



OPMRUN Graphical User Interface For OPM Flow

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OPMRUN

A Graphical User Interface For OPM Flow

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2020-02-04	Rev-1	Final 2020-04	D. Baxendale	N/A	N/A
2020-01-30	Rev-0	Final 2020-04	D. Baxendale	N/A	N/A

OPM - OPM OPMRUN: What Is It?

- A graphical user interface to OPM Flow that has similar functionality to the commercial simulator's ECLRUN program.
- Target audience are Reservoir Engineers in a production environment. Developers and experienced Linux users will already have compatible work flows.
- Allows editing and management of OPM Flow's run time parameters. Default parameters are automatically loaded from OPM Flow, and the user can reset the default set either from a parameter or *.PRT file. Editing of a job's parameter file is also available.
- Allows simulation jobs to be queued and run in either foreground (under OPMRUN), or background (in an xterm terminal session). All jobs in the queue can be set to run in NOSIM mode or RUN mode.
- Foreground jobs can be killed from OPMRUN.
- Queues can be edited, saved and loaded.
- Jobs can be compressed to save space (*.DATA and all OPM Flow output files) and uncompressed.
- **OPM Flow Keyword Generator - New Application (this presentation).**
- Written in Python 3 and tested under Ubuntu-Mate 18.04 TLS.
- Compiled binary version should work on all Linux systems, no need to install dependencies or Python.



