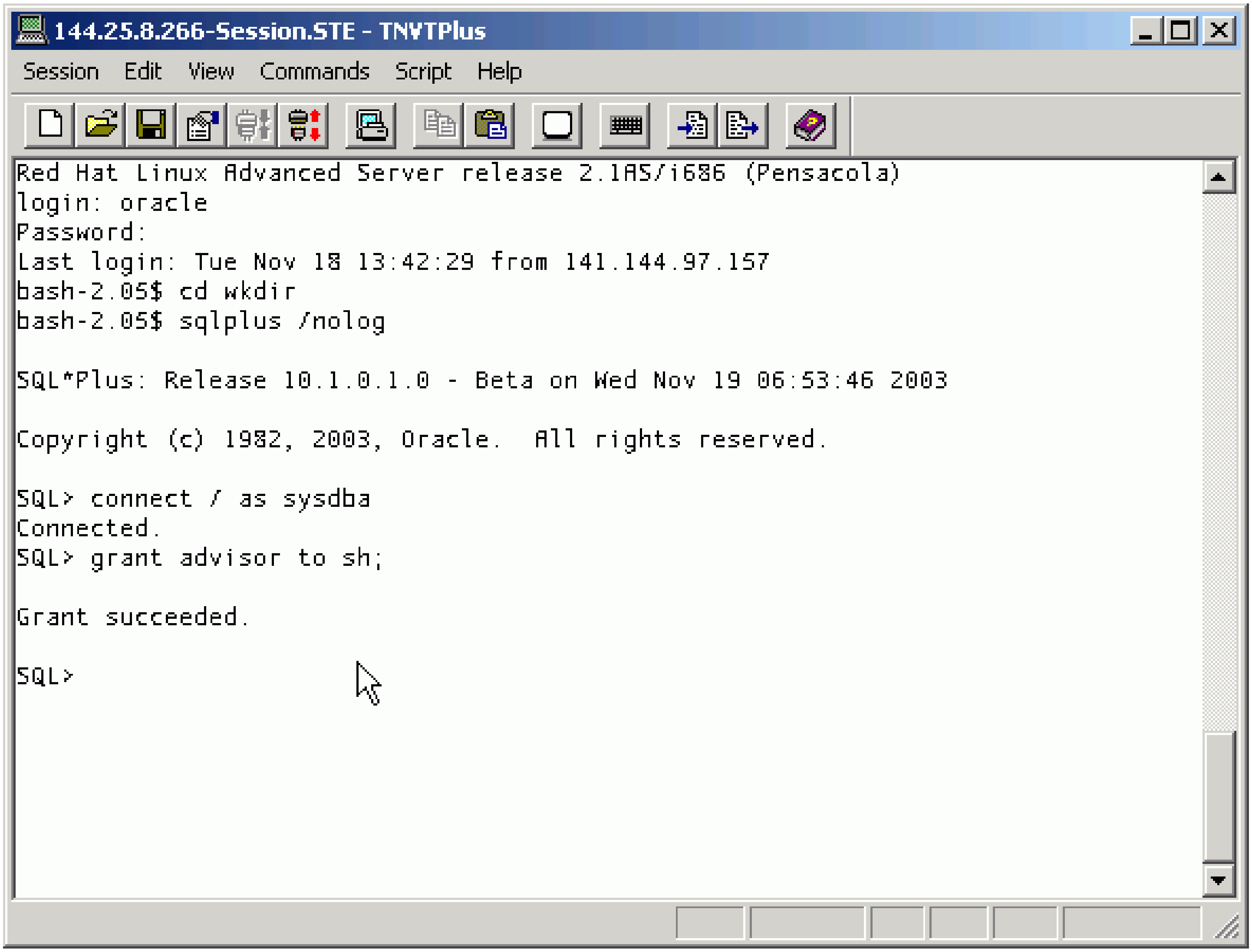
☐ **2.** Completed the Installing the Oracle Database 10g on Linux lesson

☐ **3.** Completed the Postinstallation Tasks lesson.

☐ **4.** Download and unzip tunemview.zip into your working directory (i.e. /home/oracle/wkdir)

☐ **5.** Open a terminal window and execute the following:

```
cd wkdir
sqlplus /nolog
connect / as sysdba
grant advisor to sh;
```


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

```
Red Hat Linux Advanced Server release 2.1AS/i686 (Pensacola)
login: oracle
Password:
Last login: Tue Nov 18 13:42:29 from 141.144.97.157
bash-2.05$ cd wkdir
bash-2.05$ sqlplus /nolog

SQL*Plus: Release 10.1.0.1.0 - Beta on Wed Nov 19 06:53:46 2003

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SQL> connect / as sysdba
Connected.
SQL> grant advisor to sh;

Grant succeeded.

SQL>
```

Generating Materialized View Suggestions using TUNE_MVIEW

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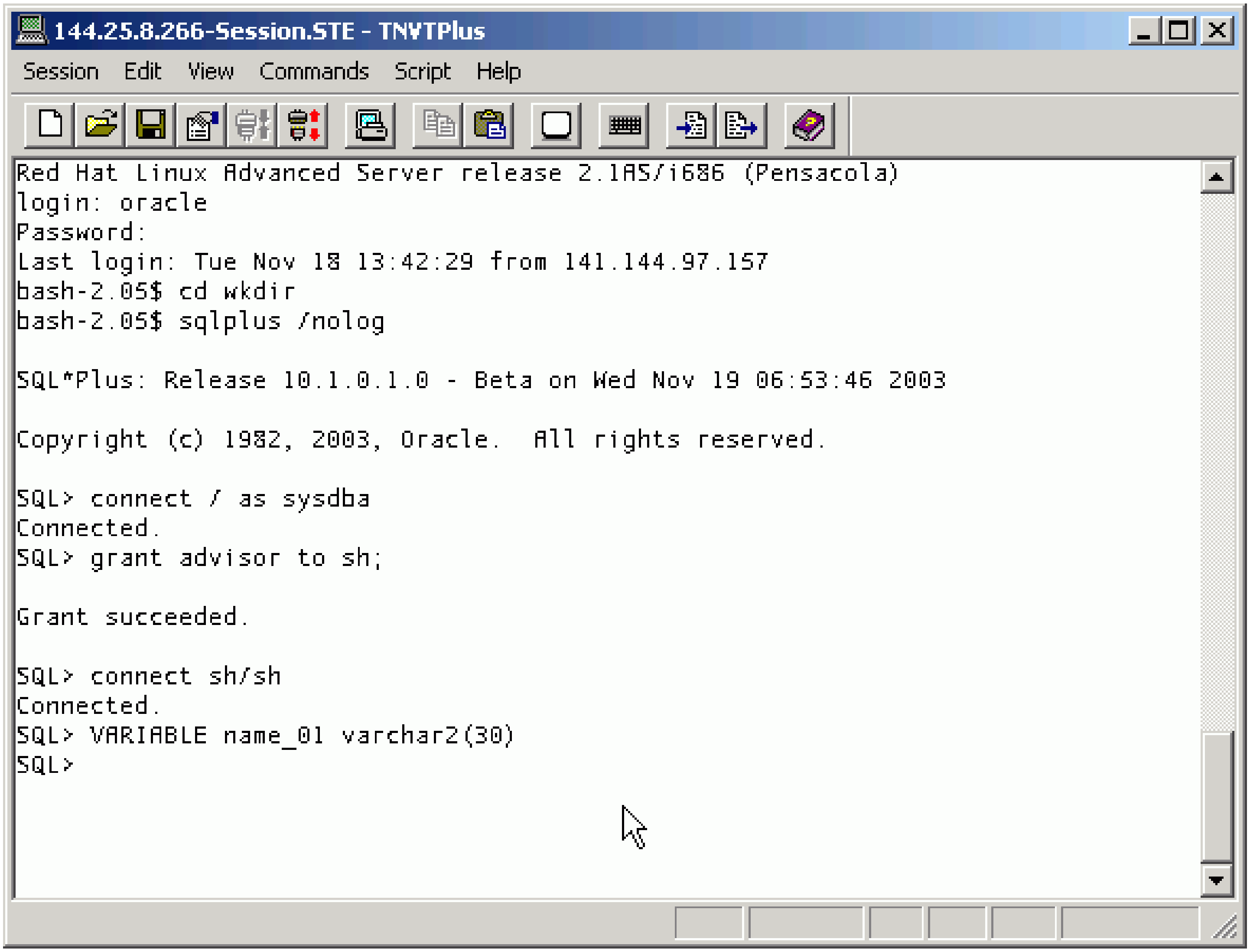
You will generate materialized view suggestions using the new Oracle Database 10g dbms_advisor.TUNE_MVIEW procedure. Perform the following steps:

☐ **1.** You need to define a bind variable to capture a task name from the dbms_advisor.TUNE_MVIEW procedure. From your terminal window, execute the following commands:

```
connect sh/sh
VARIABLE name_01 varchar2(30)
```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Session Edit View Commands Script Help

```
Red Hat Linux Advanced Server release 2.1AS/i686 (Pensacola)
login: oracle
Password:
Last login: Tue Nov 18 13:42:29 from 141.144.97.157
bash-2.05$ cd wkdir
bash-2.05$ sqlplus /nolog

SQL*Plus: Release 10.1.0.1.0 - Beta on Wed Nov 19 06:53:46 2003

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SQL> connect / as sysdba
Connected.
SQL> grant advisor to sh;

Grant succeeded.

SQL> connect sh/sh
Connected.
SQL> VARIABLE name_01 varchar2(30)
SQL>
```

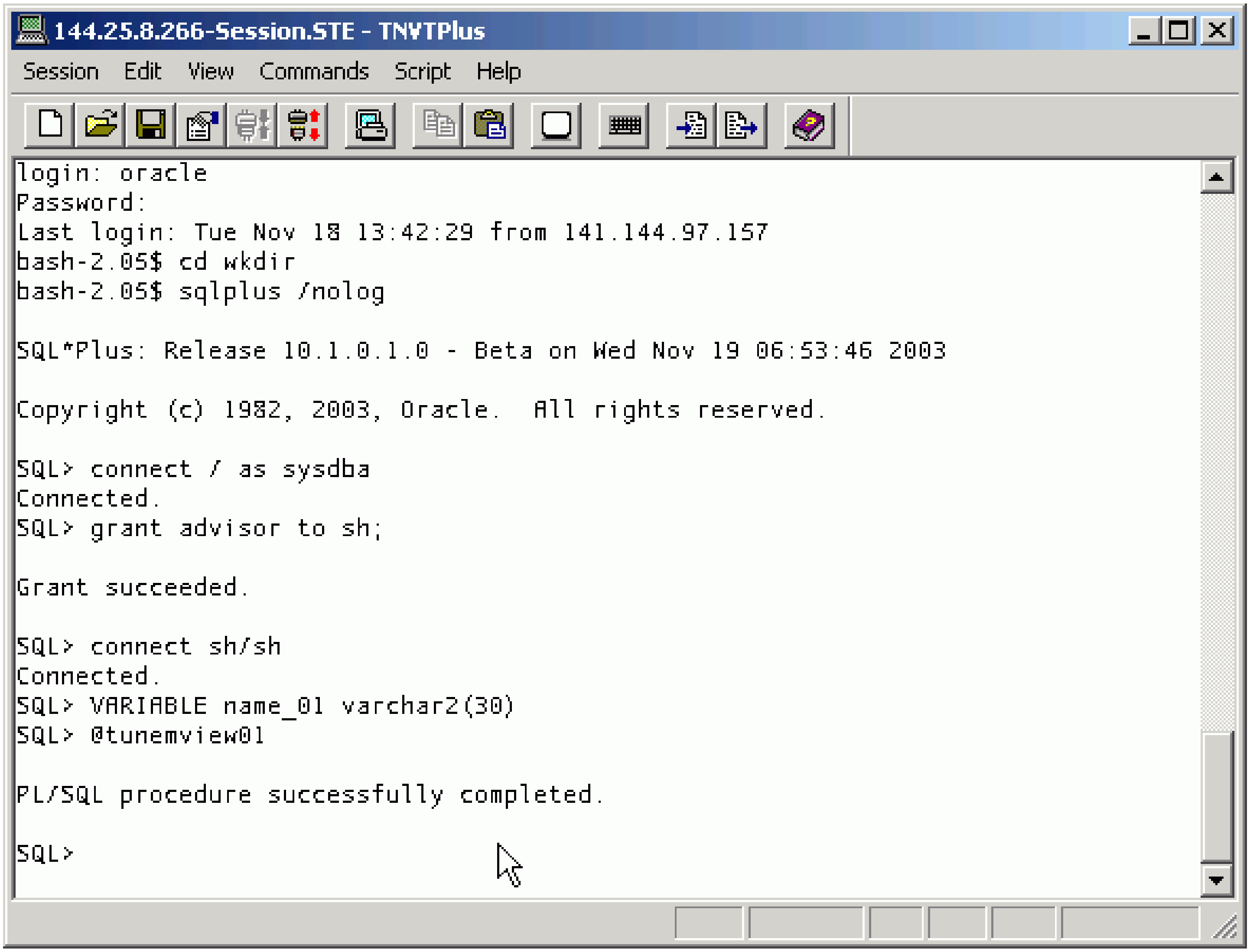
☐ **2.** Now you can execute the procedure by executing the following script from your terminal window:

```
@tunemview01
```

The query in the **`tunemview01.sql`** script is as follows:

```
EXECUTE dbms_advisor.TUNE_MVIEW     -
( :name_01                          -
, 'CREATE MATERIALIZED VIEW prod_mv -
   REFRESH FAST WITH ROWID          -
   ENABLE QUERY REWRITE             -
   AS                               -
   SELECT DISTINCT                  -
          prod_name, prod_category  -
   FROM   products'                 -
) ;
```

Note that the query above contains a DISTINCT clause.


144.25.8.266-Session.STE - TNVTPlus
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```
login: oracle
Password:
Last login: Tue Nov 18 13:42:29 from 141.144.97.157
bash-2.05$ cd wkdir
bash-2.05$ sqlplus /nolog

SQL*Plus: Release 10.1.0.1.0 - Beta on Wed Nov 19 06:53:46 2003

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SQL> connect / as sysdba
Connected.
SQL> grant advisor to sh;

Grant succeeded.

SQL> connect sh/sh
Connected.
SQL> VARIABLE name_01 varchar2(30)
SQL> @tunemview01

PL/SQL procedure successfully completed.

SQL>
```

☐ **3.** The TUNE_MVIEW procedure returns a task name into the name_01 variable and the results are stored in the data dictionary. Now you can query DBA_TUNE_MVIEW to view the suggested rewrite of the MV definition. From your terminal window, execute the following script:

```
@results01
```

The query in the **`results 01.sql`** script is as follows:

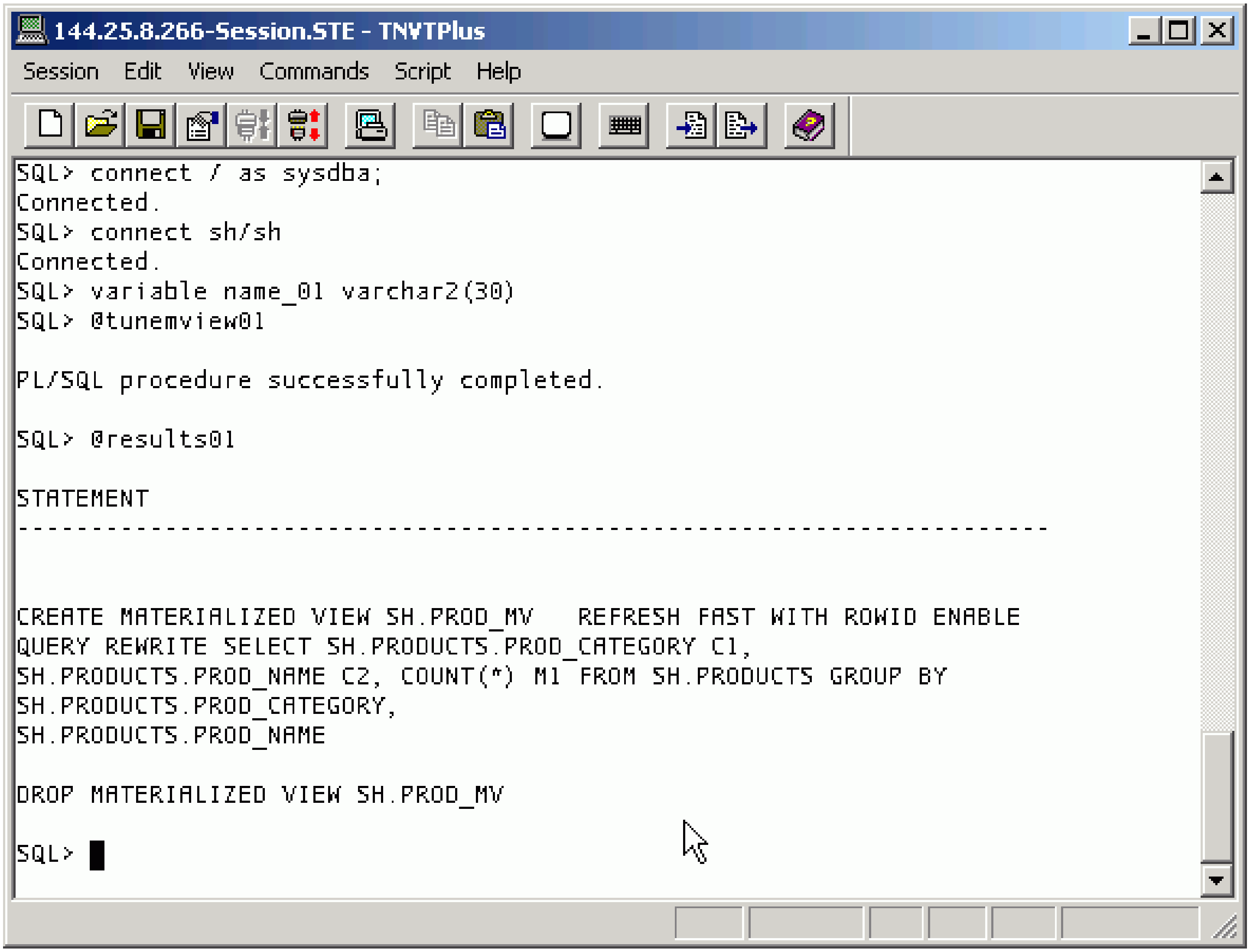
```
column statement format a70 word

set long 999
SELECT statement

FROM   DBA_TUNE_MVIEW
```

```
WHERE  task_name = :name_01

ORDER  BY script_type, action_id;
```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```
SQL> connect / as sysdba;
Connected.
SQL> connect sh/sh
Connected.
SQL> variable name_01 varchar2(30)
SQL> @tunemview01

PL/SQL procedure successfully completed.

SQL> @results01

STATEMENT
----------------------------------------------------------------------


CREATE MATERIALIZED VIEW SH.PROD_MV   REFRESH FAST WITH ROWID ENABLE
QUERY REWRITE SELECT SH.PRODUCTS.PROD_CATEGORY C1,
SH.PRODUCTS.PROD_NAME C2, COUNT(*) M1 FROM SH.PRODUCTS GROUP BY
SH.PRODUCTS.PROD_CATEGORY,
SH.PRODUCTS.PROD_NAME

DROP MATERIALIZED VIEW SH.PROD_MV

SQL>
```

Note that the DISTINCT clause is replaced by the GROUP BY construct, and the COUNT(*) is added to the SELECT clause. This makes the Materialized view eligible for fast refresh and usable for general rewrite.

Using TUNE_MVIEW to Make a Materialized View Fast Refreshable

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You will try to create a materialized view with the REFRESH FAST option that fails. You will use TUNE_MVIEW to figure out what needs to be changed. Perform the following steps:

☐ **1.** Before you perform the steps in this example, you need to clean up your database. From your terminal window, execute the following script:

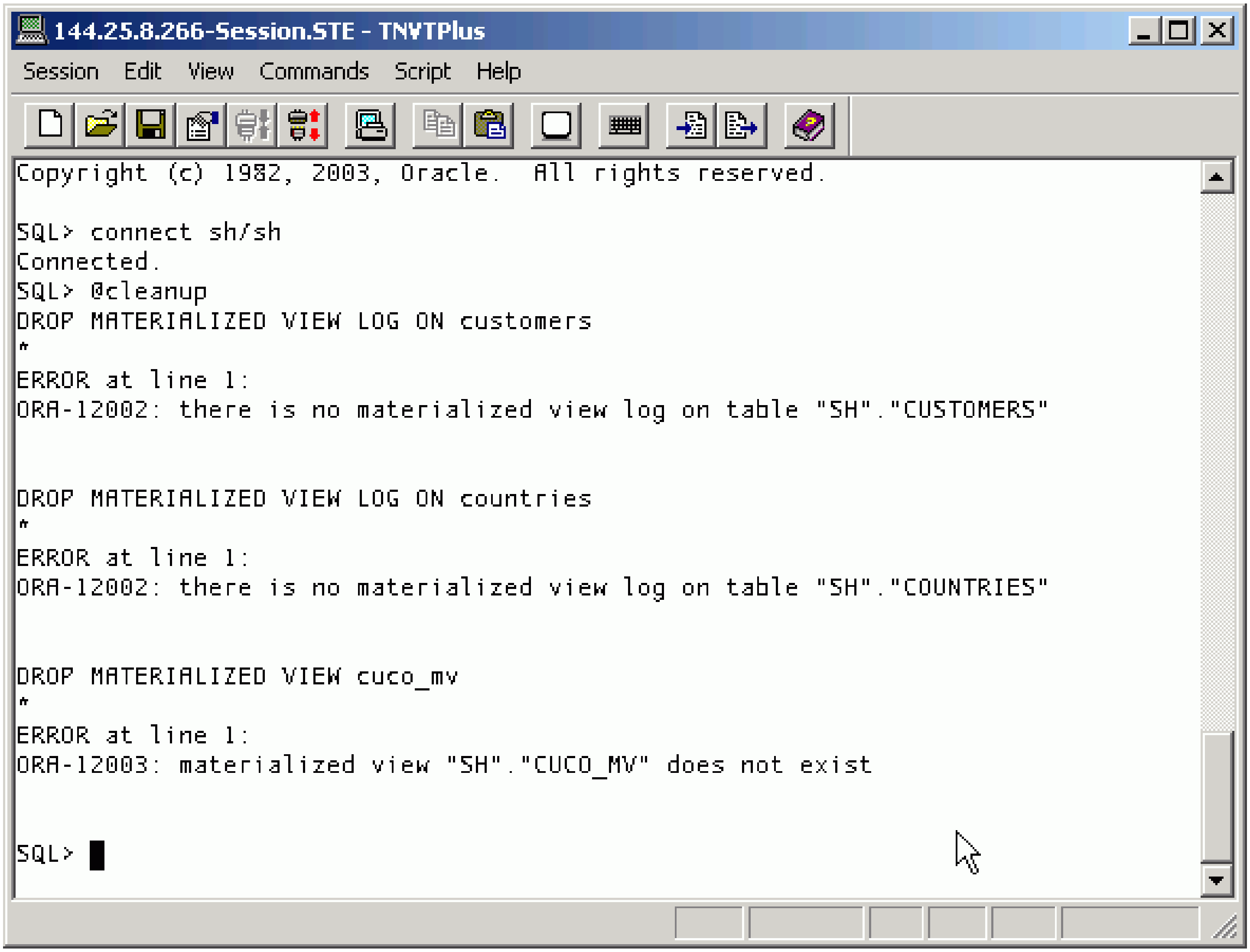
```
@cleanup
```

The script `cleanup.sql` contains the following:

```
DROP MATERIALIZED VIEW LOG ON customers;

DROP MATERIALIZED VIEW LOG ON countries;

DROP MATERIALIZED VIEW cuco_mv;
```



```
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SQL> connect sh/sh
Connected.
SQL> @cleanup
DROP MATERIALIZED VIEW LOG ON customers
*
ERROR at line 1:
ORA-12002: there is no materialized view log on table "SH"."CUSTOMERS"


DROP MATERIALIZED VIEW LOG ON countries
*
ERROR at line 1:
ORA-12002: there is no materialized view log on table "SH"."COUNTRIES"


DROP MATERIALIZED VIEW cuco_mv
*
ERROR at line 1:
ORA-12003: materialized view "SH"."CUCO_MV" does not exist


SQL>
```
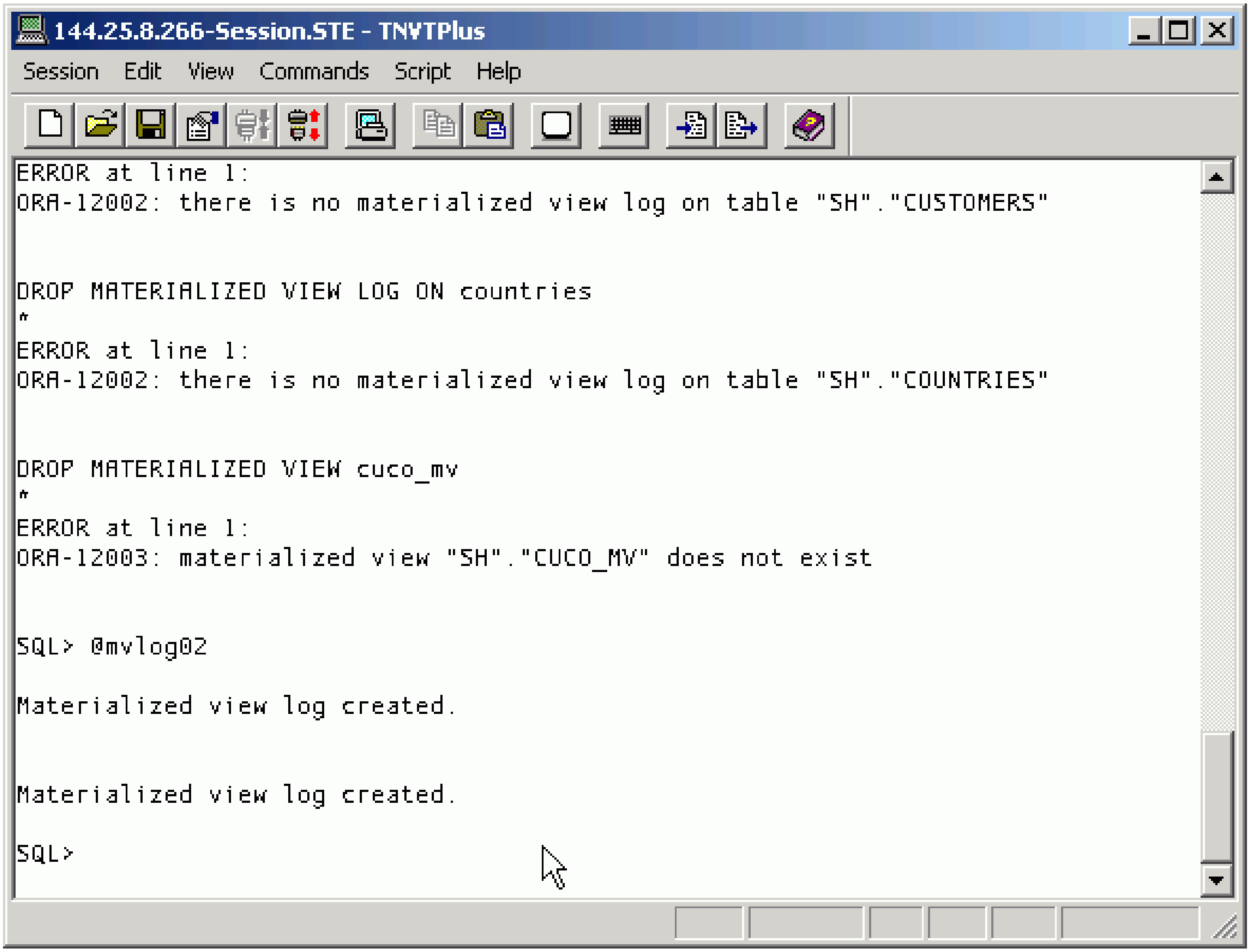

☐ **2.** You need to create two MV logs on CUSTOMERS and COUNTRIES. From your terminal window, execute the following script:

```
@mvlog02
```

The script **`mvlog02 .sql`** contains the following:

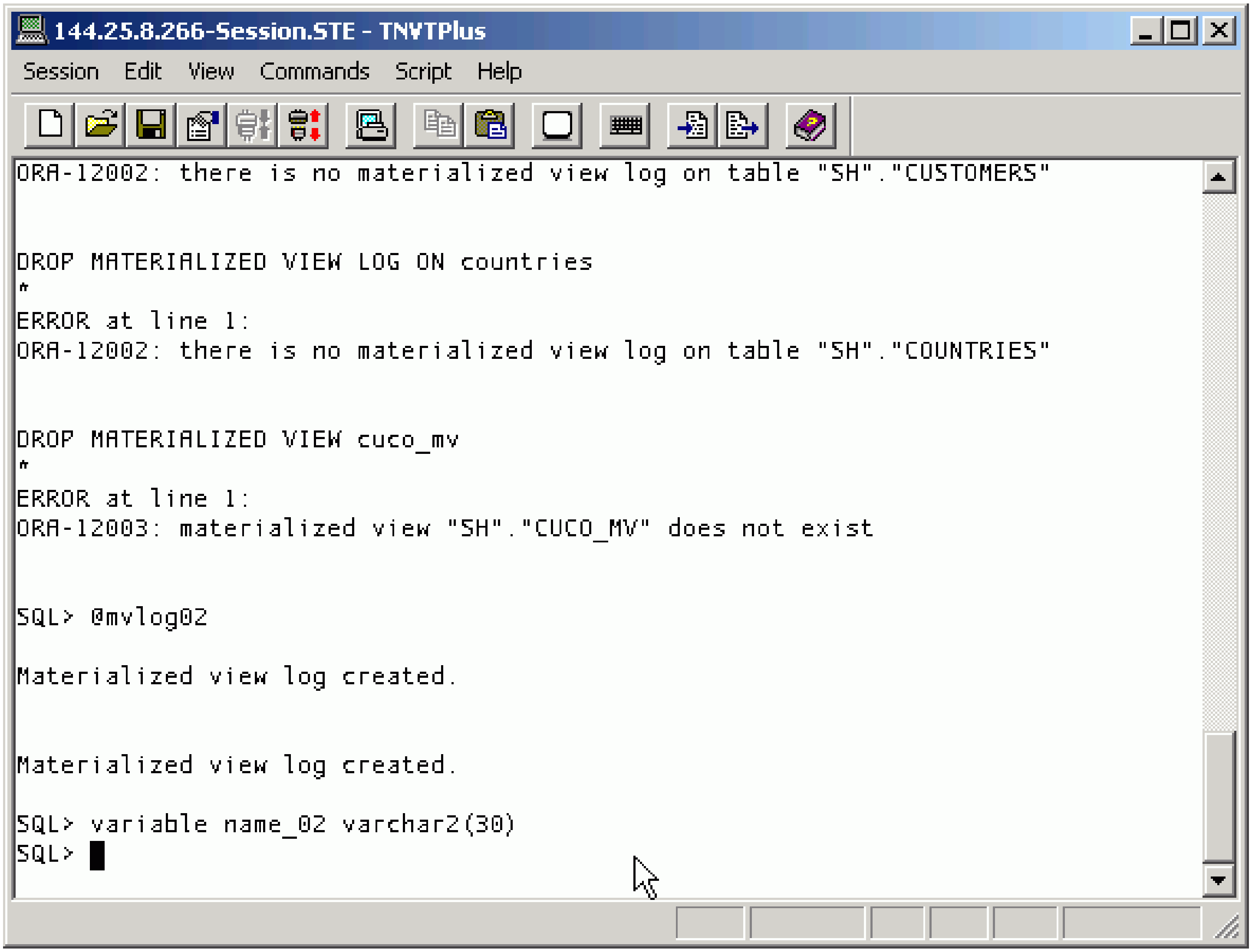
```
CREATE MATERIALIZED VIEW LOG ON customers

   WITH SEQUENCE, ROWID INCLUDING NEW VALUES;

CREATE MATERIALIZED VIEW LOG ON countries
   WITH SEQUENCE, ROWID INCLUDING NEW VALUES;
```



```
ERROR at line 1:
ORA-12002: there is no materialized view log on table "SH"."CUSTOMERS"


DROP MATERIALIZED VIEW LOG ON countries
*
ERROR at line 1:
ORA-12002: there is no materialized view log on table "SH"."COUNTRIES"


DROP MATERIALIZED VIEW cuco_mv
*
ERROR at line 1:
ORA-12003: materialized view "SH"."CUCO_MV" does not exist


SQL> @mvlog02

Materialized view log created.


Materialized view log created.

SQL>
```

