

Securing the future of Nuclear Energy

Recent SNAP Development

2024 European MELCOR Users' Group Meeting

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Contributions from Don Ulshafer, ISL, Inc.



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MELCOR

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SNAP Overview

- SNAP Model Editor Introduction
 - Interface
 - GUI vs ASCII
- Post-Processing with SNAP
 - Animations
 - Indicators
- What's new in SNAP



SNAP Model Editor

- Model Editor
 - Unique plug-ins handle specific model details for a given code (MELCOR, RELAP, etc.)
 - Stores both MELGEN and/or MELCOR user input
 - Can convert older MELGEN/MELCOR 1.86 input to 2.x
 - Import/Export ASCII files
 - Built-in Capabilities
 - Support for multiple files & subcomponents
 - Support for user comments
 - Tool/Tips & Helps
 - User manual guidance available
 - ASCII view of model
 - Job scheduler
 - Run jobs in interactive mode (linked to animation)
 - Access to numerics (python, etc.)
 - Integration with GIT
 - Integration with APTPLOT
 - Uncertainty analysis with DAKOTA plugin

SNAP Model Editor utilized significantly in introductory MELCOR workshops to reduce time discussing input syntax







SNAP

RN Classes should be defined before Decay Elements

	2	Decay Heat				Ģ	51
Snutdown Flag	V	[U] Constant				1	8
Shutdown Time			0.0	(S)	٩٥	2	?
Operating Power	~		4.3E9	(W)	٩٥	2	?
Whole Core Decay	2	[2] ANS			-	?	?
Operating Time				(s)	${\mathord{\triangleleft}}{\mathord{\triangleright}}$	2	?
Fissions/Atom			0.713	(F/A)	${}^{\triangleleft}{}^{\triangleright}$	2	?
Decay Elements	[7] D	efined Elements			E₹	¢ Ъ	?
RN Classes	[23]	RN Classes			E₹	P	?
Normalization Flag		< Inactive >			-	P	?

Element	Mass (kg)	Heat Data	
B2	(19)	0.0 Rows: 1 [0.0,0.0]	E
B3		0.0 [1] Decay Row	
B4		0.0 [1] Decay Row	
B5		0.0 [1] Decay Row	
B6		0.0 [1] Decay Row	
B7		0.0 [1] Decay Row	
B8		0.0 [1] Decay Row	
	Add Remov	e	

Number	Class Name	Custom	Class Elements
1	XE		<none></none>
2	CS		<none></none>
3	BA		<none></none>
4	12		<none></none>
5	TE		<none></none>
6	RU		<none></none>
7	MO		<none></none>
8	CE		<none></none>
9	LA		<none></none>
10	U02		<none></none>
11	CD		<none></none>
12	AG		<none></none>
13	BO2		<none></none>
14	H2O		<none></none>
15	CON		<none></none>
16	CSI		<none></none>
17	H3B3O6	V	B2
18	HBO2	v	B3
19	BH3	V	B4
20	B2H6	v	B5
21	BOH	V	B6
22	B(S)	V	B7
23	C(S)	V	B8

Remove
Cancel

		Λ	20		
		A	36		
DCH_CL	'cs'	DEFAULT			
DCH_CL	'BA'	DEFAULT			
DCH_CL	'12'	DEFAULT			
DCH_CL	'TE'	DEFAULT			
DCH_CL	'RU'	DEFAULT			
DCH_CL	'MO'	DEFAULT			
DCH_CL	'CE'	DEFAULT			
DCH_CL	'LA'	DEFAULT			
DCH CL	'UO2'	DEFAULT			
DCH CL	'CD'	DEFAULT			
DCH CL	'AG'	DEFAULT			
DCH CL	'B02'	DEFAULT			
DCH CL	'H2O'	DEFAULT			
DCH CL	'CON'	DEFAULT			
DCH CL	'CSI'	DEFAULT			
DCH CL	'H3B3O	USER	1 In	clselm	
			1	'B2'	
DCH CL	'HB02'	USER	1 1 1 1 1 1 1	clselm	
Den_en	11202	ODER	1	'B2'	
DCH CI	10021	TICED	1.1=	alsalm	
Den_en	Bho	USER		CISEIM	
DOI: 01	IDOUGI	HOPP	1 1-	D4	
DCH_CL	BZHC	USER	1 !!!	ciseim	
			1 1	.82.	
DCH_CL	.BOH.	USER	1 !n	ciseim	
			1	.Be.	
DCH_CL	'B(S)'	USER	1 !n	clselm	
			1	'87'	
DCH_CL	'C(S)'	USER	1 !n	clselm	
			1	'B8'	
DCH_EL	'B2'	0.0	1 !n	time	dcheat
			1	0.0	0.0
DCH_EL	'B3'	0.0	1 !n	time	dcheat
			1	0.0	0.0
DCH_EL	'B4'	0.0	1 !n	time	dcheat
			1	0.0	0.0
DCH_EL	'B5'	0.0	1 !n	time	dcheat
			1	0.0	0.0
DCH_EL	'B6'	0.0	1 !n	time	dcheat