OPMRUN

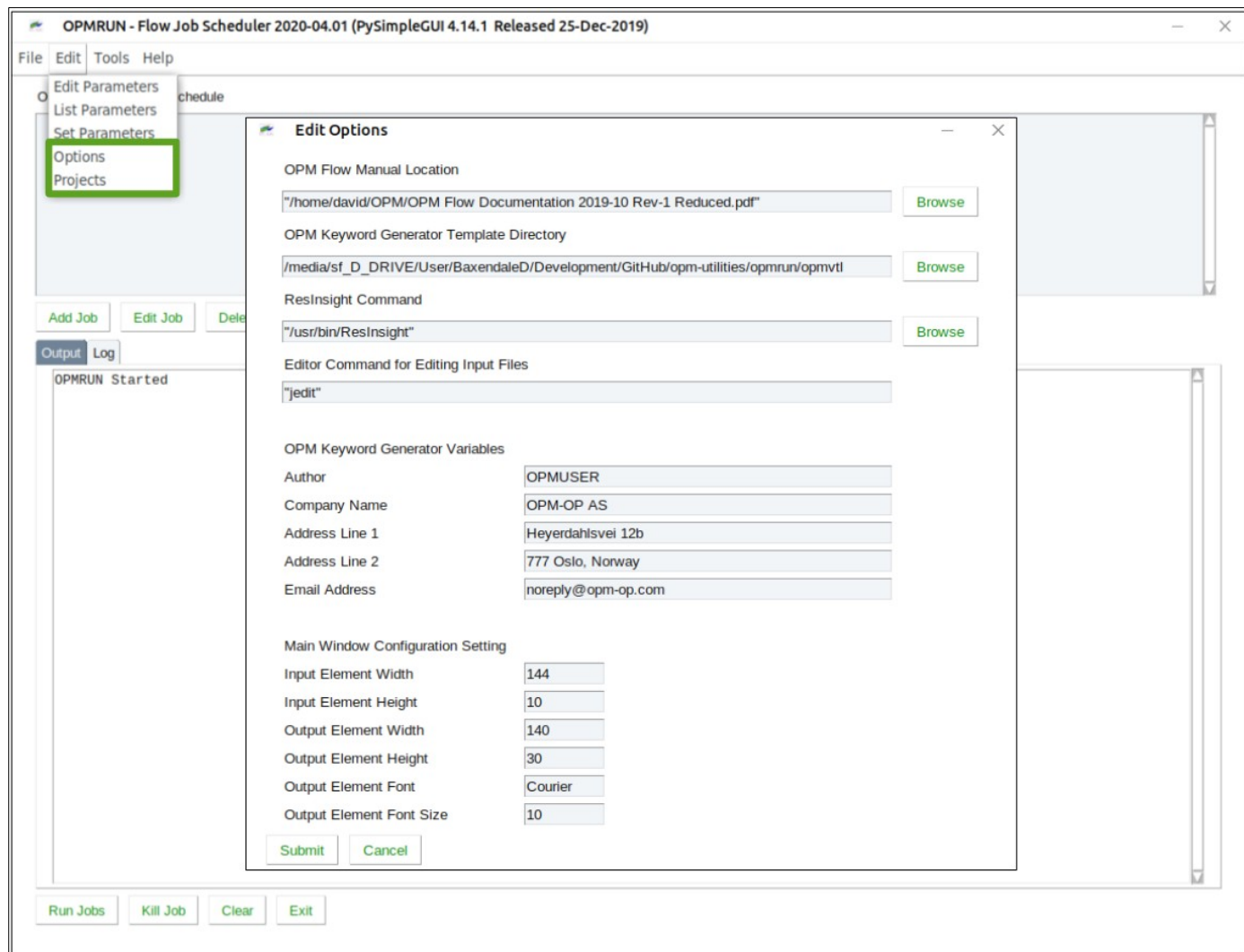
A Graphical User Interface For OPM Flow

OPMRUN KEYWORD GENERATOR (OPMKEYW)

