SNAP Applications and Post Processing

Presented by
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EMUG 2015
Brussels, Belgium

Sandia National Laboratories

Outline

- **Present the simple example model**
- **Creating a Sensitivity Analysis with SNAP**
- **Post Processing a Job Stream with AptPlot**

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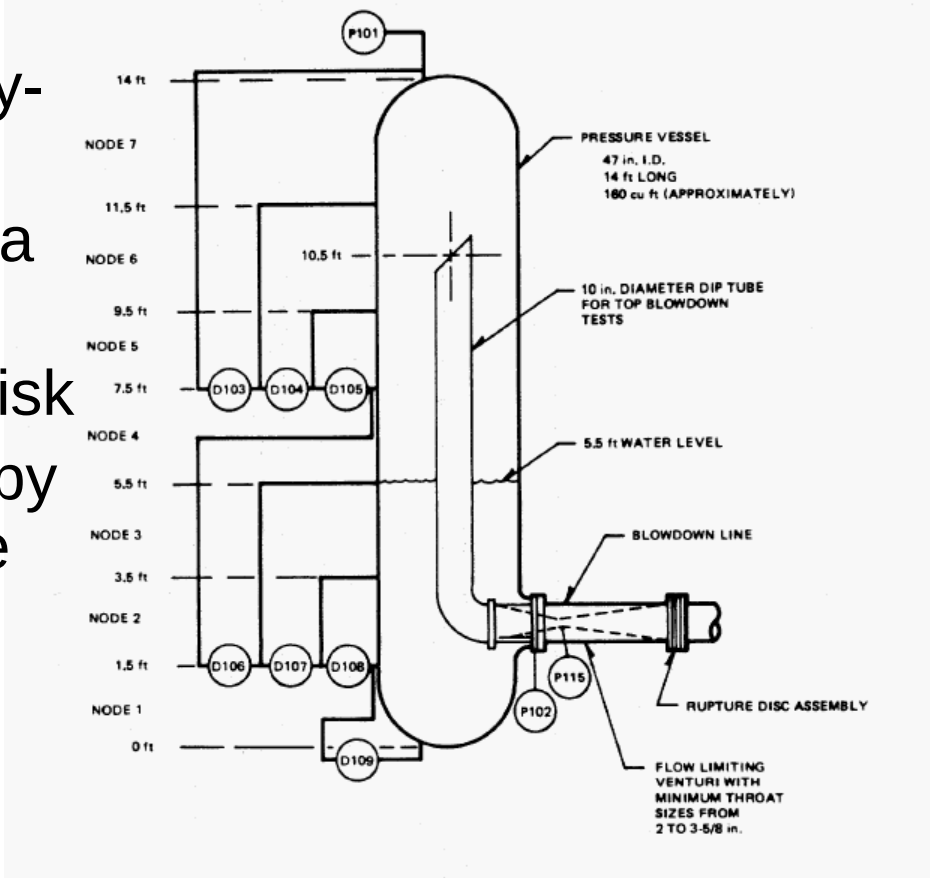
Overview of One of the GE Level Swell Tests

- GE Swell 5801-13
  - Saturated water partially-filled vessel
  - Depressurized through a dip tube
    - Actuated a rupture disk
    - Hole size simulated by throat in dip tube line



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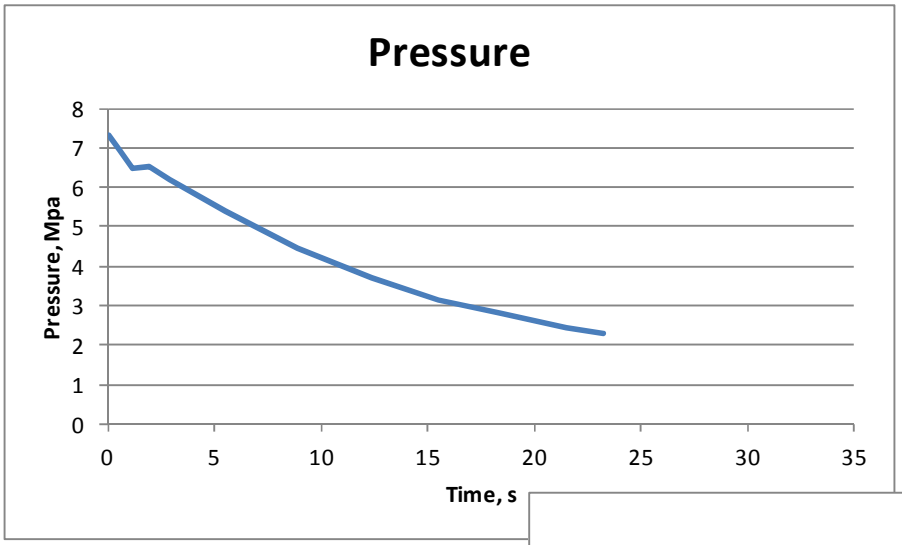
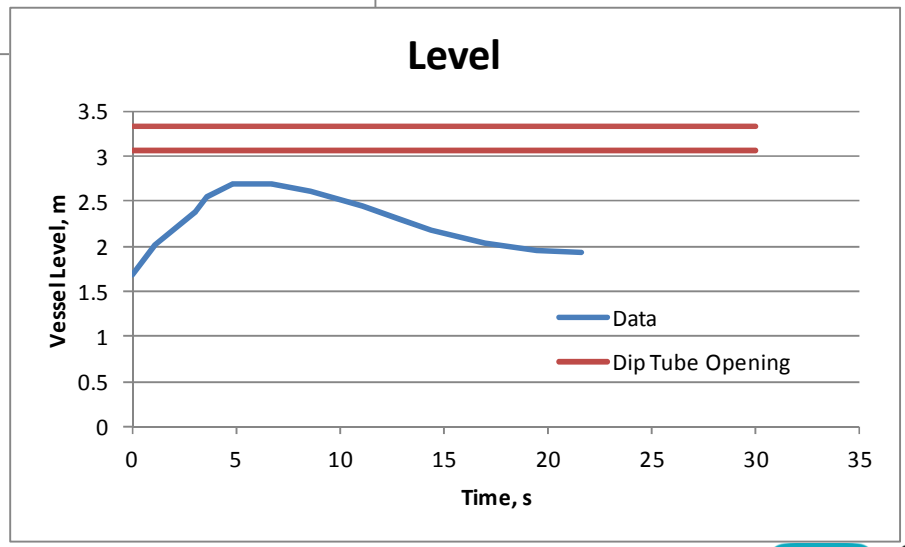
GE Test Data





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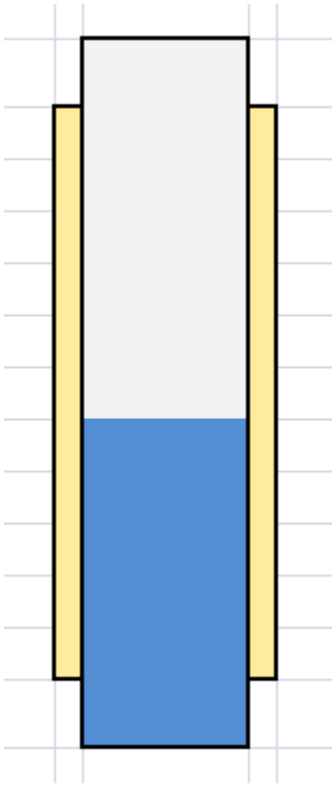
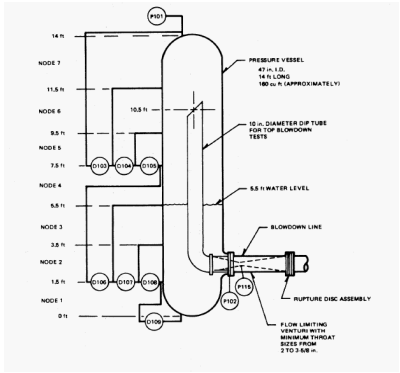
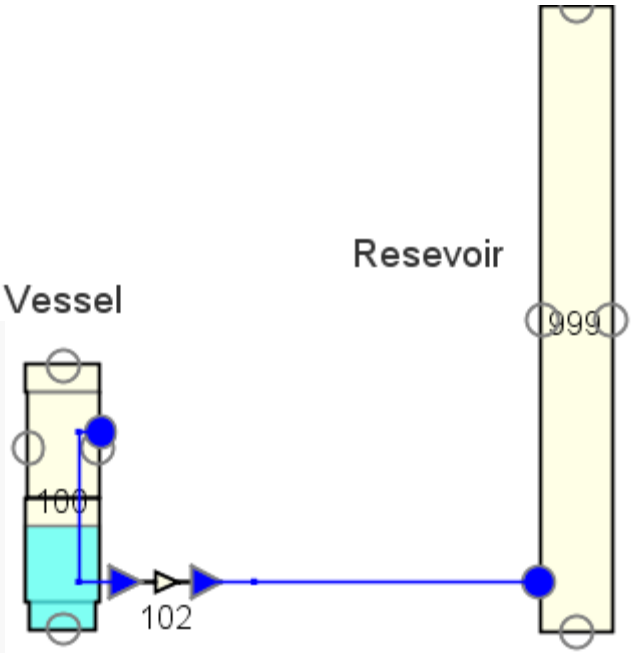
Nodalization