☐ **3.** You need to define another bind variable. From your SQL*Plus session, execute the following command:

```
VARIABLE name_02 varchar2(30)
```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```
ORA-12002: there is no materialized view log on table "SH"."CUSTOMERS"


DROP MATERIALIZED VIEW LOG ON countries
*
ERROR at line 1:
ORA-12002: there is no materialized view log on table "SH"."COUNTRIES"


DROP MATERIALIZED VIEW cuco_mv
*
ERROR at line 1:
ORA-12003: materialized view "SH"."CUCO_MV" does not exist


SQL> @mvlog02

Materialized view log created.


Materialized view log created.

SQL> variable name_02 varchar2(30)
SQL>
```

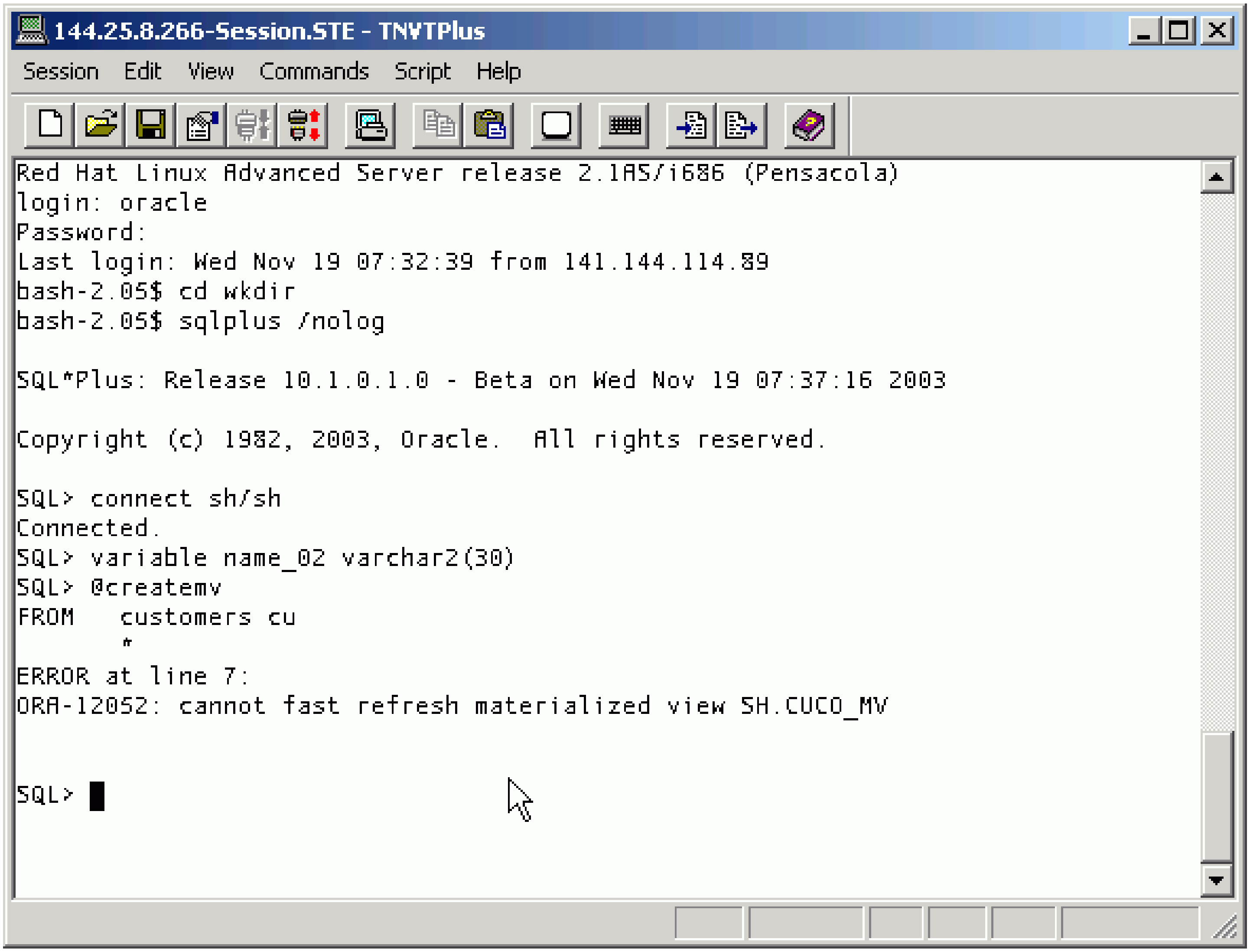
☐ **4.** Now you can try to create the MV by executing the following script:

```
@createmv
```

The command in the **`createmv .sql`** script is as follows:

```
CREATE MATERIALIZED VIEW cuco_mv

       REFRESH FAST

       ENABLE QUERY REWRITE

AS

SELECT cu.cust_last_name

,      co.country_name

FROM   customers cu

,      countries co

WHERE  cu.country_id = co.country_id;
```

Note that you explicitly ask for REFRESH FAST.


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

```
Red Hat Linux Advanced Server release 2.1AS/i686 (Pensacola)
login: oracle
Password:
Last login: Wed Nov 19 07:32:39 from 141.144.114.89
bash-2.05$ cd wkdir
bash-2.05$ sqlplus /nolog

SQL*Plus: Release 10.1.0.1.0 - Beta on Wed Nov 19 07:37:16 2003

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SQL> connect sh/sh
Connected.
SQL> variable name_02 varchar2(30)
SQL> @createmv
FROM   customers cu
       *
ERROR at line 7:
ORA-12052: cannot fast refresh materialized view SH.CUCO_MV