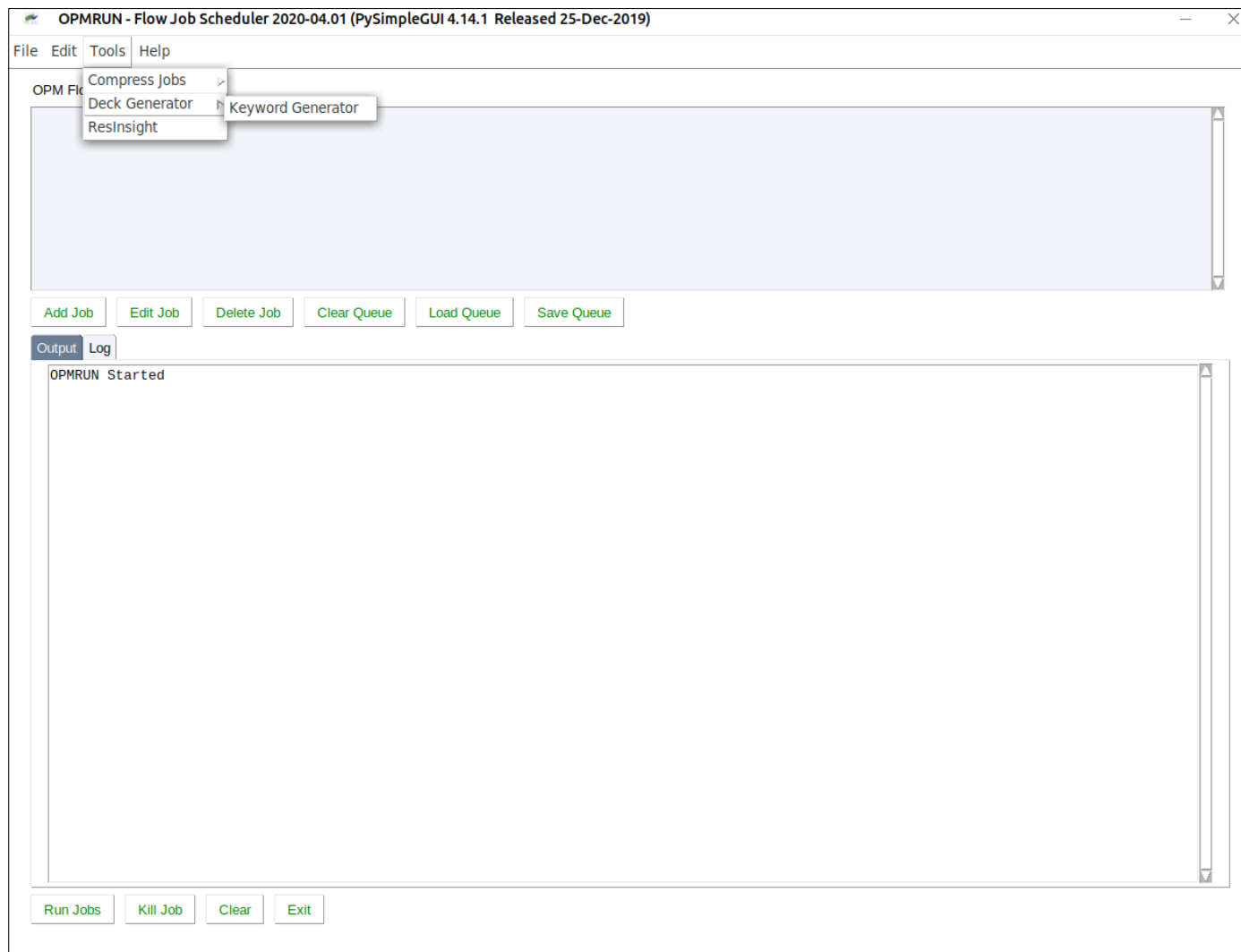
OPM - OPM OPMRUN: Keyword Generator

- Objective:
 - Generate OPM Flow keywords in a consistent manner and make the generation of a “deck” of keywords relatively straight forward.
 - Able to be used with any editor via cut and paste.
 - Able to create and edit existing keyword templates.
 - Target audience are Reservoir Engineers and Developers.
- Application:
 - Based on the Apache Velocity Template Language (“VTL”). The templates can therefore also be used with any editor that supports VTL, jEdit for example.
 - One template per keyword, with formatting the same as the OPM Flow manual. Over 450 templates are currently implemented.
 - One can also customize the existing templates as well as creating User defined templates by including the templates in the template directory and following the VTL language syntax.
 - Keywords filtered by Section in alphabetic order, and can also list all the keywords.
 - Multiple keywords can be generated at a time and copied to the clipboard or saved to a file.
 - Section keywords (RUNSPEC, GRID, EDIT, PROPS, SOLUTION, SUMMARY and SCHEDULE) can optionally generate a set of keywords for the section.
 - The keywords are examples, one still has to edit the resulting deck with the actual required data, but the format with comments should make this a straight forward process.

- OPMRUN options have been expanded to include the “template directory” and the “author property” fields.
- The “author property” fields are used in some templates to document the file.
- Note if a “author property” field is not defined then the template variable will be output instead – this can easily be deleted in the application.

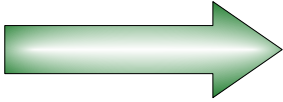


- The Keyword Generator is located under the “Tools” menu “Deck Generator” option.
- Additional Deck Generator applications are planned for future versions.

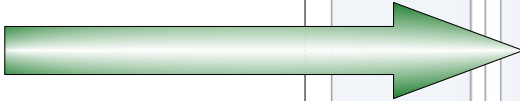


Keyword Filter Options

Keyword List



Deck Element



OPMRUN Keyword Generation Utility

Keyword Filter HEADER GLOBAL RUNSPEC GRID EDIT PROPS SOLUTION SUMMARY SCHEDULE ALL

COMMENT
DEBUG
ECHO
END
ENDINC
ENDSKIP
EXTRAPMS
INCLUDE
MESSAGES
NOECHO
NOWARN
SKIP
SKIP100
SKIP300
WARN

OPMRUN - Flow Job Scheduler 2020-04.01

OPM Flow Input Keyword Generation Utility is a Graphical User Interface ("GUI") program for the Open Porous Media ("OPM") Flow simulator

This module generates input decks based of the keywords available for the simulator and uses the Apache Velocity Template Language ("VTL") for the templates. VTL is a common templating language used by many programming editors, and therefore the templates can also be used directly with an editor provided the editor supports VTL. The Python airspeed module is used to parse the templates and the key templates are comparable to the examples depicted in the OPM Flow Manual.

The "Keyword Filter" button allows for the filtering of the various keywords in the selected section, including being able to list all the keywords available for all sections. Clicking on a keyword will result in the keyword being "pasted" into the Deck element. This element is editable by simply clicking anywhere in the element and making changes.

The "Clear" button will clear the Deck element of all text, and the "Copy" button will copy the text in the Deck element to the clipboard from which you can paste the text in your chosen editor. The text can also be save saved to a file by selecting the "Save" button

See the OPM Flow manual for further information.

OK

Clear Copy Help Save Exit

- The Keyword Filter button allows for the filtering of the various keywords in the selected section, including being able to list all the keywords available for all sections.
- The HEADER section allows for a start and end of file comment headers.
- Clicking on a keyword will result in the keyword being "pasted" into the Deck Element.

