

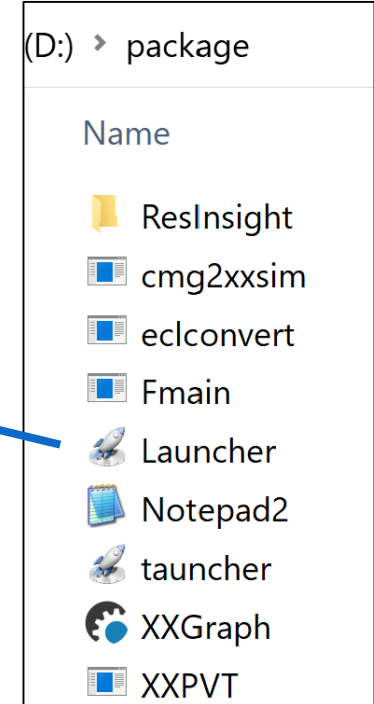
XXSIM: A General Purpose Reservoir Simulator



- Download Link:
- No Installations Needed, just click the launcher icon on your desktop or inside **package folder**



- Demo Videos:
 - Convert Eclipse Models and Run
 - Convert CMG Models and Run
 - Run XXSIM Models
 - Integrated with ILoop-RE Pre & Post Package





How to Run and View the simulation results

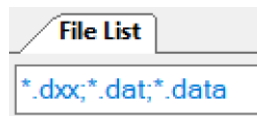
Steps:

1. Inside Package folder, double click launcher icon
2. A Launcher Control Window Will pup up
3. Click the drop down list to filter and list:



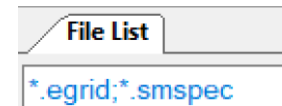
Launcher

Step 3

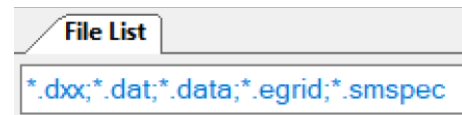


Data Files:

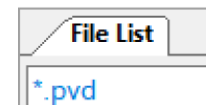
Dxx: XXSIM
Data: ECL
Dat: CMG



Egrid & Simspec



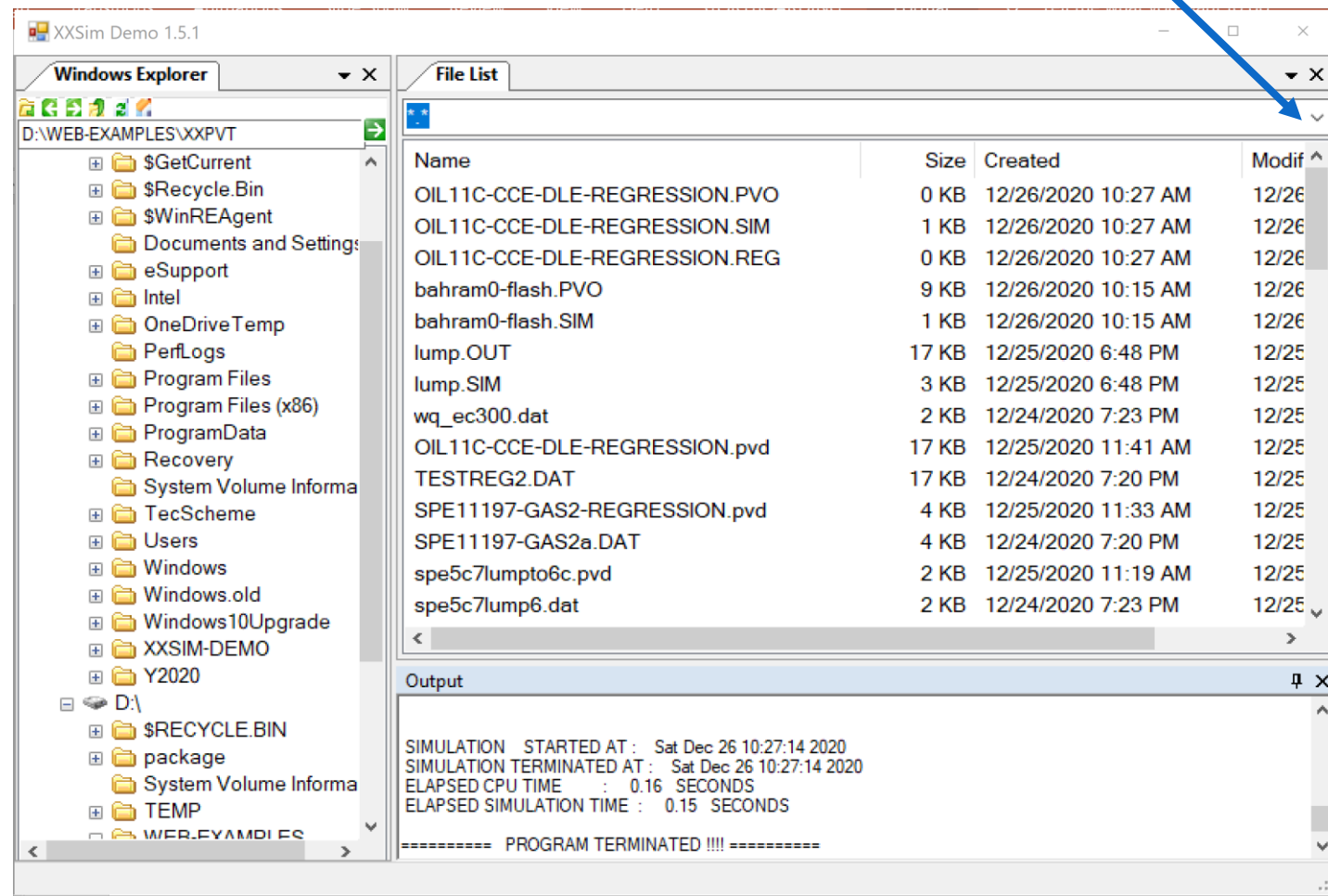
Both above



PVT Files



All Files





How to Run and View the simulation results

Step 4a: Convert Eclipse Data

- Go to E100 or E300 folder under ECL_FORMAT or your own data folders
- Highlight SPE9.DATA, then right click
- Click Convert Eclipse Format

Note: Steps 5 ~ 10 will be identical for both Eclipse, CMG, and XXSIM runs

Step 4b: Convert CMG Data

- Go to IMEX folder under CMG_FORMAT or your own data folders
- Highlight spe9.dat, then right click, a select frame will be popped up
- Click Convert CMG Format

Step 4c: Run XXSIM Data

- Go to Blackoil folder under XXSIM_FORMAT or your own data folders
- Highlight SPE9.dxx, then right click Run Simulator

The screenshot shows the XXSim Demo 1.5.1 application window. On the left, a Windows Explorer view displays the directory structure, with 'ECL_FORMAT' expanded to show 'E100' and 'E300' folders. A blue arrow points from the 'E100' folder to the 'File List' pane. The 'File List' pane shows a table of files in the 'D:\WEB-EXAMPLES\ECL_FORMAT\E100' directory. A blue arrow points to 'SPE9.DATA' in the list, and a green box with the text 'Right Click' is positioned next to it. The 'Output' window at the bottom displays simulation results.

Name	Size	Created	Modified
SPE7_AQUCT_4EDGES.DATA	7 KB	12/5/2020 5:07 PM	12/5/2020 5:07 PM
SPE7.DATA	9 KB	11/4/2020 1:27 PM	7/18/2020 11:27 PM
SPE7_AQUFETP_4EDGES.DATA	9 KB	12/9/2020 6:25 PM	6/3/2020 1:33 PM
SPE9DEBUG.DATA	151 KB	11/4/2020 1:27 PM	3/18/2020 8:17 PM
SPE6_SIGMAV.DATA	8 KB	11/4/2020 1:27 PM	12/13/2017 7:52 PM
ENDSCALE.DATA	5 KB	11/4/2020 1:27 PM	8/7/2017 7:52 PM
ENDSCALE_300.DATA	5 KB	11/4/2020 1:27 PM	8/7/2017 7:52 PM
SPE10CELLS2000_E100.DATA	170 KB	11/4/2020 1:27 PM	8/7/2017 7:52 PM
SPE10CELLS2000_E300.DATA	170 KB	11/4/2020 1:27 PM	8/7/2017 7:52 PM
SPE2.DATA	11 KB	11/4/2020 1:27 PM	8/7/2017 7:52 PM
SPE9.DATA	151 KB	11/4/2020 1:27 PM	8/7/2017 7:52 PM
SPE9E300.DATA	152 KB	11/4/2020 1:27 PM	8/7/2017 7:52 PM

Output

```
SIMULATION STARTED AT : Sat Dec 26 10:27:14 2020
SIMULATION TERMINATED AT : Sat Dec 26 10:27:14 2020
ELAPSED CPU TIME : 0.16 SECONDS
ELAPSED SIMULATION TIME : 0.15 SECONDS

===== PROGRAM TERMINATED !!!! =====
```