SQL> 
```
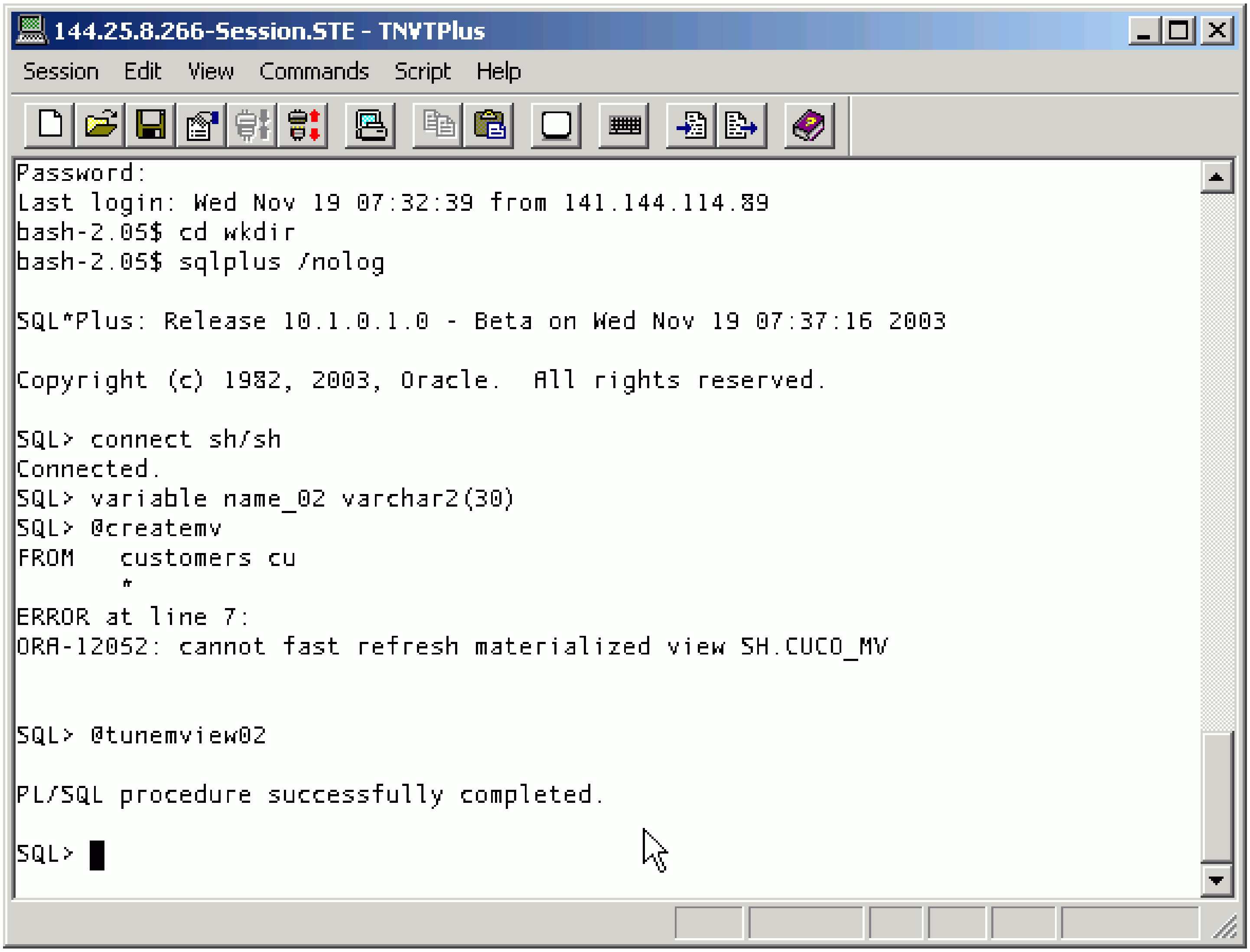

Notice that you received an error even though you created the necessary MV logs on the two tables. Any idea what might be the problem?

☐ **5.** Now you can use the TUNE_MVIEW procedure to see what recommendations can be made. Execute the following script:

```
@tunemview02
```

The command in the **`tunemview02.sql`** script is as follows:

```
EXECUTE dbms_advisor.TUNE_MVIEW              -

( :name_02                                   -
, 'CREATE MATERIALIZED VIEW cuco_mv      -

          REFRESH FAST                  -

          ENABLE QUERY REWRITE          -

   AS                                   -

   SELECT cu.cust_last_name             -

   ,      co.country_name               -

   FROM   customers cu                  -

   ,      countries co                  -

   WHERE  cu.country_id = co.country_id' -

) ;
```



```
Password:
Last login: Wed Nov 19 07:32:39 from 141.144.114.89
bash-2.05$ cd wkdir
bash-2.05$ sqlplus /nolog

SQL*Plus: Release 10.1.0.1.0 - Beta on Wed Nov 19 07:37:16 2003

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SQL> connect sh/sh
Connected.
SQL> variable name_02 varchar2(30)
SQL> @createmv
FROM   customers cu
       *
ERROR at line 7:
ORA-12052: cannot fast refresh materialized view SH.CUCO_MV


SQL> @tunemview02

PL/SQL procedure successfully completed.

SQL> 
```

☐ **6.** Now you can query DBA_TUNE_MVIEW to view the suggested rewrite of the MV definition. From your terminal window, execute the following script:

```
@results02
```

The query in the **`results 02.sql`** script is as follows:

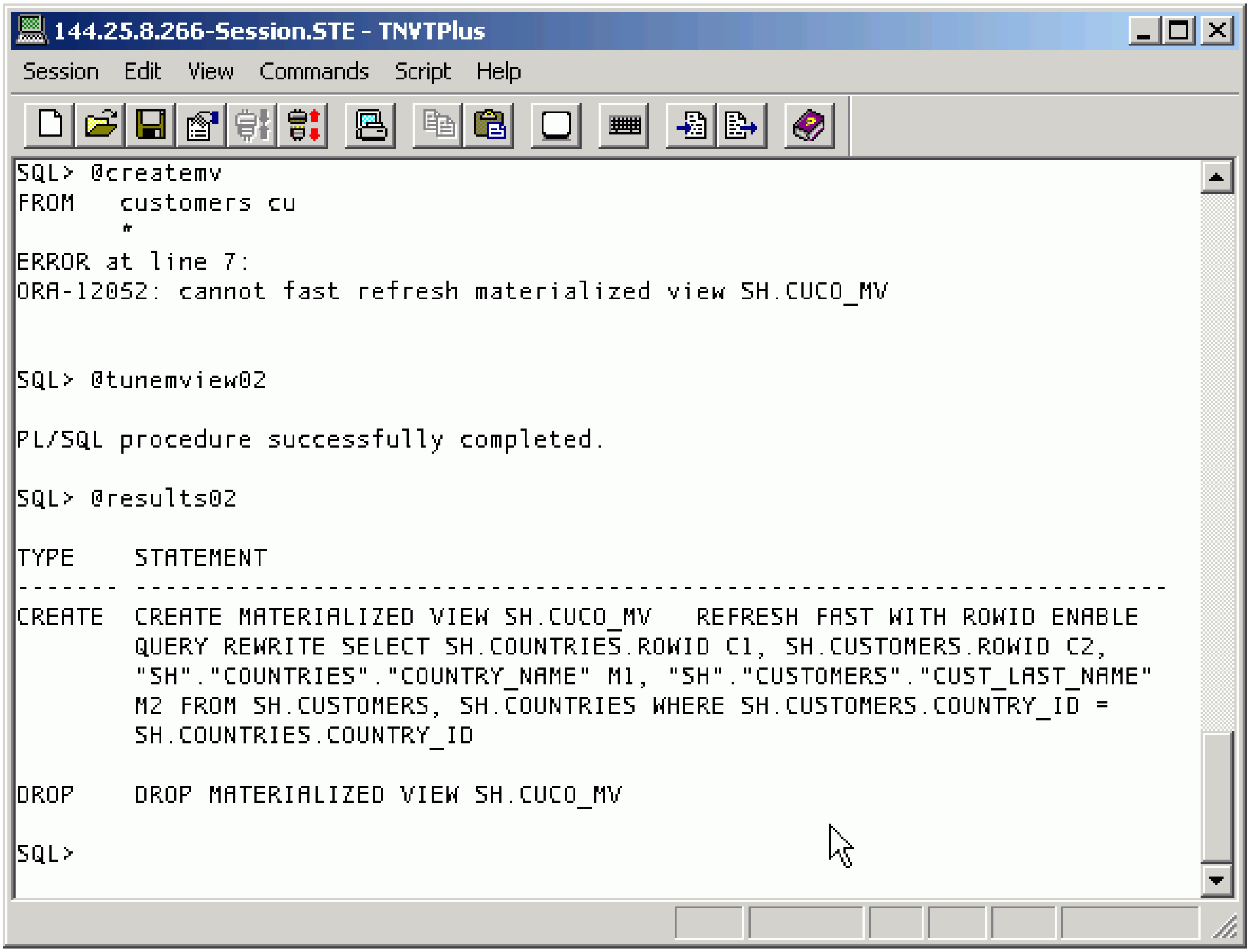
```
column statement format a70 word

set long 999
SELECT script_type as type, statement

FROM   DBA_TUNE_MVIEW

WHERE  task_name = :name_02

ORDER  BY script_type, action_id;
```


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

```
SQL> @createmv
FROM   customers cu
       *
ERROR at line 7:
ORA-12052: cannot fast refresh materialized view SH.CUCO_MV


SQL> @tunemview02

PL/SQL procedure successfully completed.