Simple Vessel Nodalization
1 HS, 1 CV, 1 FL







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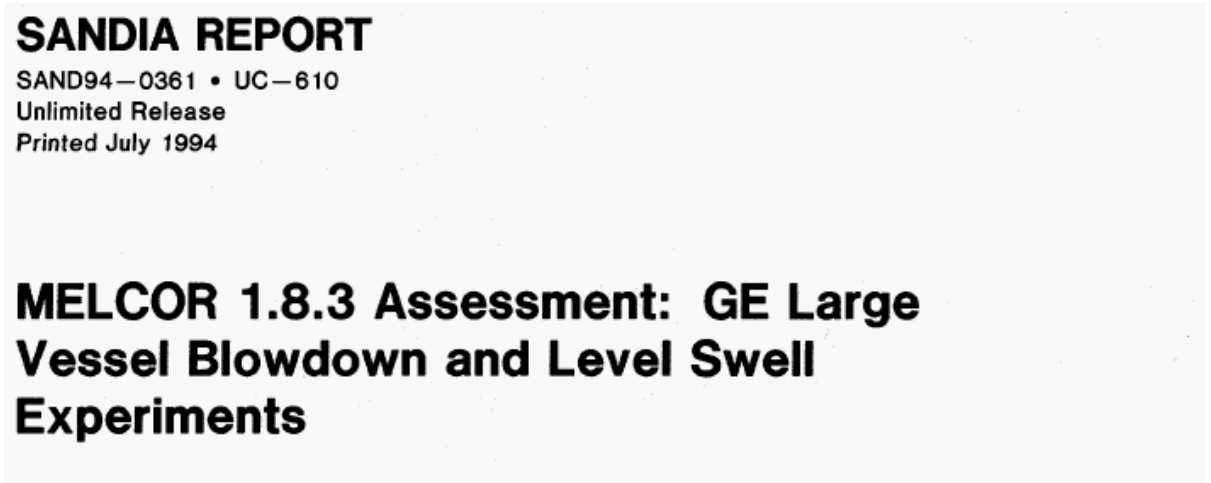
Background Report



SANDIA REPORT

SAND94—0361 • UC—610
Unlimited Release
Printed July 1994

MELCOR 1.8.3 Assessment: GE Large Vessel Blowdown and Level Swell Experiments

- **Kmetyk's report provides the 1.8.3 MELCOR input**
  - **CVH/FL/HS input has remained relatively unchanged between 1.8.3 and 1.8.6**
    - **SNAP was utilized to perform the conversion**

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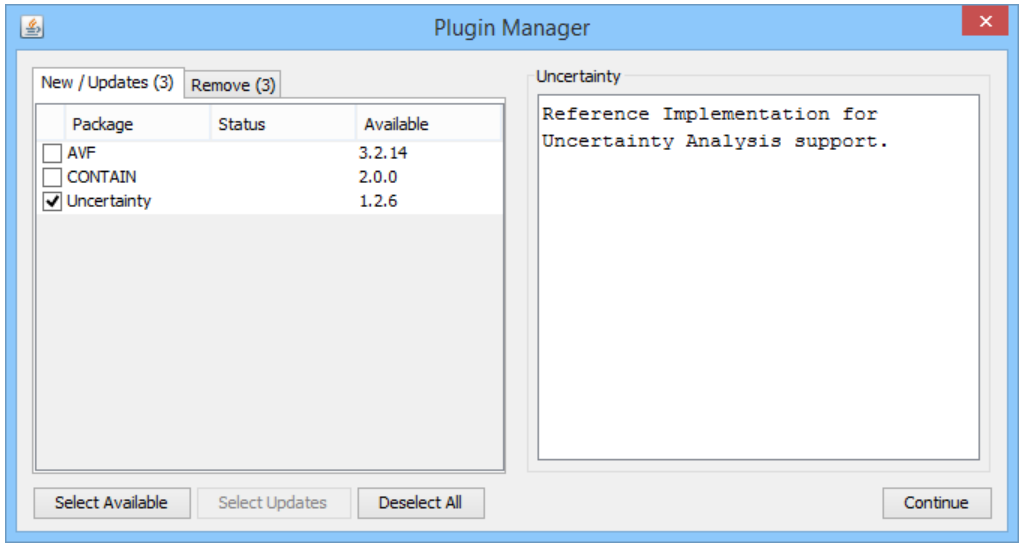
Performing a Sensitivity Study with SNAP
Step 1 – Downloading Dakota Plugin

1. **Select Dakota plug-in during the SNAP plugins download and installation step**
2. Create a Numeric value in your model
3. Assign the Numeric value as an input value
4. Create a Dakota Run Stream
5. Specify a model node as parametric (MELGEN or MELCOR depending on input)
6. Define Dakota parametric properties
7. Run Job



Be sure to download the Uncertainty plugin while downloading the MELCOR plugin

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Performing a Sensitivity Study with SNAP
Step 2 – Adding a Numeric

1. Select Dakota plug-in during SNAP plugins download and installation step

2. **Create a Numeric value in your model**

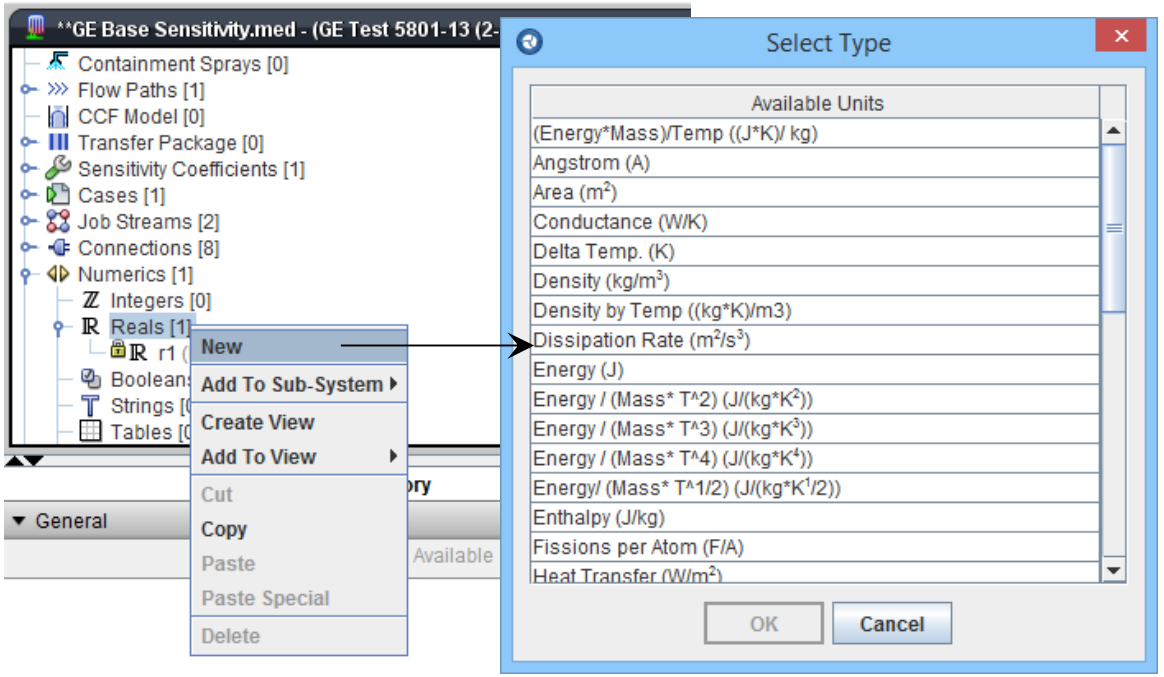
3. Assign the Numeric value as an input value

4. Create a Dakota Run Stream

5. Specify a model node as parametric (MELGEN or MELCOR depending on input)

6. Define Dakota parametric properties

7. Run Job



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Performing a Sensitivity Study with SNAP
Step 3 – Assign the New Numeric