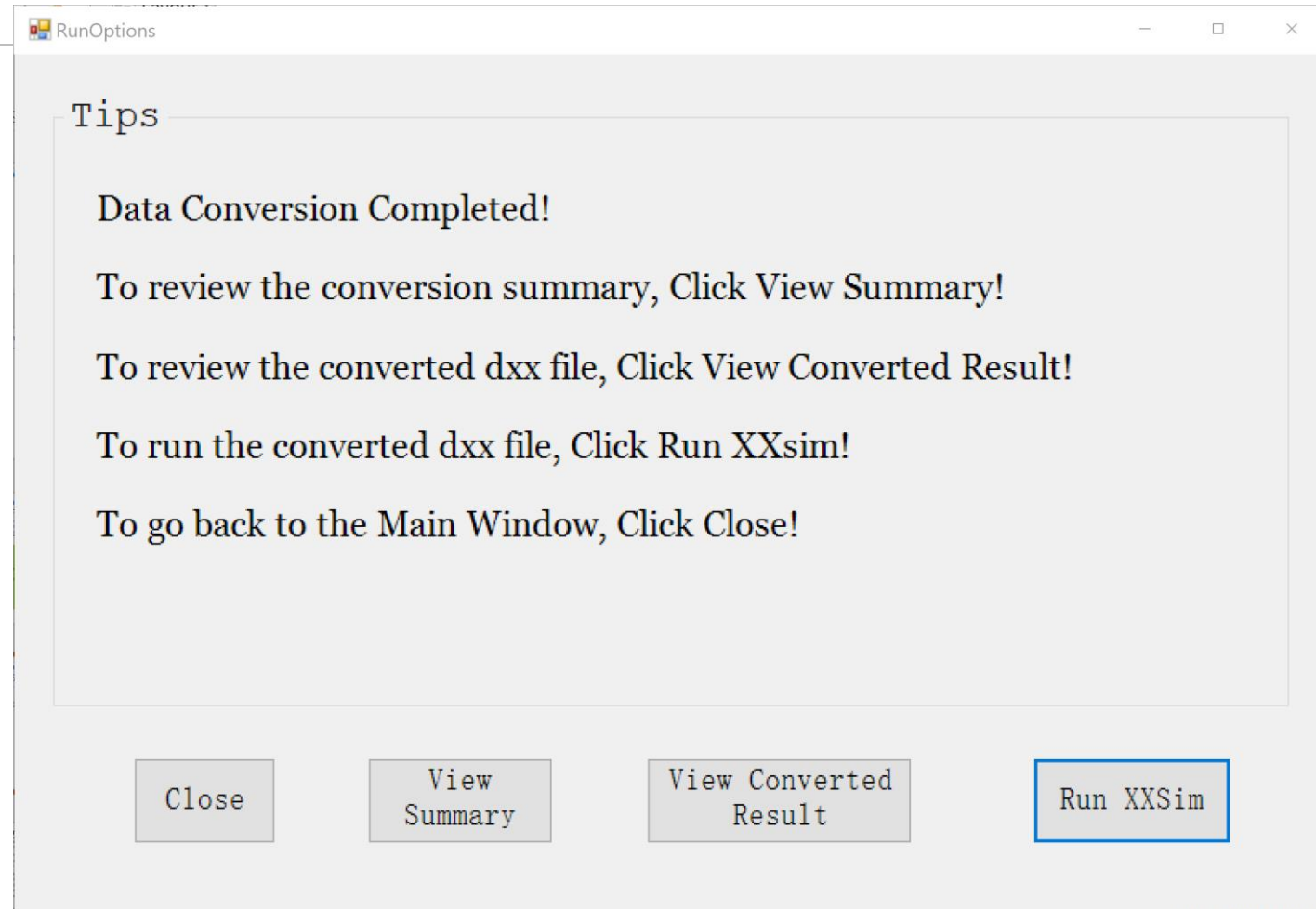


How to Run and View the simulation results

Step 5: Run Options

- Run XXSim (the converted data)
- View Converted Result (the converted data)
- View Summary: Unconverted ECL keywords
- Close: Exit

A XXSIM data file will be created with the root of original Eclipse file name + _XX.DXX
In this example will be **SPE9_XX.DXX**