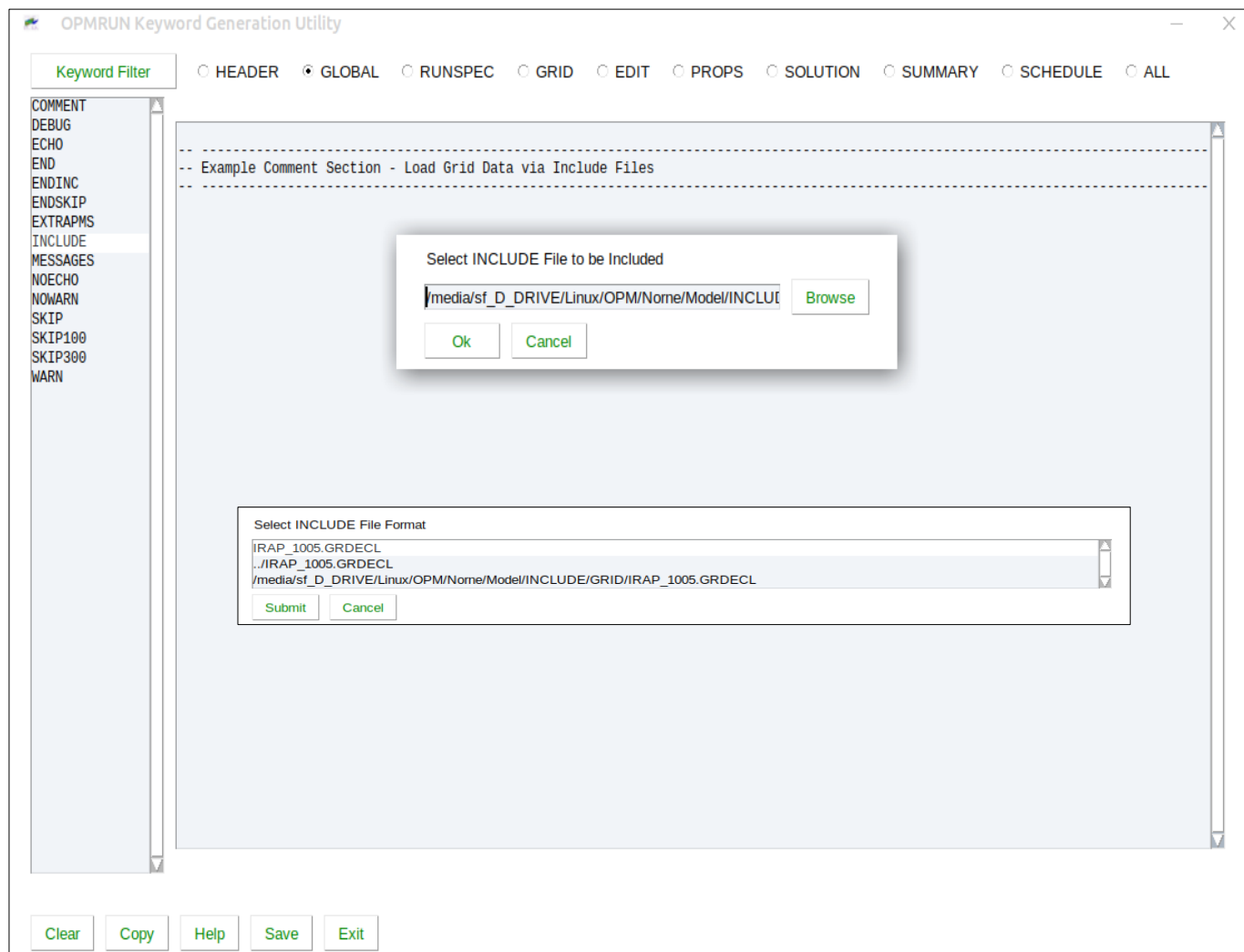


- The Deck Element is editable by simply clicking anywhere in the element and making changes.
- Use the “Clear” button to clear the Deck Element display. Note that this will cause all changes to be deleted.