SQL> @results02

TYPE    STATEMENT
------- ----------------------------------------------------------------------
CREATE  CREATE MATERIALIZED VIEW SH.CUCO_MV   REFRESH FAST WITH ROWID ENABLE
        QUERY REWRITE SELECT SH.COUNTRIES.ROWID C1, SH.CUSTOMERS.ROWID C2,
        "SH"."COUNTRIES"."COUNTRY_NAME" M1, "SH"."CUSTOMERS"."CUST_LAST_NAME"
        M2 FROM SH.CUSTOMERS, SH.COUNTRIES WHERE SH.CUSTOMERS.COUNTRY_ID =
        SH.COUNTRIES.COUNTRY_ID

DROP    DROP MATERIALIZED VIEW SH.CUCO_MV

SQL>
```

Two explicit ROWID references are added to the SELECT clause. This makes the materialized view fast refreshable.

Generating a Script of TUNE_MVIEW Recommendations

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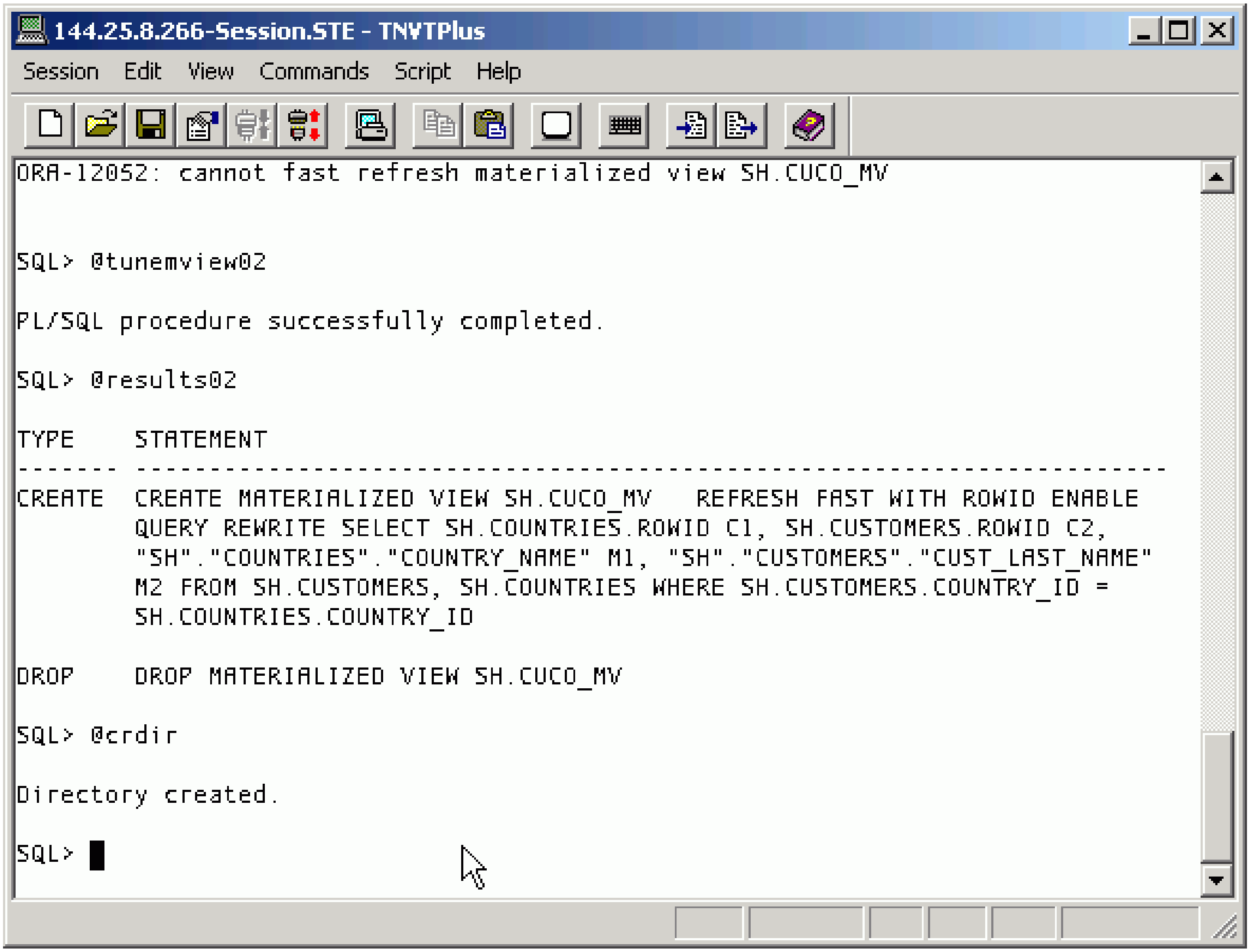
At this point, you want to generate a script of the recommendations from DBA_TUNE_MVIEW so that you can execute them in a SQL*Plus session. Perform the following steps:

☐ **1.** Before you perform the steps in this example, you need to clean up your database. From your terminal window, execute the following script:

```
@crdir
```

The script **`crdir.sql`** contains the following:

```
create or replace directory ext_tab_dir as '/home/oracle/wkdir';
```


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

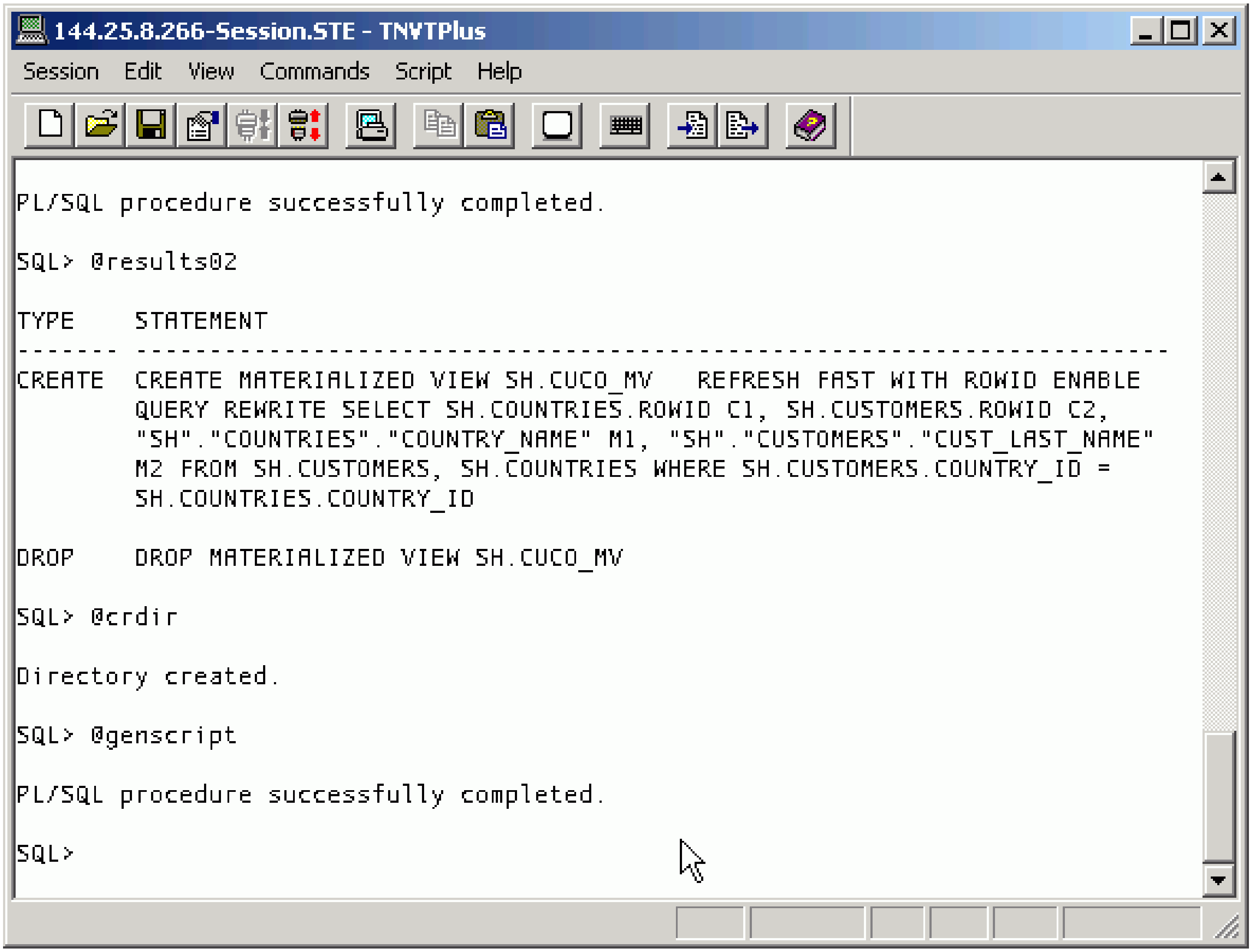
```
ORA-12052: cannot fast refresh materialized view SH.CUCO_MV


SQL> @tunemview02

PL/SQL procedure successfully completed.