How to Run and View the simulation results

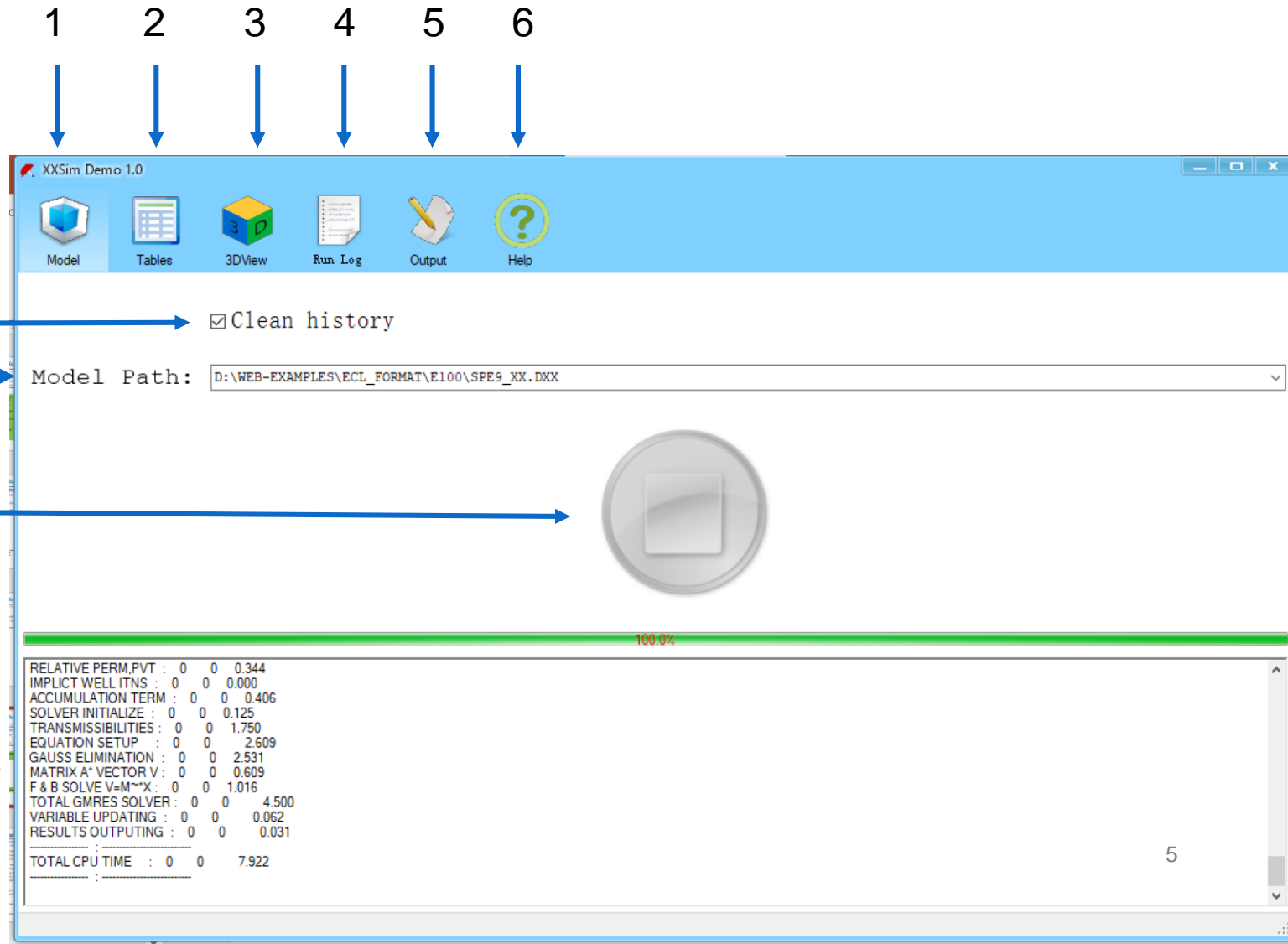
Step 6: Click Run XXSim

- A Control Panel will popup (Right)
- Wait until the run complete

Keep/Cleanup the full paths of completed cases

Terminate the running case

shorter running log Window



Step 7: View Run Summary Table



XXSim Demo 1.0

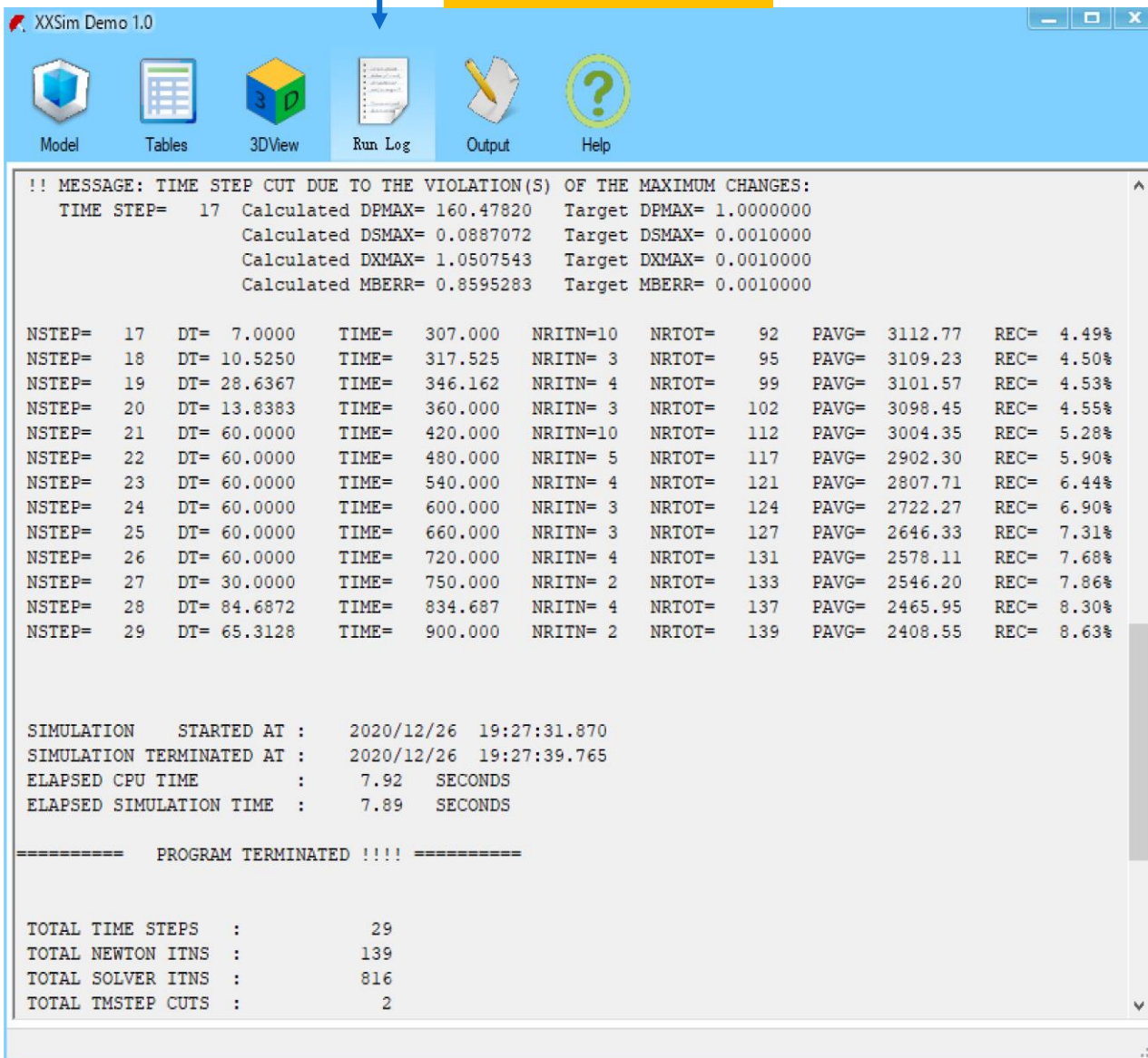
Model Tables 3DView Run Log Output Help

	Date	Newtons	StepNum	Time	DTime	OilRate	WatRate	GasRate	WCut	GOR	Press	WIRate	GIRate	OilCum	WatCum	GasCum	WICum	GICum
1	1/2/1990	2	6	1	0.623	37500	17	51900	0.000453	1.38	3810	1430	0	14100	6.31	19600	647	0
2	2/20/1990	2	10	50	12.442	35900	92.9	49600	0.00258	1.38	3640	868	0	1360000	2380	1860000	31900	0
3	4/11/1990	5	11	100	50	35600	171	53700	0.00479	1.51	3610	910	0	1800000	4510	2530000	43200	0
4	7/20/1990	6	14	200	32.175	33400	1390	108000	0.0399	3.23	3380	1130	0	5830000	119000	13200000	169000	0