1. Select Dakota plug-in during SNAP plugins download and installation step

2. Create a Numeric value in your model

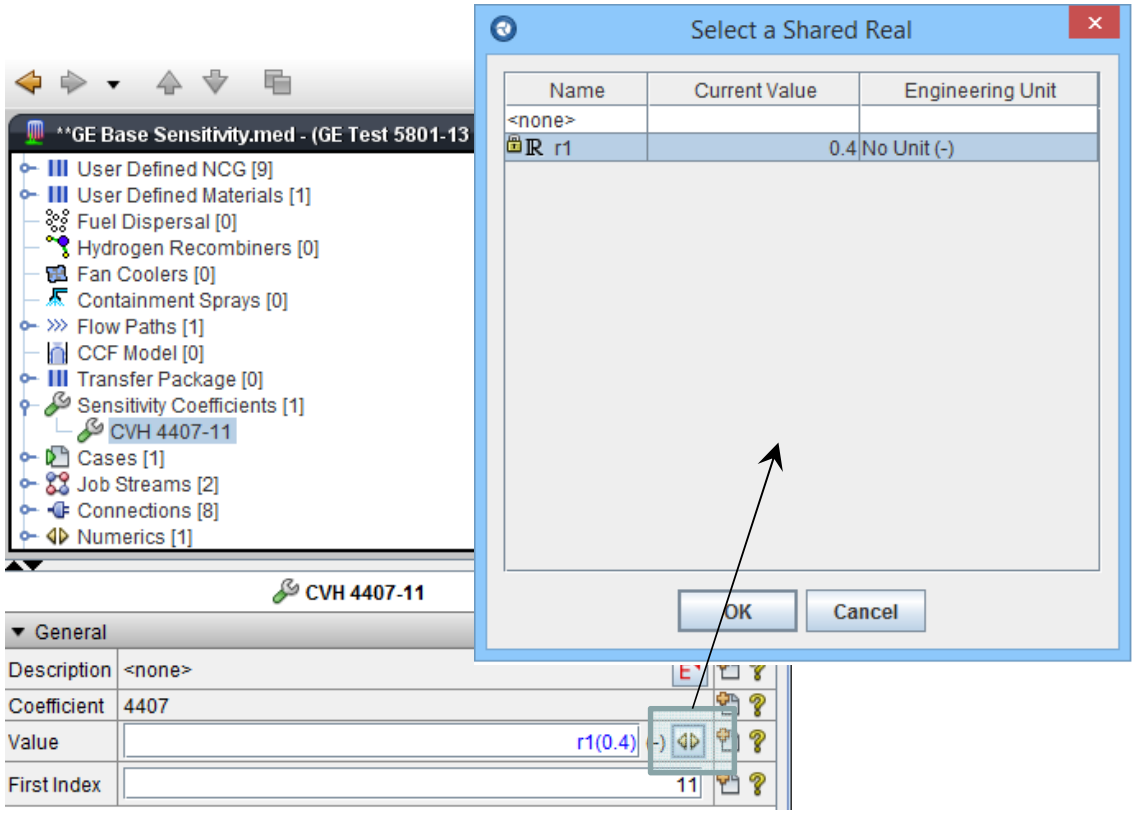
3. Assign the Numeric value as an input value

4. Create a Dakota Run Stream

5. Specify a model node as parametric (MELGEN or MELCOR depending on input)

6. Define Dakota parametric properties

7. Run Job



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Performing a Sensitivity Study with SNAP
Step 4 – Dakota Job Stream (1)

1. Select Dakota plug-in during SNAP plugins download and installation step

2. Create a Numeric value in your model

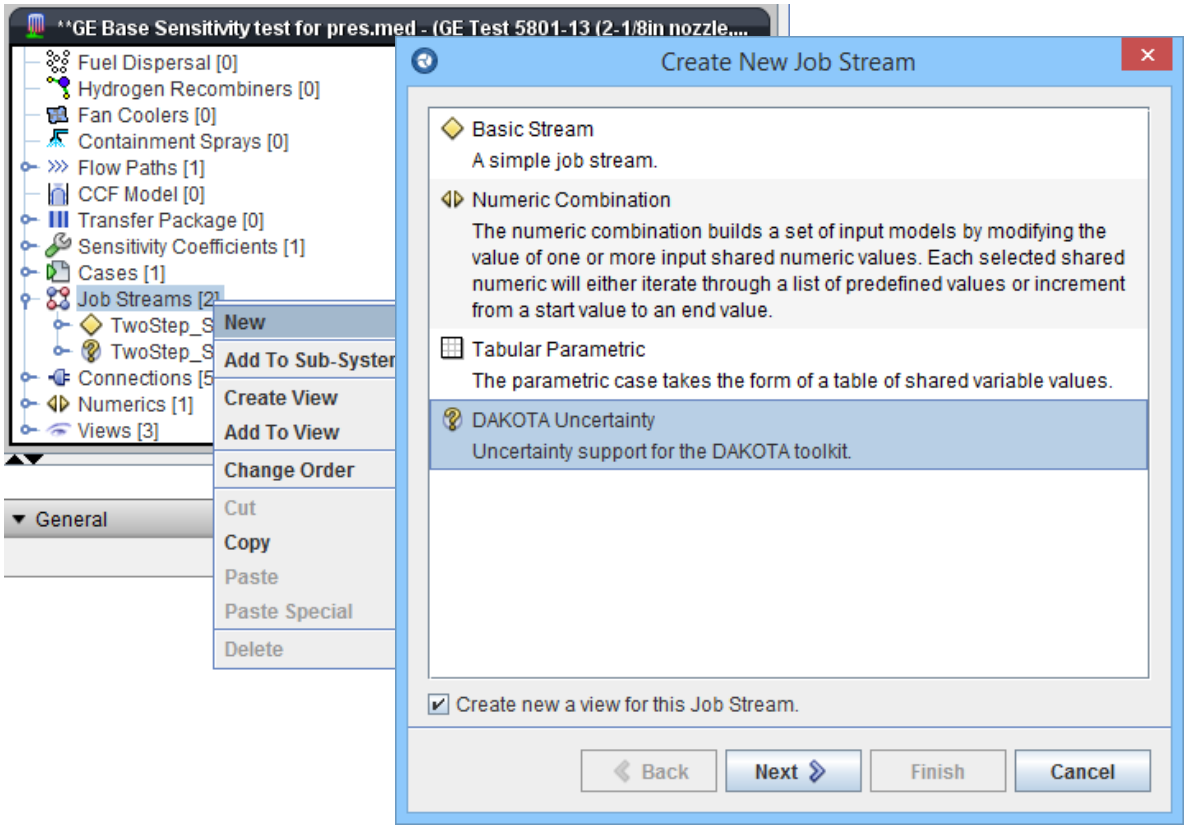
3. Assign the Numeric value as an input value

4. **Create a Dakota Run Stream**

5. Specify a model node as parametric (MELGEN or MELCOR depending on input)

6. Define Dakota parametric properties

7. Run Job



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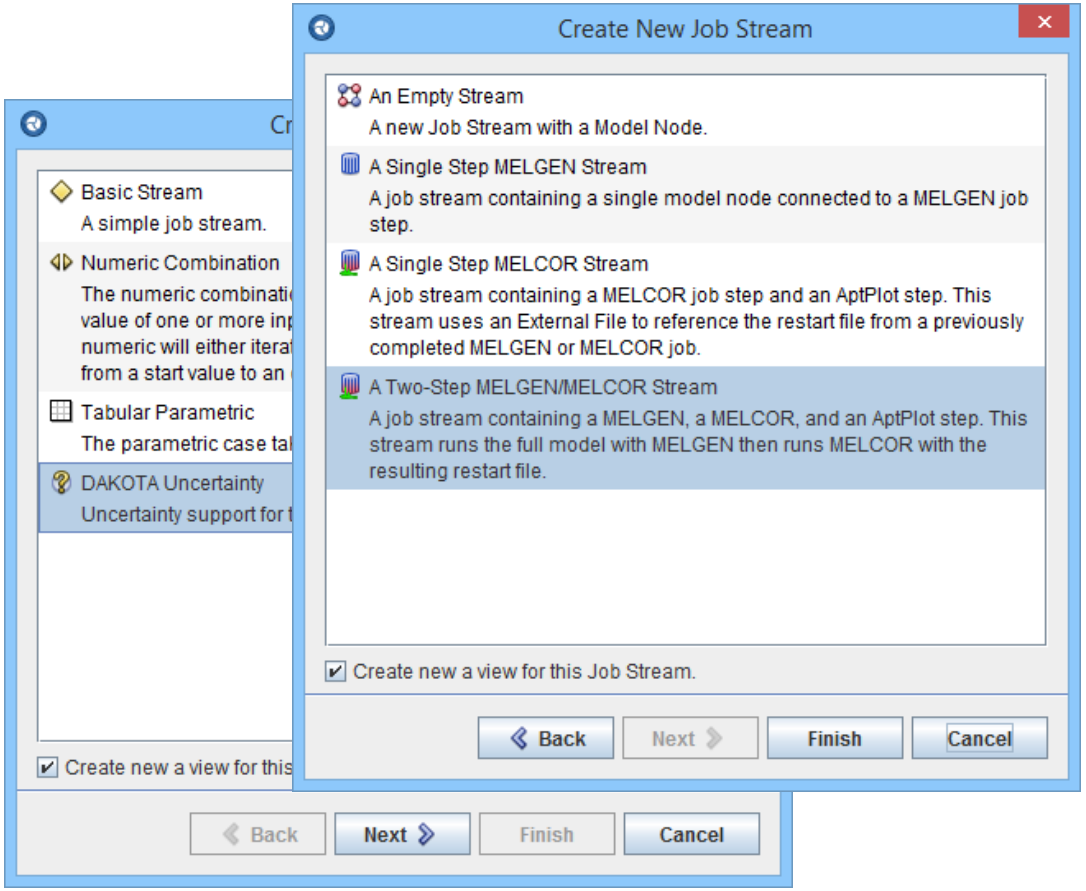
Performing a Sensitivity Study with SNAP
Step 4 – Dakota Job Stream (2)