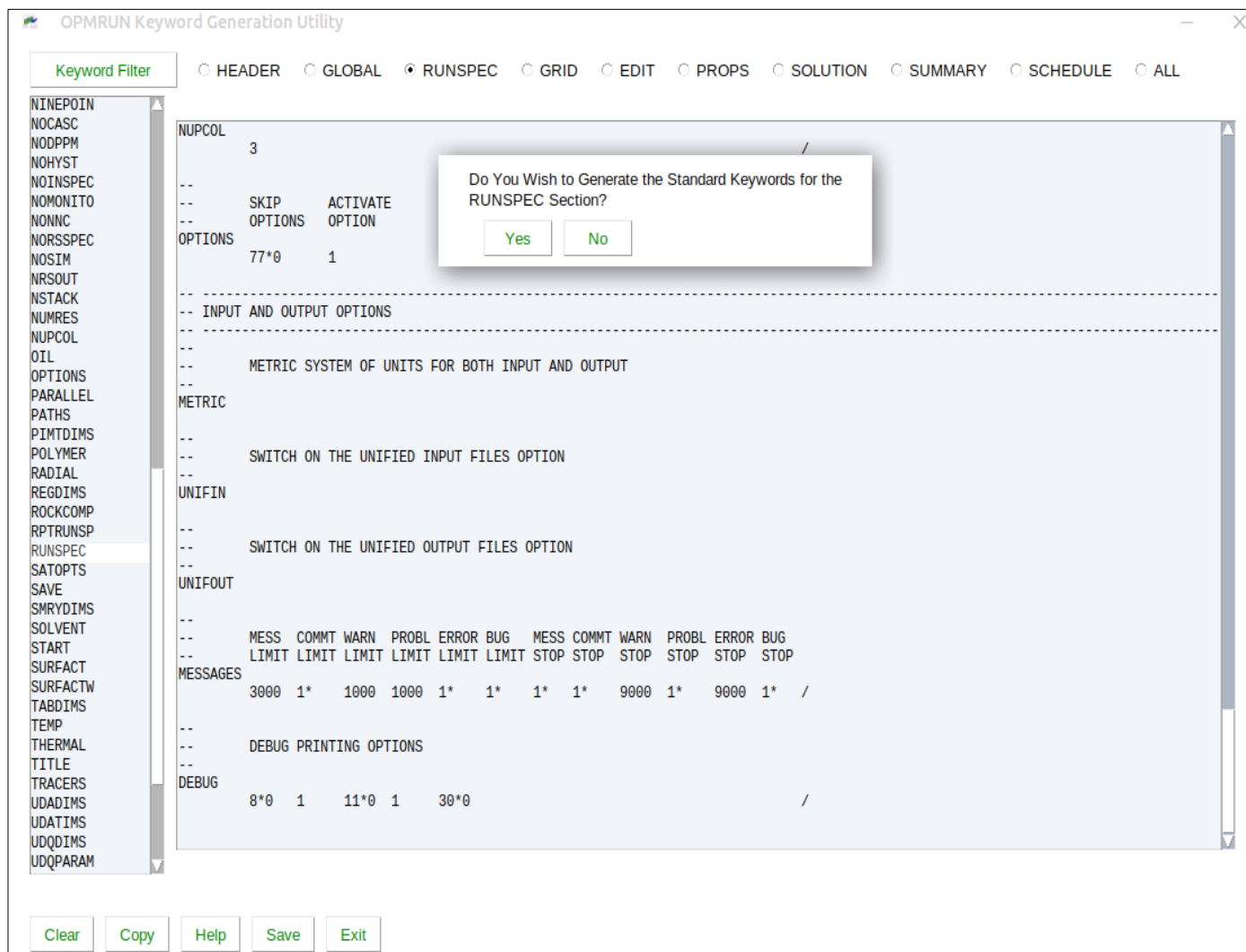
The screenshot shows the OPMRUN Keyword Generation Utility window. It features a 'Keyword Filter' dropdown menu on the left with options: HEADER-EOF, HEADER-INCLUDE, HEADER-LICENSE, HEADER-LONG, HEADER-OPM, and HEADER-SHORT. The main area contains a text editor with a pre-defined simulation file header. At the top, there are radio buttons for selecting a keyword type: HEADER (selected), GLOBAL, RUNSPEC, GRID, EDIT, PROPS, SOLUTION, SUMMARY, SCHEDULE, and ALL. At the bottom, there are buttons for 'Clear', 'Copy', 'Help', 'Save', and 'Exit'.

```
OPMRUN Keyword Generation Utility  
Keyword Filter  
● HEADER ○ GLOBAL ○ RUNSPEC ○ GRID ○ EDIT ○ PROPS ○ SOLUTION ○ SUMMARY ○ SCHEDULE ○ ALL  
HEADER-EOF  
HEADER-INCLUDE  
HEADER-LICENSE  
HEADER-LONG  
HEADER-OPM  
HEADER-SHORT  
-----  
OPM FLOW SIMULATION FILE  
-----  
COPYRIGHT NOTICE  
-----  
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Copyright (C) 2020 Equinox International Petroleum Consultants Pte. Ltd  
-----  
COMMENTS  
-----  
Base Case run for testing MULTX keywords.]  