SQL> @results02

TYPE    STATEMENT
------- --------------------------------------------------------------------
CREATE  CREATE MATERIALIZED VIEW SH.CUCO_MV   REFRESH FAST WITH ROWID ENABLE
        QUERY REWRITE SELECT SH.COUNTRIES.ROWID C1, SH.CUSTOMERS.ROWID C2,
        "SH"."COUNTRIES"."COUNTRY_NAME" M1, "SH"."CUSTOMERS"."CUST_LAST_NAME"
        M2 FROM SH.CUSTOMERS, SH.COUNTRIES WHERE SH.CUSTOMERS.COUNTRY_ID =
        SH.COUNTRIES.COUNTRY_ID

DROP    DROP MATERIALIZED VIEW SH.CUCO_MV

SQL> @crdir

Directory created.

SQL>
```

☐ **2.** Now you can generate the script. From your terminal window, execute the following script:

```
@genscript
```

The script **`genscript.sql`** contains the following:

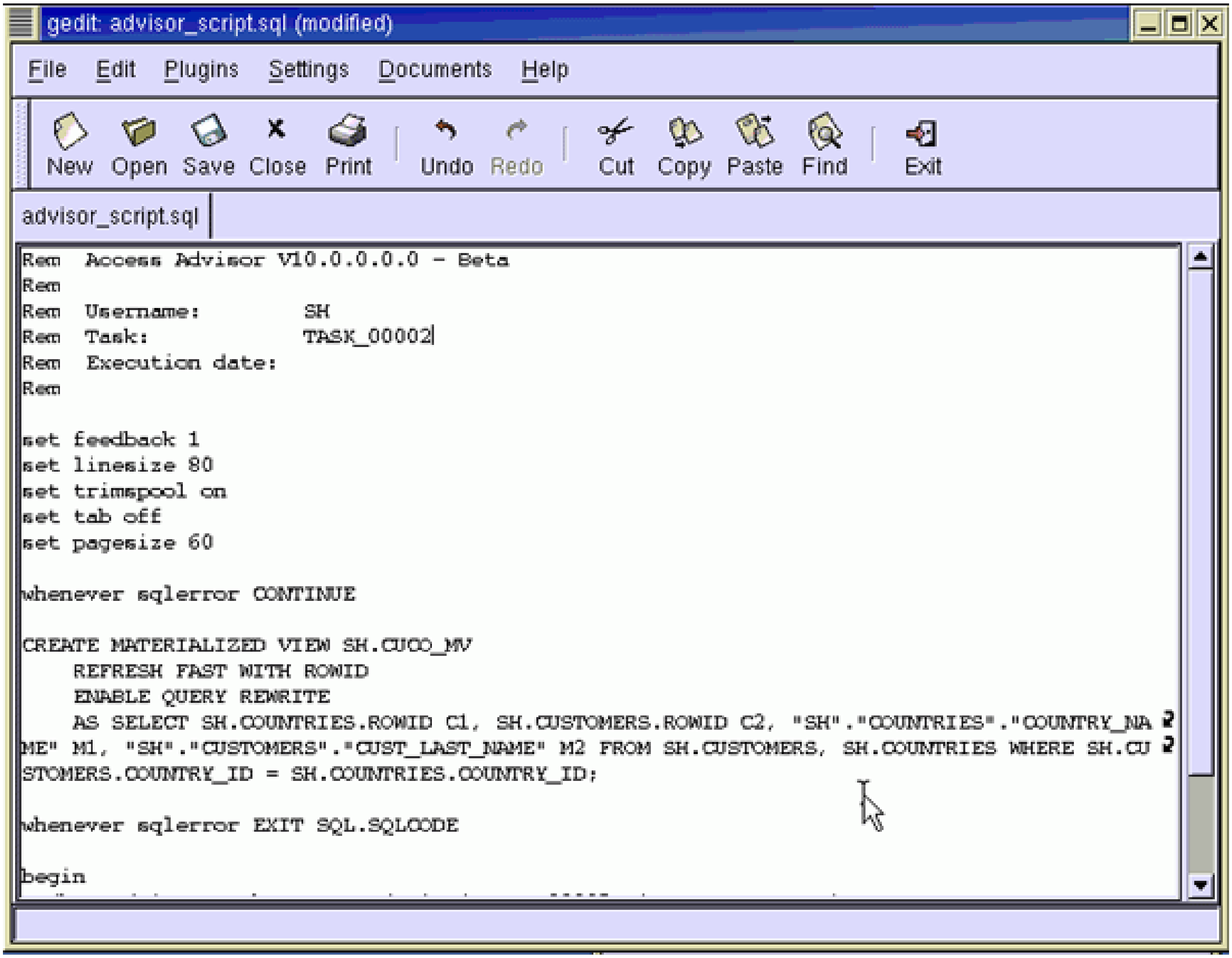
```
EXECUTE dbms_advisor.CREATE_FILE         -
( dbms_advisor.get_task_script(:name_02) -
, location => 'EXT_TAB_DIR'              -
, filename => 'advisor_script.sql'       -
) ;
```



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

```
PL/SQL procedure successfully completed.

SQL> @results02

TYPE    STATEMENT
------- ------------------------------------------------------------------------------
CREATE  CREATE MATERIALIZED VIEW SH.CUCO_MV   REFRESH FAST WITH ROWID ENABLE
        QUERY REWRITE SELECT SH.COUNTRIES.ROWID C1, SH.CUSTOMERS.ROWID C2,
        "SH"."COUNTRIES"."COUNTRY_NAME" M1, "SH"."CUSTOMERS"."CUST_LAST_NAME"
        M2 FROM SH.CUSTOMERS, SH.COUNTRIES WHERE SH.CUSTOMERS.COUNTRY_ID =
        SH.COUNTRIES.COUNTRY_ID

DROP    DROP MATERIALIZED VIEW SH.CUCO_MV

SQL> @crdir

Directory created.

SQL> @genscript

PL/SQL procedure successfully completed.

SQL>
```

☐ **3.** You can now view the script file **`advisor_script.sql`** . Open the file in gedit.



```
Rem  Access Advisor V10.0.0.0.0 - Beta
Rem
Rem  Username:         SH
Rem  Task:             TASK_00002
Rem  Execution date:
Rem

set feedback 1
set linesize 80
set trimspool on
set tab off
set pagesize 60

whenever sqlerror CONTINUE

CREATE MATERIALIZED VIEW SH.CUCO_MV
    REFRESH FAST WITH ROWID
    ENABLE QUERY REWRITE
    AS SELECT SH.COUNTRIES.ROWID C1, SH.CUSTOMERS.ROWID C2, "SH"."COUNTRIES"."COUNTRY_NA
ME" M1, "SH"."CUSTOMERS"."CUST_LAST_NAME" M2 FROM SH.CUSTOMERS, SH.COUNTRIES WHERE SH.CU
STOMERS.COUNTRY_ID = SH.COUNTRIES.COUNTRY_ID;

whenever sqlerror EXIT SQL.SQLCODE

begin
```

Place the cursor on this icon to hide all screenshots.