1. Select Dakota plug-in during SNAP plugins download and installation step
2. Create a Numeric value in your model
3. Assign the Numeric value as an input value
4. **Create a Dakota Run Stream**
5. Specify a model node as parametric (MELGEN or MELCOR depending on input)
6. Define Dakota parametric properties
7. Run Job



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Performing a Sensitivity Study with SNAP
Step 4 – Dakota Job Stream (3)

1. Select Dakota plug-in during SNAP plugins download and installation step

2. Create a Numeric value in your model

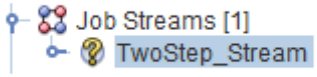
3. Assign the Numeric value as an input value

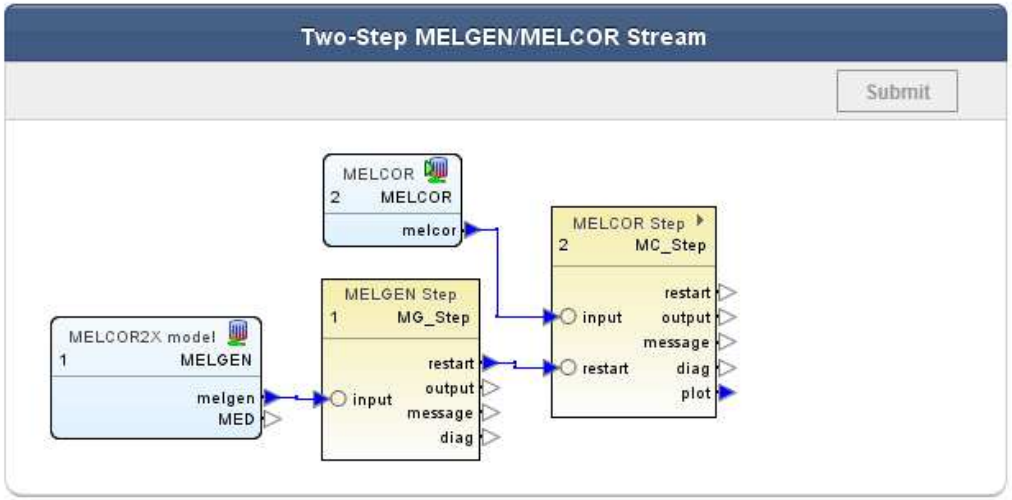
4. **Create a Dakota Run Stream**

5. Specify a model node as parametric (MELGEN or MELCOR depending on input)

6. Define Dakota parametric properties

7. Run Job





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Performing a Sensitivity Study with SNAP
Step 5 – Parametric Model Node (1)

1. Select Dakota plug-in during SNAP plugins download and installation step

2. Create a Numeric value in your model

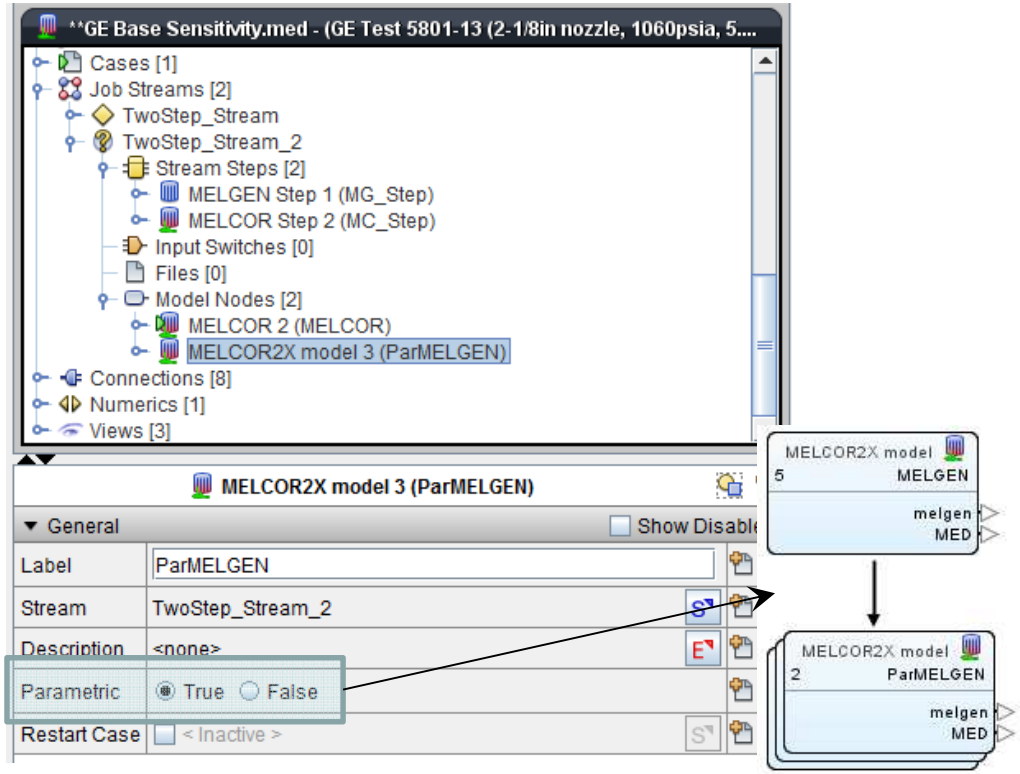
3. Assign the Numeric value as an input value

4. Create a Dakota Run Stream

5. Specify a model node as parametric (MELGEN or MELCOR depending on input)

6. Define Dakota parametric properties

7. Run Job



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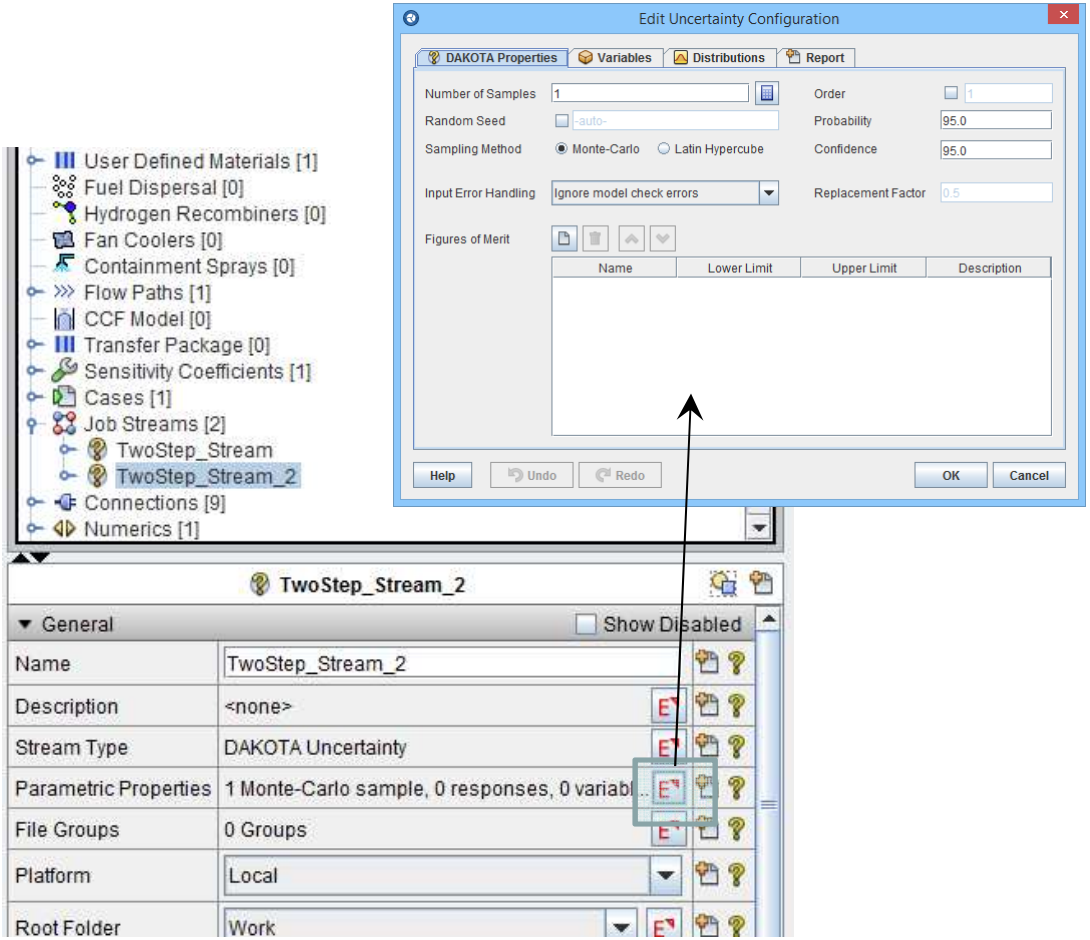
Performing a Sensitivity Study with SNAP
Step 5 – Sensitivity Properties (1)