-----  
4567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012  
1 2 3 4 5 6 7 8 9 0 1 2 3  
0 0 0 0 0 0 0 0 0 1 1 1 1  
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```

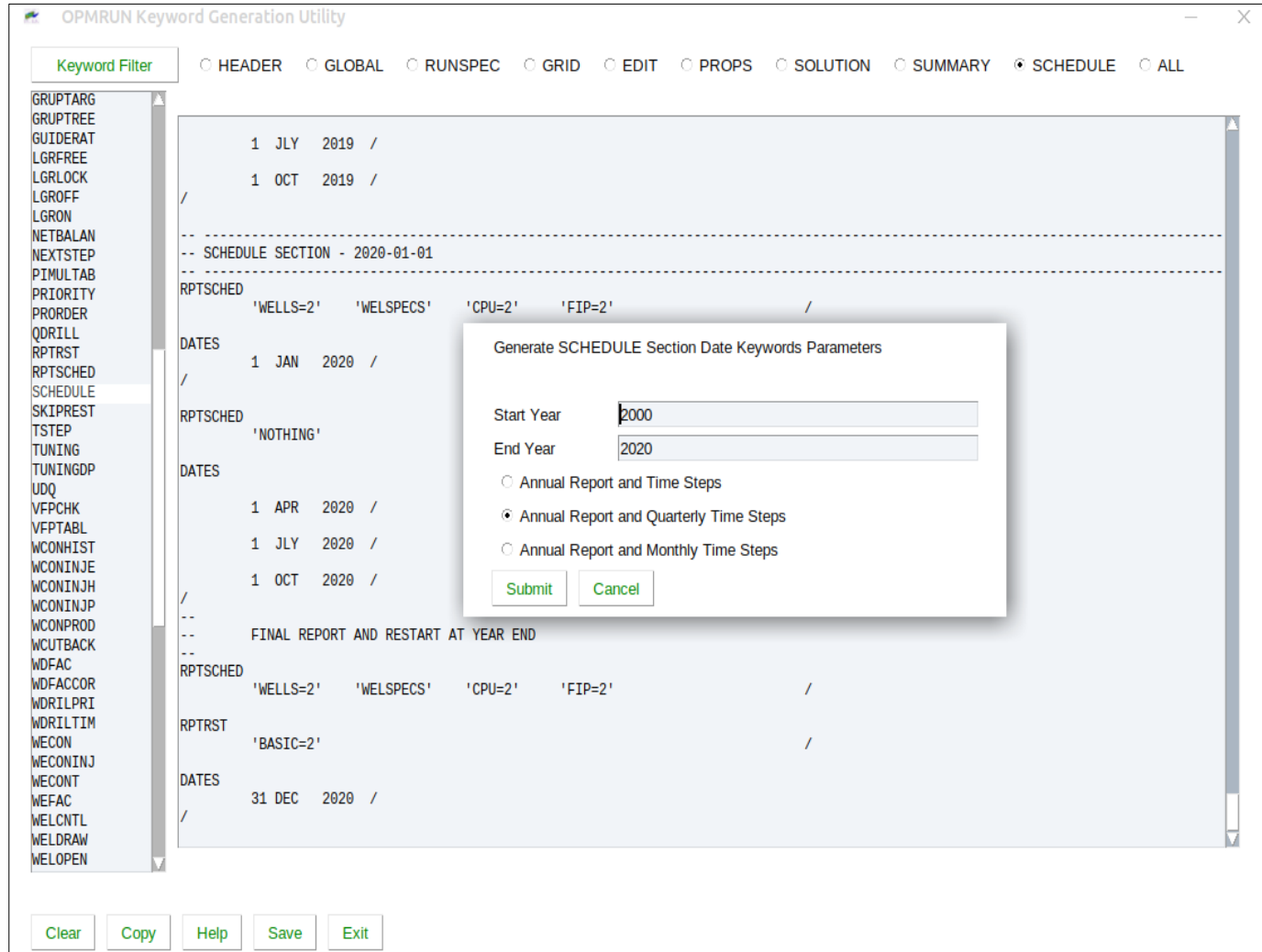
- If a keyword requires a file, for example, the INCLUDE and LOAD keywords, then a dialog box is presented to enable the file to be selected.
- Will also allow one to select the file name format, after the file has been selected.
- The COMMENT keyword, is not an actual keyword, but a comment block to make the deck more readable.



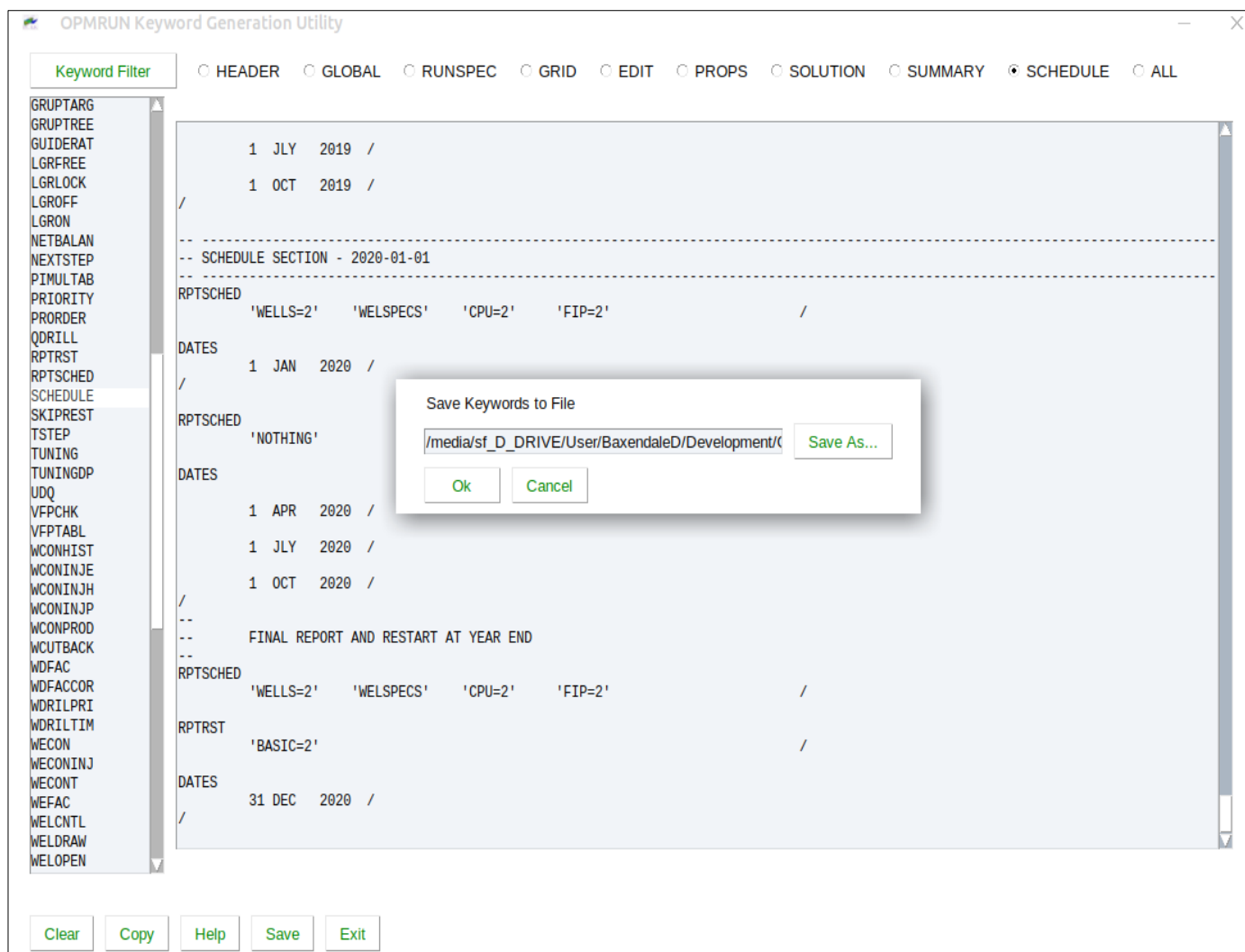
- Selecting a Section keyword (RUNSPEC, GRID, EDIT, PROPS, SOLUTION, SUMMARY, and SCHEDULE) will give an option to generate a representative set of keywords for that section.
- One can therefore generate a complete input deck in a matter of minutes.
- However, you still have to edit this with your actual data.



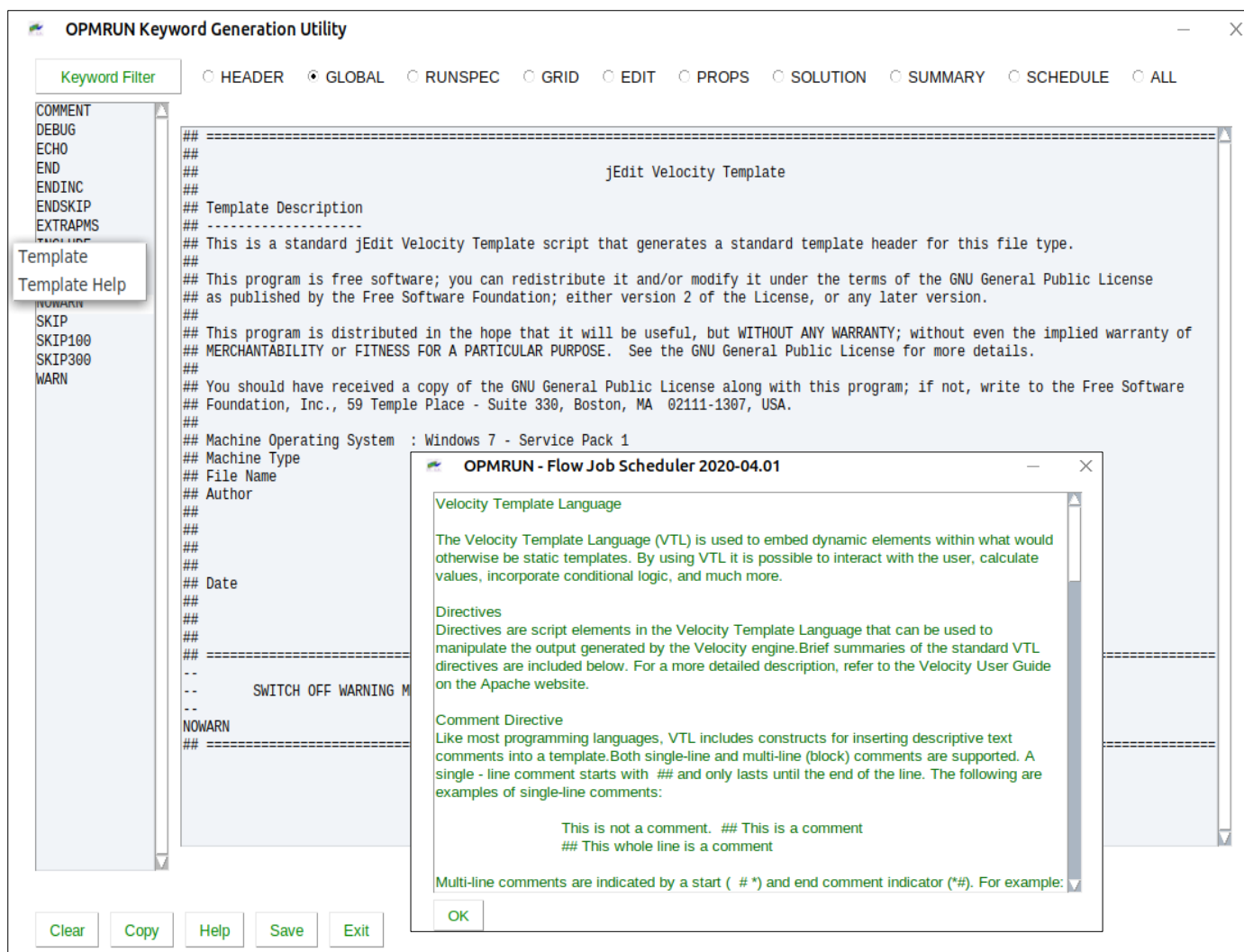
- For The SCHEDULE Section keyword, one can also generate a date schedule from a start year to and end year, using Annual, Quarterly, or Monthly time steps.