5	10/28/1990	5	16	300	75.719	30300	1910	121000	0.0593	4	3270	1210	0	7590000	220000	20000000	237000	0
6	12/27/1990	3	20	360	13.838	2490	470	4900	0.159	1.96	3100	1400	0	9720000	421000	29700000	402000	0
7	2/25/1991	10	21	420	60	2490	476	4360	0.16	1.75	3100	1420	0	9750000	427000	29800000	422000	0
8	4/26/1991	5	22	480	60	26100	2740	106000	0.095	4.05	3000	1490	0	11300000	592000	36100000	511000	0
9	6/25/1991	4	23	540	60	22300	2990	120000	0.118	5.39	2900	1560	0	12700000	771000	43300000	604000	0
10	8/24/1991	3	24	600	60	19100	2930	112000	0.133	5.87	2810	1640	0	13800000	947000	50100000	703000	0
11	10/23/1991	3	25	660	60	16600	2900	102000	0.148	6.11	2720	1730	0	14800000	1120000	56200000	807000	0
12	12/22/1991	4	26	720	60	14500	2950	90500	0.169	6.22	2650	1810	0	15700000	1300000	61600000	915000	0
13	6/19/1992	2	29	900	65.313	11400	3200	74700	0.22	6.58	2470	2030	0	17800000	1840000	75100000	1260000	0