1. Select Dakota plug-in during SNAP plugins download and installation step
2. Create a Numeric value in your model
3. Assign the Numeric value as an input value
4. Create a Dakota Run Stream
5. Specify a model node as parametric (MELGEN or MELCOR depending on input)
6. **Define Dakota parametric properties**
7. Run Job



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Performing a Sensitivity Study with SNAP
Step 6 – Sensitivity Properties (2)

1. Select Dakota plug-in during SNAP plugins download and installation step

2. Create a Numeric value in your model

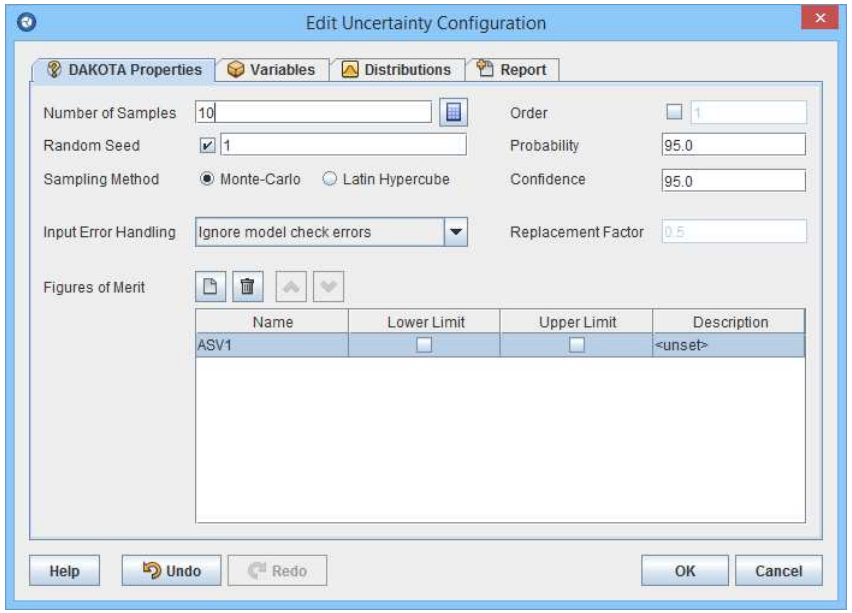
3. Assign the Numeric value as an input value

4. Create a Dakota Run Stream

5. Specify a model node as parametric (MELGEN or MELCOR depending on input)

6. Define Dakota parametric properties

7. Run Job



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Performing a Sensitivity Study with SNAP
Step 6 – Sensitivity Properties (3)

1. Select Dakota plug-in during SNAP plugins download and installation step

2. Create a Numeric value in your model

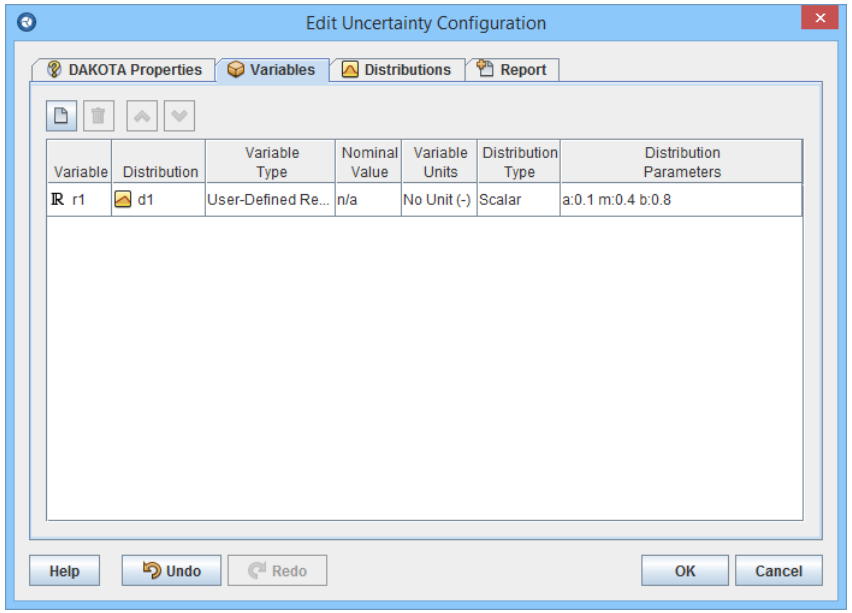
3. Assign the Numeric value as an input value

4. Create a Dakota Run Stream

5. Specify a model node as parametric (MELGEN or MELCOR depending on input)

6. Define Dakota parametric properties

7. Run Job



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Performing a Sensitivity Study with SNAP
Step 6 – Sensitivity Properties (4)

1. Select Dakota plug-in during SNAP plugins download and installation step

2. Create a Numeric value in your model

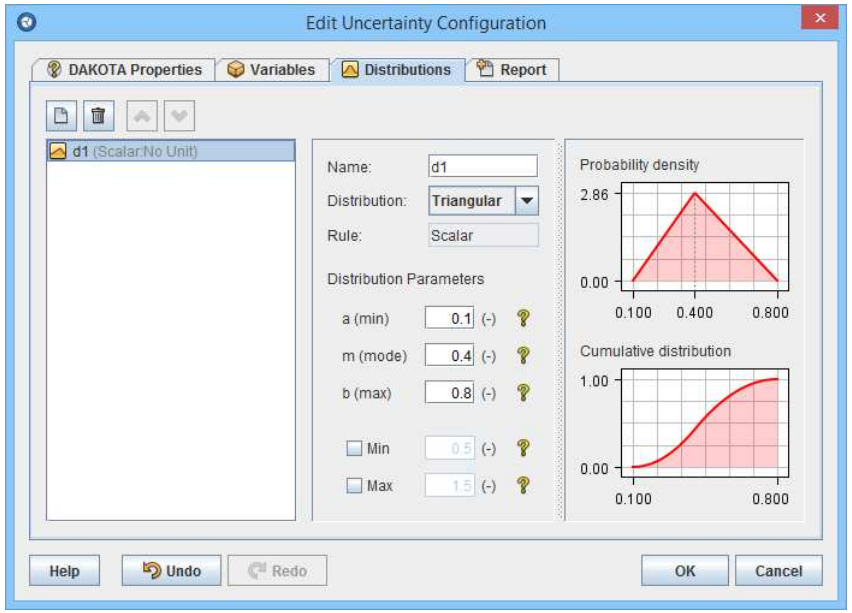
3. Assign the Numeric value as an input value

4. Create a Dakota Run Stream

5. Specify a model node as parametric (MELGEN or MELCOR depending on input)

6. Define Dakota parametric properties

7. Run Job



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Performing a Sensitivity Study with SNAP
Step 7 – Run Dakota Job Stream

