SNAP Applications and Post Processing

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Overview of One of the GE Level Swell Tests

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











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



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

| | | | Reference Implementation for | | |
|---------------|--------|-----------|-------------------------------|--|--|
| Package | Status | Available | Uncertainty Analysis support. | | |
| | | 3.2.14 | | | |
| | | 2.0.0 | | | |
| ✓ Uncertainty | | 1.2.6 | | | |
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Be sure to download the Uncertainty plugin while downloading the MELCOR plugin



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





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





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





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





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





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





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





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

| lumber of Samples | 10 | | Order | |
|---------------------|-----------------------|-----------------|--------------------|-----------------|
| Random Seed | 1 | | Probability | 95.0 |
| Sampling Method | Monte-Carlo | Latin Hypercube | Confidence | 95.0 |
| nput Error Handling | Ignore model check er | rrors | Replacement Factor | |
| Figures of Merit | | | | w |
| | Name | Lower Limit | Upper Limit | Description |
| | ASV1 | | | <unset></unset> |
| | | | | |
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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

| | | Edit | t Uncerta | inty Conf | iguration | | |
|----------|---------------|------------------|------------------|-------------------|----------------------|----------------------------|--|
| 😵 DAKO | TA Properties | 😂 Variables | 🔼 Distri | butions | 🖺 Report | | |
| | ~ V | | | | | | |
| Variable | Distribution | Variable Type | Nominal Value | Variable Units | Distribution Type | Distribution Parameters | |
| ℝ r1 | 🖂 d1 | User-Defined Re | n/a | No Unit (-) | Scalar | a:0.1 m:0.4 b:0.8 | |
| | | | | | | | |
| | | | | | | | |



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

| d1 (Scalar:No Unit) | Name: | d1 | Probability density | |
|---------------------|----------------|--------------|-------------------------|------|
| | Distribution: | Triangular 🔻 | 2.86 | |
| | Rule: | Scalar | | |
| | Distribution P | arameters | 0.00 | 1 |
| | a (min) | 0.1 (-) 💡 | 0.100 0.400 | 0.80 |
| | m (mode) | 0.4 (-) 💡 | Cumulative distribution | |
| | b (max) | 0.8 (-) 💡 | 1.00 | |
| | 🔲 Min | 0.5 (-) 💡 | | |
| | 🔲 Max | 1.5 (-) 💡 | 0.00 | |



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





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.)



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





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)





Adjusting AptPlot 'Step' Properties for Plot Creation

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

| WoStep_Stream WoStep_Stream_TESTREPORT10 Fill Stream Steps [3] MELGEN Step 1 (MG_Step) MELCOR Step 2 (MC_Step) MELCOR Step 2 (MC_Step) | | | 3 | Edit Plot Propert | ies - AptPlot 3 (Warı ▼ General Name | pFactor) | how Disabled |
|--|-----------------------------|-------|----------------|-------------------|--|--------------------------|--------------|
| - D Inp | but Switches [0] | | or g0: graph1 | | Parameter File | <inactive></inactive> | ST B |
| → 🕒 Fili → 🕞 Mo | es [0] Idel Nodes [2] | | ← 🛃 g1: meanin | gful name | Page Size | <pre>//hadive ></pre> | - 9 |
| 🔶 🔶 TwoSt | ep_Stream_3 | | ⊶ 🖾 g0: p2g1 | | Page DPI | | 9 |
| ••• | 🔀 AptPlot 3 (WarpFactor) | | | | Fill Background | True O F | alse |
| Stream | TwoStep_Stream_TESTREPORT10 | S" 2 | | | Background | < Inactive > | - 9 |
| Parametric Tasks | Including 10 of 10 | E" Ϋ | | | Timestamp | 0 On @ 017 | 9 |
| Application | Materia AptPlot | S" 2 | | | Timestamp Color | <inactive></inactive> | - 9 |
| Relative Location | | 2 | 7 | | Timestamp Font | Sinactive > | - 9 |
| Conditional Logic | None | E' 2 | | | | | |
| Plot Inputs | [1] input definition | E3 🛷 | | | Timestamp Font Size | <pre>Inactive ></pre> | 1 |
| Plots | [2] plots | E* 12 | | | Timestamp Angle | < inactive > | 1 |
| Plot Outputs | [4] output definitions | EN N | | | Timestamp Location | <pre>/</pre> | <u>E</u> |
| Parameter File | ✓ <unset></unset> | S" D | | | Arrange Graphs | 🔟 [2 x 1] right, the | en d [🖣 |
| Task Bundling | | | 1 | 18 | | | - |
| Custom Proces | ssing | | | | | | Close |



Plot File Data Added to the Defined Plots

• Add MELCOR data channel to a plot

| p0: plant Create a new Set in the selected G go: graphin go: | Name p2g1 raph P2G1 | R AptPlot 3 (A | NarnFactor) | × |
|--|---|----------------------------------|--------------------------|------|
| p1: PLOT2 • □ <u>00: p2g1</u> • □ s0: parametric | | General | Show Disable | ed b |
| | 9-8 p0: plot1 | Name | parametric | 8 |
| | 🛉 🖾 g0: graph1 | Input | 📃 input 💽 | 8 |
| | o Su o Su o Su g1: meaningful name | Plot Type | Time | 8 |
| | S0: ppoint p1: PLOT2 | Dependent Data | CVH-LIQLEV_100 | 2 |
| | 9 g0: p2g1 | Dependent Type | Channel Expression | 8 |
| | a su parametre | Units | 🔲 🖲 SI 🔘 British | 8 |
| | | X Slope Factor | 1.0 (-) | 8 |
| | | X Shift | 0.0 (-) | 8 |
| | | Y Slope Factor | 1.0 (-) | 8 |
| | | Y Shift | 0.0 (-) | 8 |
| | | Legend Entry | <pre>Inactive ></pre> | ? |
| | | Line Propertie | S | _ |
| | | Symbol Prope | rties | |
| | | | | Con |

AptPlot Plot Output Added to Job Stream





Job Stream Plot Generated





Combining the Output of the Ascii Plot Data in Excel





Thank you for your attention.

Questions