- A standard report is written at the beginning of each year and is subsequently switch off for intermediate Quarterly and Monthly time steps.
- A final report is written at the end of the run.



- Use the “Copy” button to copy the data in the Deck Element to the clipboard, which can then be pasted into your favorite editor.
- Alternatively, one can save the data directly to a *.DATA or *.INC file for further editing and processing.



- After selecting a keyword, right clicking on the keyword allows one to load the actual template for the keyword.
- One can then edit the template and save the changes back to the same template or another template.
- Probably a good idea to save as a separate template.
- The Template Help option displays a brief introduction to VTL.



OPM - O P OPMRUN: Keyword Generator

- Status:
 - Currently under going final testing. Once complete will be uploaded to GitHub together with documentation.
 - The Keyword Generator can also be used standalone, but the preferred application is within OPMRUN to leverage Project directories etc.
 - The standard alone version is operating system independent, just need Python and the various modules.
 - Considering generating standalone binaries, downloadable from the company's web site, if there is a need.
 - Considering generating additional Deck Generator applications:
 - Deck Sensitivity Generator: Using an existing input deck, generate sensitivity runs via parameter substitution based on Full Factorial or an Experimental Design. Generate queue and optionally run all the jobs.
 - Deck Production Generator: Load CSV file with production data and generate an OPM Flow SCHEDULE section using the WCONHIST keyword.
 - Deck DST Generator: Load a CSV containing DST pressure gauge data and a CSV file containing DST rate data and generate an OPM Flow SCHEDULE section using the WCONHIST keyword, with automatic merging of the two data sets and user defined sampling (5, 10 minutes etc).
 - Feedback welcome on current application and future developments.



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End of Presentation