1. Select Dakota plug-in during SNAP plugins download and installation step

2. Create a Numeric value in your model

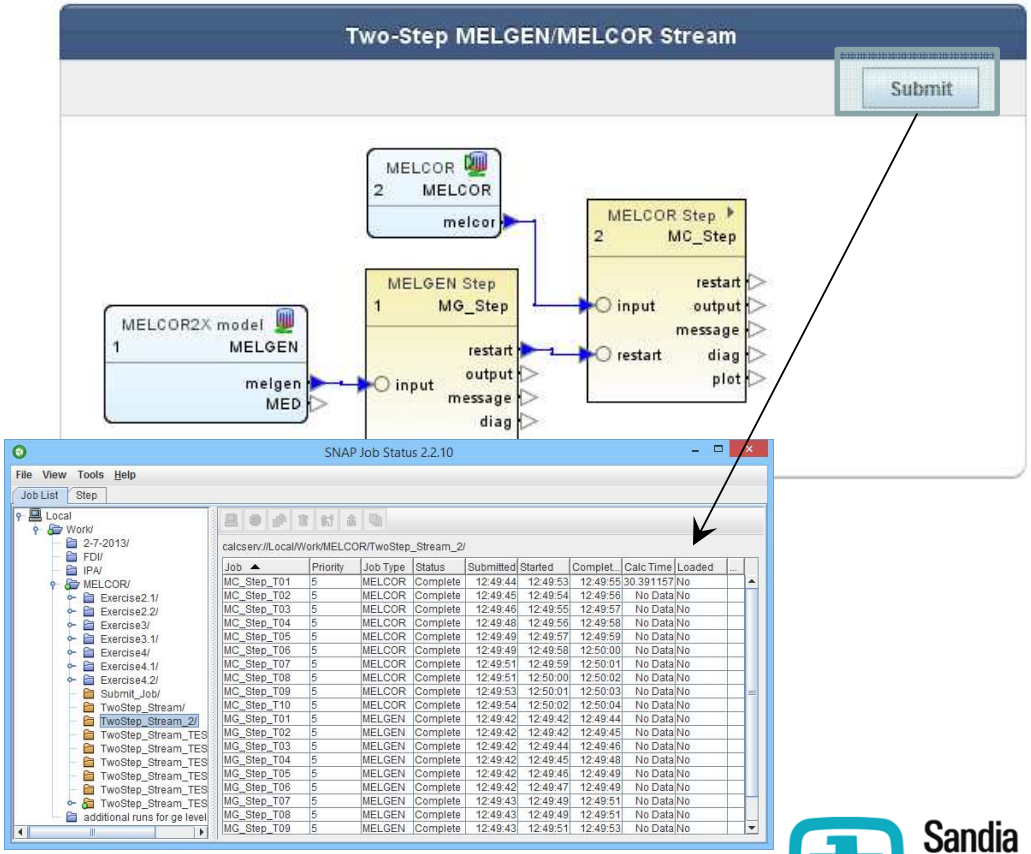
3. Assign the Numeric value as an input value

4. Create a Dakota Run Stream

5. Specify a model node as parametric (MELGEN or MELCOR depending on input)

6. Define Dakota parametric properties

7. **Run Job**



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Using AptPlot within the Job Stream

- **Plot files can be interrogated during the MELGEN/MELCOR analyses using AptPlot**
  - **ASCII text files can be generated**
  - **Plot creation is also possible**
    - **Generates exported image or PDF file.**
  - **Automated report generation**
    - **(Though I can't seem to get it to work.)**

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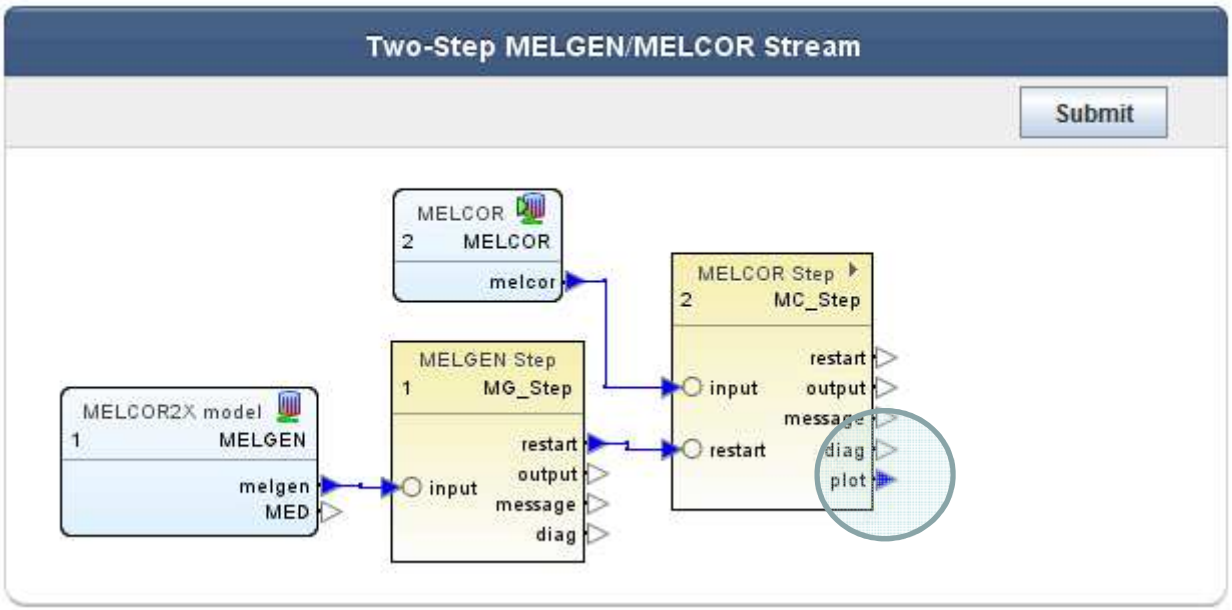
AptPlot within Job Stream (1)

- **An execution step for AptPlot is created with each new stream. (See the blue arrow which doesn't seem to connect to anything.)**
  - **Even though SNAP generates this stream, it does not include the AptPlot execution step in the drawing**



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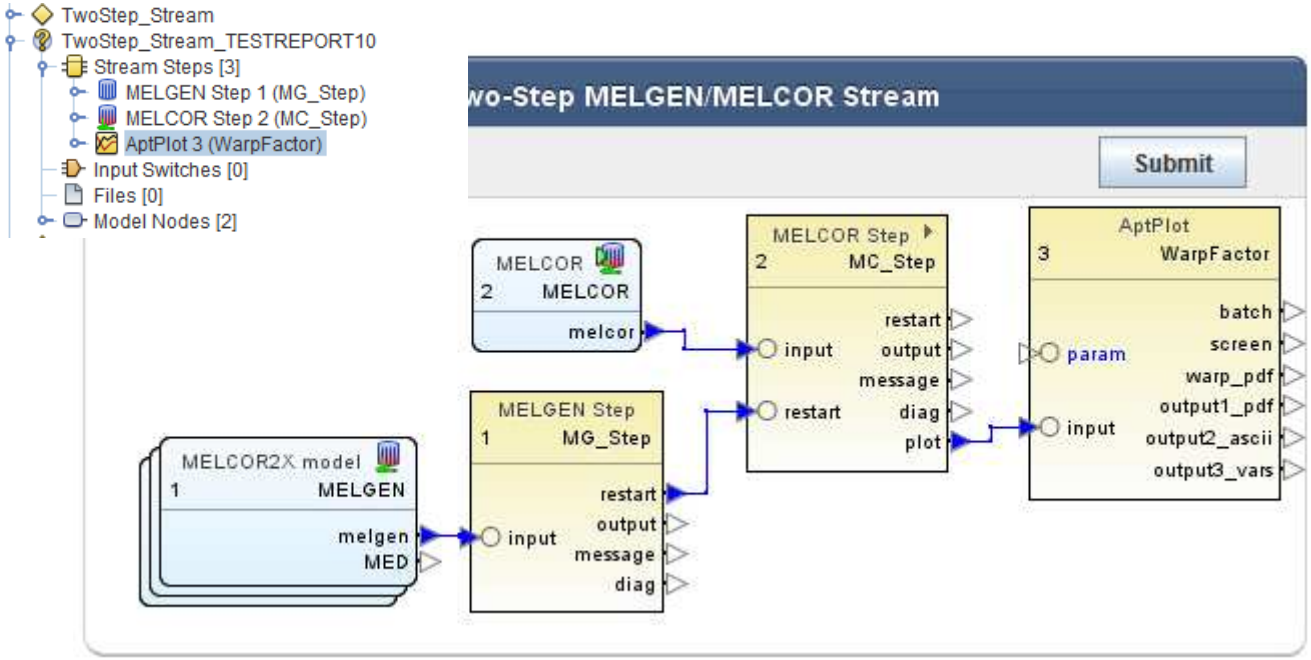
AptPlot within Job Stream (2)

- **AptPlot execution ‘Step’ has been added to the view so it is more apparent that it is present.**
  - **Right click on AptPlot (select add to view)**