6

Step 8: View Run Log

A brief run log



The image shows the 'Run Log' window of the XXSim Demo 1.0 software. The window has a blue title bar and a menu bar with icons for Model, Tables, 3DView, Run Log, Output, and Help. The main text area displays a message about a time step cut and a table of simulation data for steps 17 through 29. At the bottom, it shows simulation start/stop times, elapsed CPU and simulation times, and a summary of total time steps, Newton iterations, solver iterations, and time step cuts.

```
!! MESSAGE: TIME STEP CUT DUE TO THE VIOLATION(S) OF THE MAXIMUM CHANGES:
  TIME STEP= 17 Calculated DPMAX= 160.47820 Target DPMAX= 1.0000000
                Calculated DSMAX= 0.0887072 Target DSMAX= 0.0010000
                Calculated DXMAX= 1.0507543 Target DXMAX= 0.0010000
                Calculated MBERR= 0.8595283 Target MBERR= 0.0010000

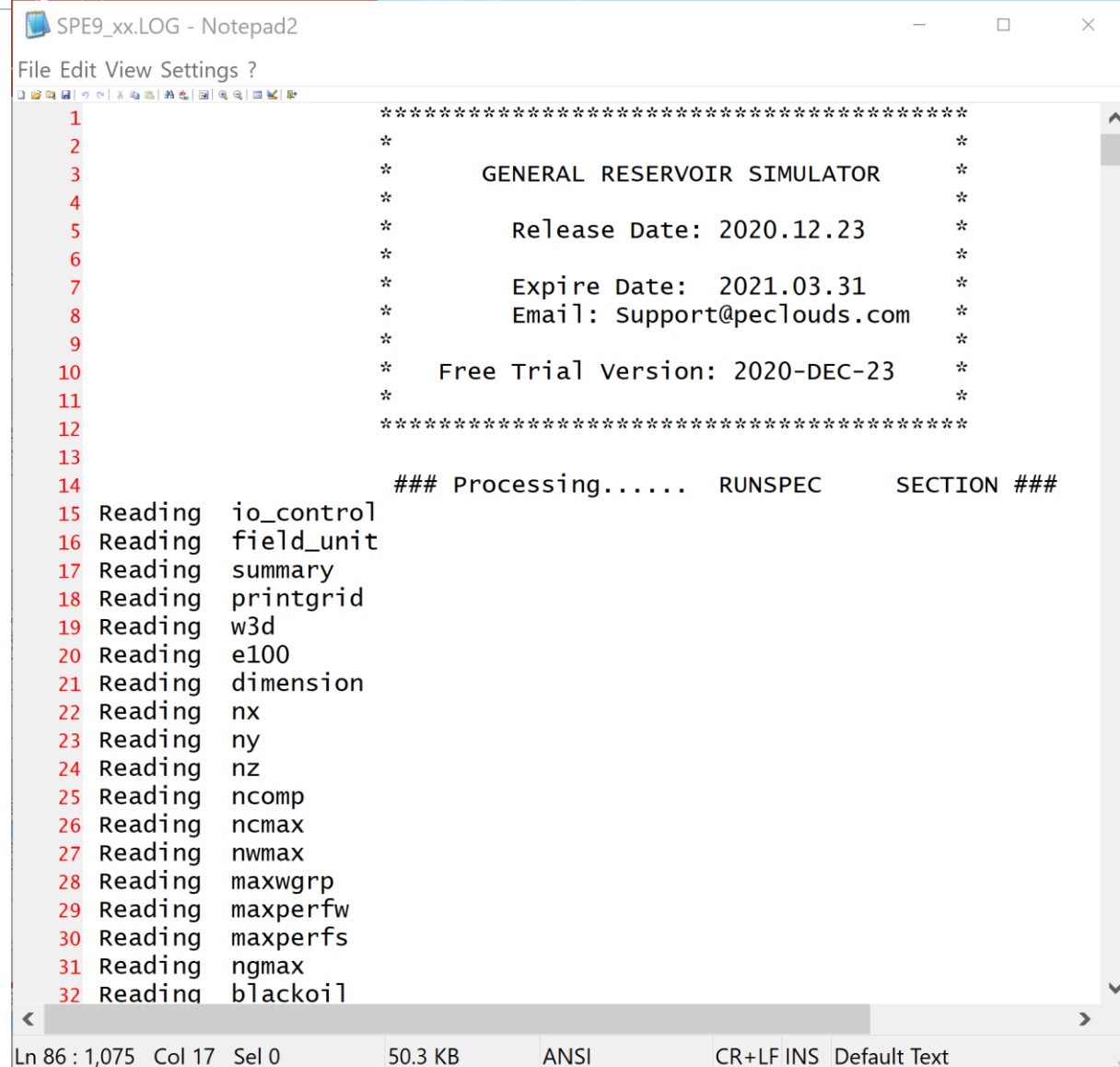
NSTEP= 17 DT= 7.0000 TIME= 307.000 NRITN=10 NRTOT= 92 PAVG= 3112.77 REC= 4.49%
NSTEP= 18 DT= 10.5250 TIME= 317.525 NRITN= 3 NRTOT= 95 PAVG= 3109.23 REC= 4.50%
NSTEP= 19 DT= 28.6367 TIME= 346.162 NRITN= 4 NRTOT= 99 PAVG= 3101.57 REC= 4.53%
NSTEP= 20 DT= 13.8383 TIME= 360.000 NRITN= 3 NRTOT= 102 PAVG= 3098.45 REC= 4.55%
NSTEP= 21 DT= 60.0000 TIME= 420.000 NRITN=10 NRTOT= 112 PAVG= 3004.35 REC= 5.28%
NSTEP= 22 DT= 60.0000 TIME= 480.000 NRITN= 5 NRTOT= 117 PAVG= 2902.30 REC= 5.90%
NSTEP= 23 DT= 60.0000 TIME= 540.000 NRITN= 4 NRTOT= 121 PAVG= 2807.71 REC= 6.44%
NSTEP= 24 DT= 60.0000 TIME= 600.000 NRITN= 3 NRTOT= 124 PAVG= 2722.27 REC= 6.90%
NSTEP= 25 DT= 60.0000 TIME= 660.000 NRITN= 3 NRTOT= 127 PAVG= 2646.33 REC= 7.31%
NSTEP= 26 DT= 60.0000 TIME= 720.000 NRITN= 4 NRTOT= 131 PAVG= 2578.11 REC= 7.68%
NSTEP= 27 DT= 30.0000 TIME= 750.000 NRITN= 2 NRTOT= 133 PAVG= 2546.20 REC= 7.86%
NSTEP= 28 DT= 84.6872 TIME= 834.687 NRITN= 4 NRTOT= 137 PAVG= 2465.95 REC= 8.30%
NSTEP= 29 DT= 65.3128 TIME= 900.000 NRITN= 2 NRTOT= 139 PAVG= 2408.55 REC= 8.63%

SIMULATION   STARTED AT :   2020/12/26 19:27:31.870
SIMULATION TERMINATED AT : 2020/12/26 19:27:39.765
ELAPSED CPU TIME      :    7.92 SECONDS
ELAPSED SIMULATION TIME :    7.89 SECONDS

===== PROGRAM TERMINATED !!!! =====

TOTAL TIME STEPS :      29
TOTAL NEWTON ITNS :     139
TOTAL SOLVER ITNS :     816
TOTAL TMSTEP CUTS :      2
```

A more detailed log in text file



The image shows a Notepad2 window titled 'SPE9_xx.LOG - Notepad2'. The text file contains a header for the 'GENERAL RESERVOIR SIMULATOR', release and expiration dates, contact information, and a list of parameters being read during processing.

```
SPE9_xx.LOG - Notepad2
File Edit View Settings ?

1 *****
2 *
3 *      GENERAL RESERVOIR SIMULATOR      *
4 *
5 *      Release Date: 2020.12.23          *
6 *
7 *      Expire Date: 2021.03.31          *
8 *      Email: Support@peclouds.com      *
9 *
10 *      Free Trial Version: 2020-DEC-23   *
11 *
12 *****
13
14      ### Processing..... RUNSPEC      SECTION ###
15 Reading io_control
16 Reading field_unit
17 Reading summary
18 Reading printgrid
19 Reading w3d
20 Reading e100
21 Reading dimension
22 Reading nx
23 Reading ny
24 Reading nz
25 Reading ncomp
26 Reading ncmax
27 Reading nwmax
28 Reading maxwgrp
29 Reading maxperfw
30 Reading maxperfs
31 Reading ngmax
32 Reading blackoil

Ln 86 : 1,075 Col 17 Sel 0 50.3 KB ANSI CR+LF INS Default Text
```