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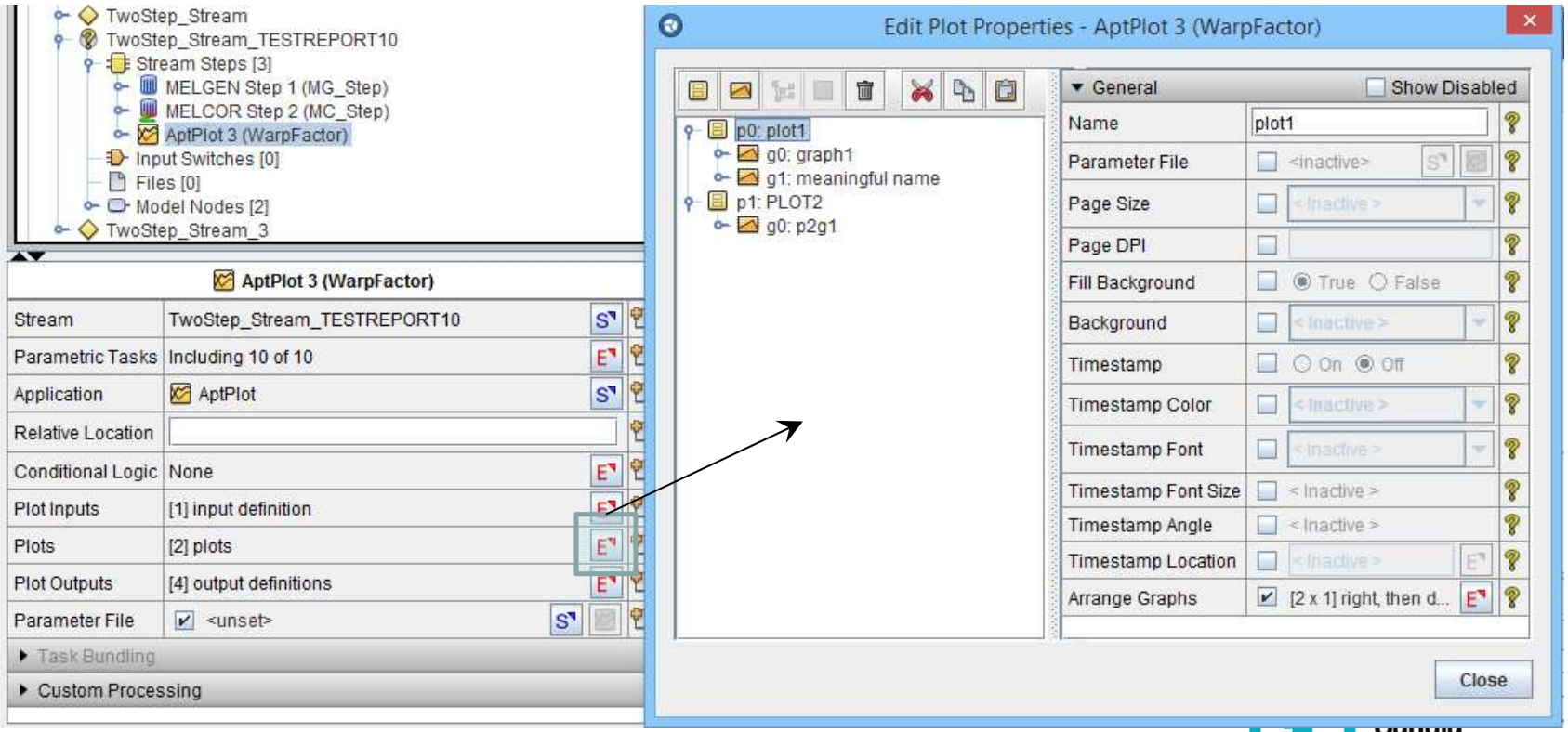
Adjusting AptPlot 'Step' Properties for Plot Creation

- **Define Graph sheets and number of plots to be shown, also Graph sheet properties**



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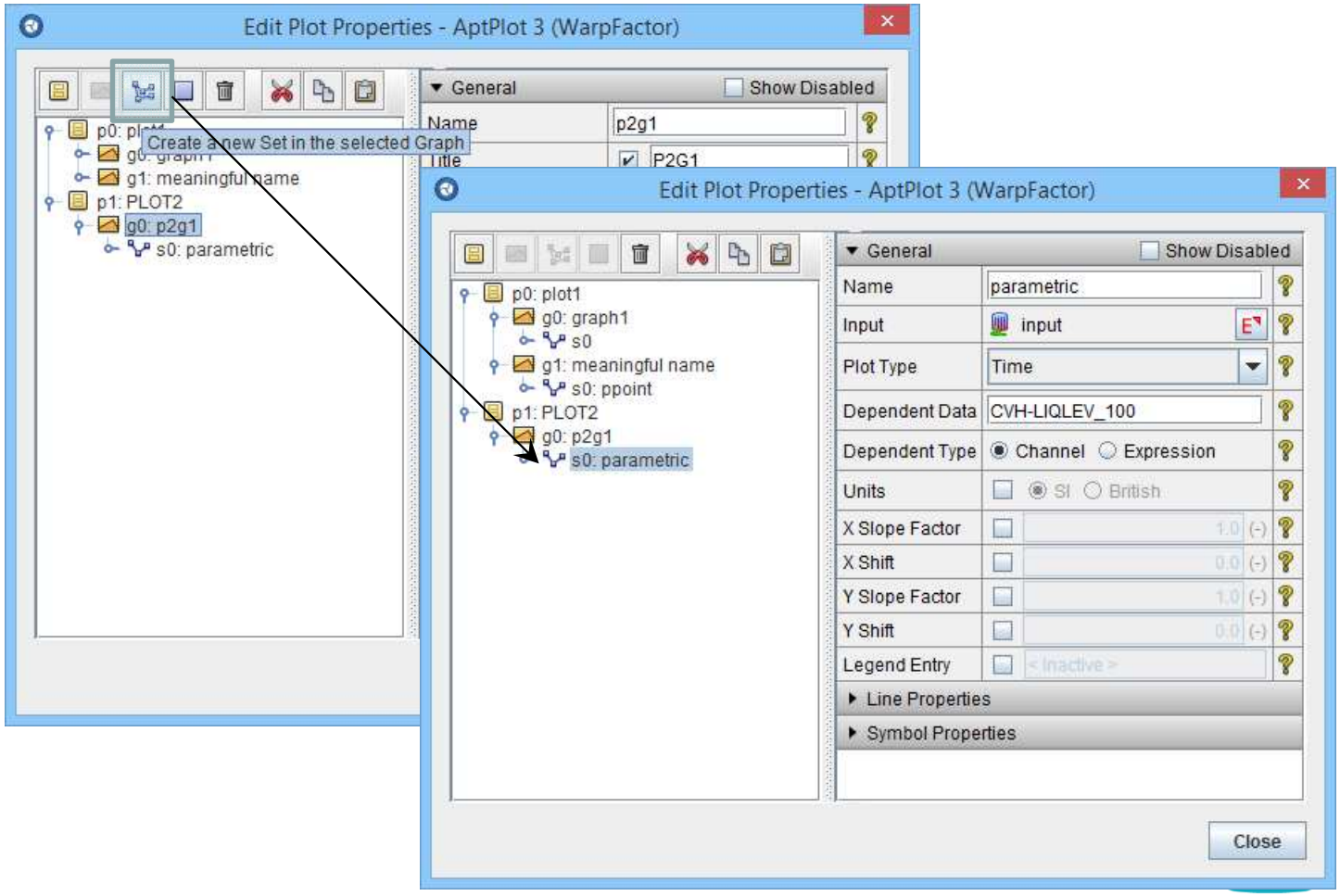
Plot File Data Added to the Defined Plots