Step 9: View Output file

Click Output button

A Text file will be popped up with Notepad Editor

The screenshot shows the XXSim Demo 1.0 application window. The 'Output' button, represented by a notepad icon, is highlighted with a blue arrow pointing to it from the 'Step 9: View Output file' instruction. Below the application window, a Notepad2 window titled 'SPE9_xx.OUT - Notepad2' is open, displaying the contents of the output file. The text in the Notepad2 window is as follows:

```
1 *****
2 *
3 *   GENERAL RESERVOIR SIMULATOR   *
4 *
5 *   Release Date: 2020.12.23       *
6 *
7 *   Expire Date: 2021.03.31       *
8 *   Email: Support@peclouds.com   *
9 *
10 *   Free Trial Version: 2020-DEC-23 *
11 *
12 *****
13
14 1 TITLE1 Demo Converter
15 2 TITLE2 Model
16 3 ##### I/O SECTION #####
17 4 IO_CONTROL
18 5 FIELD_UNIT
19 6 SUMMARY
20 7 # P/Psat, PV, TO/TU, DenW, DenO, Deng, Sw, So, Sg, Visw, Viso, Visg, Moles
21 8 PRINTGRID 0 0 0 0 0 0 0 0 0 0 0 0 0
22 9 W3D 1
23 10 E100
24 11 ##### DYNAMIC DIMENSIONING SECTION #####
25 12 DIMENSION
26 13 NX 24 NY 25 NZ 15
27 14 NCOMP 2
28 15 NCMAX 3
29 16 NWMAX 26
30 17 MAXWGRP 30
31 18 MAXPERFW 7
```

The status bar at the bottom of the Notepad2 window shows: Ln 1 : 20,699 Col 1 Sel 0 2.04 MB ANSI CR+LF INS Default Text



Step 9: View 2/3D Maps

Make sure Resinsight package is **unzipped first**

XXSim Demo 1.0

Model Tables **3DView** Run Log Output Help

ResInsight (64bit) - [3D View: SOIL]

File Edit View Windows Help

Project Tree

- ☒ Info Box
- ☒ Grids
- ☒ Cell Result
- ☐ Cell Edge Result

Property Editor

Type: Dynamic

Result Property: Completion Type

- DENG
- DENO
- DENW
- MFG-SGAS
- MFO-HOIL
- MFO-SGAS
- MFW-H2O
- PORV
- PRESSURE
- PSAT
- SGAS

Difference Options

Difference Case: None

Base Time Step: Disabled

Time Step: 0/12 02.Jan 1990

-- SPE9_XX --

Cell count. Total: 9 000 Active: 9 000
Main Grid I,J,K: 24, 25, 15 Z-Scale: 5
Cell Property: SOIL

Statistics: Current Time Step and Visible Cells

Min	P90	Mean	P10	Max	Sum
0.118431	0.120937	0.558795	0.816668	0.828441	5029.15

ResInsight v2020.04.1

Alternation 3D Solution:

You can also Right Click
the SPE9_XX.DXX
Or SPE9_XX.EGRID
in the Panel Below

File List

.dxx;.dat;*.data;*.egrid;*.smspec

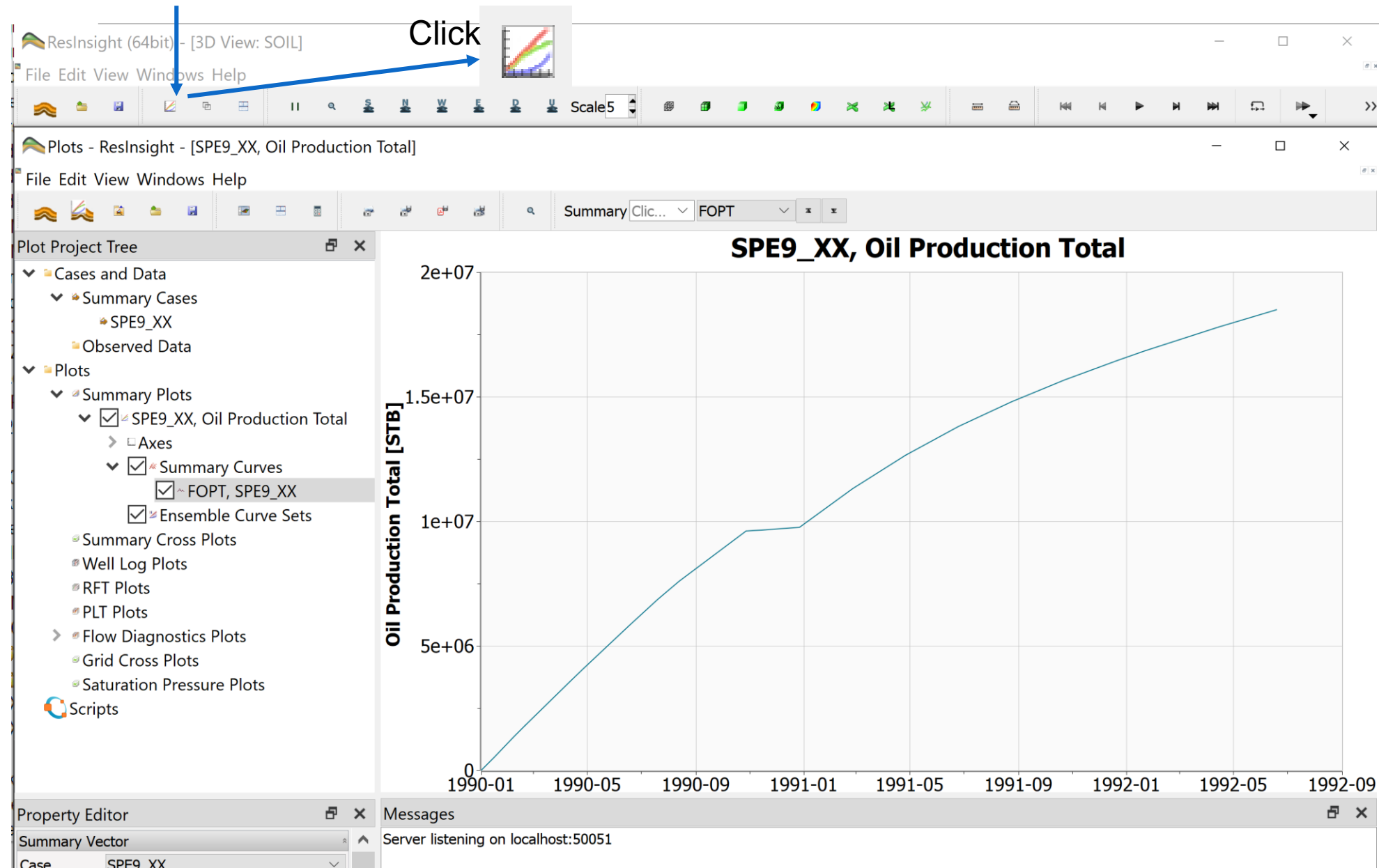
Name

- ENDSCALE.DATA
- ENDSCALE_300.DATA
- SPE10CELLS2000_E100.DATA
- SPE10CELLS2000_E300.DATA
- SPE2.DATA
- SPE6_SIGMAV.DATA
- SPE7.DATA
- SPE7_AQUCT_4EDGES.DATA
- SPE7_AQUFETP_4EDGES.DATA
- SPE9.DATA
- SPE9DEBUG.DATA
- SPE9E300.DATA
- SPE9_XX.DXX**
- SPE9_XX.EGRID**
- SPE9_XX.SMSPEC



Step 10: Create XY Plots

For ore details, Please refer to
Resinsight User Menu and Tutorials





How to Run and View the PVT simulation results

Steps: PVT Modeling

- Go to XXPVT Folder or your own PVT data folders
- Select `*.pvd;*.pvo;*.sim` from drop down list
- Highlight the pvd file (spe5c7lumpto6.pvd) then right click
- A List two options will be displayed
- Click **Run**
- Highlight spe5c7lumpto6.pvo then right click **View** to check result
- Highlight spe5c7lumpto6.sim then right click **View** to check and copy the EOS parameters generated for XXSIM's EOSCOMP module

The screenshot displays the XXSim Demo 1.5.1 application. The 'Windows Explorer' pane on the left shows the directory structure, with 'D:\WEB-EXAMPLES\XXPVT' selected. The 'File List' pane on the right shows a list of files with columns for Name, Size, Created, and Modified. The file 'spe5c7lumpto6.pvd' is highlighted, and a green box with the text 'Right Click' points to it. The 'Output' pane at the bottom shows the simulation results, including the start and end times, elapsed CPU time, and elapsed simulation time.

Name	Size	Created	Modified
CVDGAS13-contant-volume-test-REGRESS...	7 KB	12/25/2020 12:39 ...	12/25/2020
EX02-REGRESSION.pvd	5 KB	12/25/2020 1:17 AM	12/25/2020
lump.pvd	12 KB	12/25/2020 11:02 ...	12/25/2020
lump.SIM	3 KB	12/25/2020 6:48 PM	12/25/2020
mcetest-20c-regression.pvd	7 KB	12/25/2020 11:05 ...	12/25/2020
michelsen-flash.pvd	1 KB	12/24/2020 11:31 ...	12/24/2020
OIL11C-CCE-DLE-REGRESSION.pvd	17 KB	12/25/2020 11:41 ...	12/25/2020
OIL11C-CCE-DLE-REGRESSION.PVO	438 KB	12/26/2020 10:27 ...	12/26/2020
OIL11C-CCE-DLE-REGRESSION.SIM	2 KB	12/26/2020 10:27 ...	12/26/2020
SPE11197-GAS2-REGRESSION.pvd	4 KB	12/25/2020 11:33 ...	12/25/2020
SPE3C9VSF0-REGRESSION.pvd	6 KB	12/25/2020 11:15 ...	12/25/2020
spe5c7lumpto6c.pvd	2 KB	12/25/2020 11:19 ...	12/25/2020
spe5c7lumpto6c.PVO	1 KB	12/28/2020 4:52 PM	12/28/2020
spe5c7lumpto6c.SIM	0 KB	12/28/2020 4:52 PM	12/28/2020

Output

```
SIMULATION STARTED AT : Mon Dec 28 17:36:53 2020
SIMULATION TERMINATED AT : Mon Dec 28 17:36:53 2020
ELAPSED CPU TIME : 0.00 SECONDS
ELAPSED SIMULATION TIME : 0.00 SECONDS

===== PROGRAM TERMINATED !!!! =====
```