- **Add MELCOR data channel to a plot**



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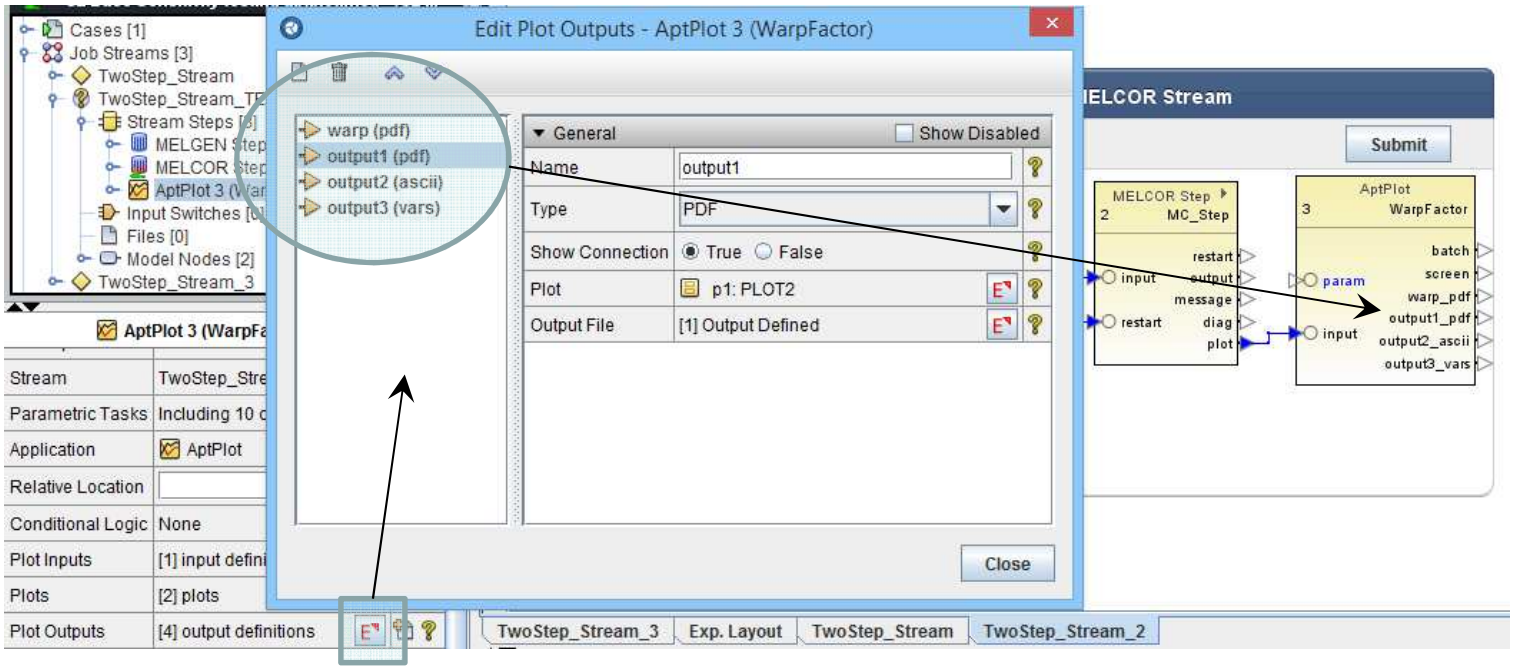
AptPlot Plot Output Added to Job Stream



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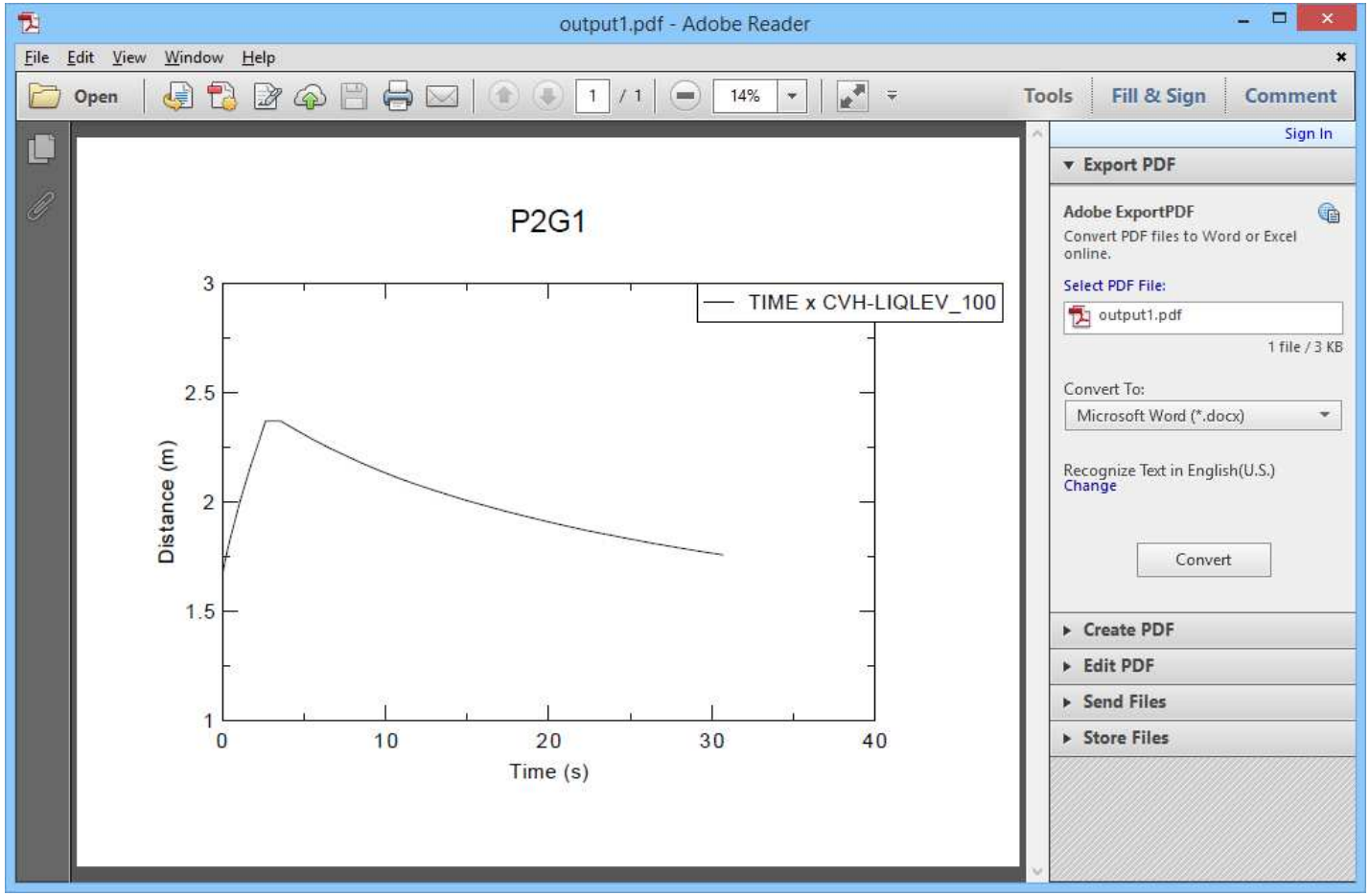
Job Stream Plot Generated



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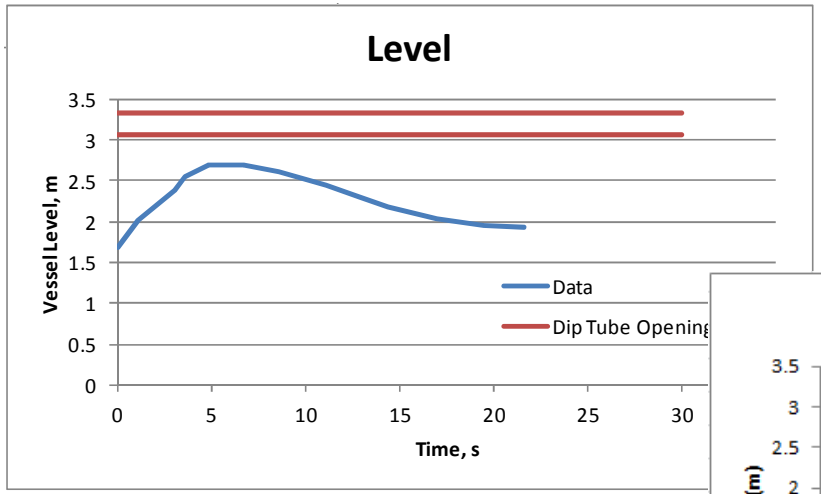
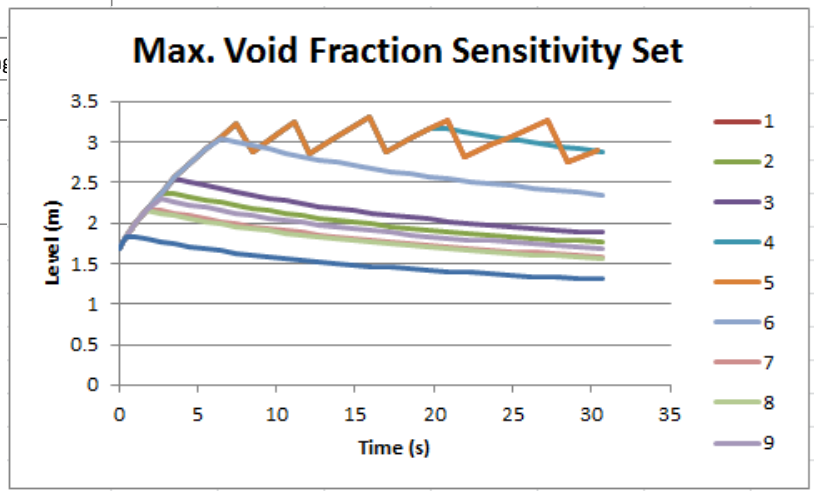
Combining the Output of the Ascii Plot Data in Excel





#	4407(11) Value
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2	0.351971902
3	0.395930093
4	0.662581155
5	0.771924143
6	0.520162292
7	0.275552663
8	0.264030894
9	0.322662716
10	0.104901023

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Thank you for your attention.

Questions

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