Post Processing with SNAP



- Animation Model is a separate model from the MELCOR model
 - File>New select Animation model
 - Data connection to the plotfile(s) must be established
 - Animations are displayed in View Port







100 90

90 80 70 60 50 40 30 20 10 H2 + CO Vol.%

Plant Components

Represents a component

- Some of these components are unique to TRACE or other code.
- Simple Components
 - Sprays, valves, break, pumps
- Simplification of Complex Components
 - Core Degradation component
 - Lower Head component
 - Stacked Elements
 - Volume Stack







Pipe

Flhow

T

040











Data Sources

- Attaching a plotfile
 - Data Sources
 - Plot file data
 - Python Data Sources
 - Multiple data sources can be specified
 - One source is designated master and used to determine Tstart, Tend, and time steps
 - Other sources are interpolated between time steps
 - Selecting Data Source
 - Click on Master in the Data Source Tree in the Navigator and set the Source Run URL in the Properties to a completed Job
 - Click the Data Connector Icon
 - Number of Source Runs
 - Data Source can span multiple plot files assuming they are from sequential restart runs.

00

 Click Data Connection to make connection to the data source.



									_
Data	Data	Lobol	Line	Line	Line	Symbol	Symbo	Skip	
Source	Channel	Laber	Туре	Width	Color	Туре	Size	Factor	
AppC (Fire)	CFVALU	East	Solid	1		None	0	0	-
North (North)	CFVALU	North	Solid	1		None	0	0	
South (South)	CFVALU	South	Solid	1		None	0	0	-
West (West)	CFVALU	West	Solid	1		None	0	0	
KL-MAG and AKL-MAG and M	OFWILL	N.L. S.A.Gonal	O all al			h la ma	0	0	_

Pu Release to Environment

OK Cancel

Remove

Add

Color Maps

- Built-in Color Map Options
 - Fluid Condition Color Map
 - Temperature Color Map
 - Void Fraction Color Map
 - Generic Color Maps
- Creating a Generic Color Map
- 1. Right Click Color Maps in the Navigator>New
- 2. Right Click the new Generic Color Map>Add To View
- 3. Adjust some Properties
 - Set Color Map Type to Generic
 - Specify Dynamic as True
 - To create a pressure color map, set Channel Name Pattern to MELCOR "CVH-P_%V"
 - Review the MELCOR User's Guide to see all the available plot channels
 - %V is a place holder for the components Control Volume number (see notes for a detailed description on its use)

 [+ Ge	eneric Color Map	1
▼ General	🗌 Show Dis	abled
Name	unnamed	2 ?
Color Map Type	Generic	۳ 🕈
Paint Background	🔾 True 🔘 False	۲ 🕈
Minor Ticks Per Major	4	۲ 🕈
Number of Major Ticks	10	۲ 🕈
Dynamic	🔾 True 🖲 False	🔁 💡
Segmentation Style	Gradient 💌	۳ 🕈
Color Display Width	35	۲ 🕈
Show Title	◉ True ◯ False	۲ 🕈
Use Custom Title Font	◯ True	۳ 🕈
Use Custom Legend Font	◯ True	۲ 🕈
Range Segments	[1] Segments	۲ 🕈
Channel Name Patterns	< none > E	۲ 🕈
Engineering Units	No Units	۲ 🕈
Use Out of Range Low Color	🔾 True 🔘 False	۲ 🕈
Use Out of Range High Color	🔾 True 🖲 False	۳ 🕈
Use Non-Linear Scaling	🔾 True 🖲 False	۳ 🕈







SNAP MELCOR Plug-in: What's New

- Full Support for MELCOR 2.2 r2023.0 Input Specifications
 - New Editors
 - Import/Exporters
- Support for command line arguments on job step configuration
- Improvements to User Interface
 - More Intuitive layout
 - Cleaner look and fell
 - Improved ergonomics
 - Introduction to Automated Testing Framework
- Partial ASCII import & export
- Bug fixes





Full support for the following new MELCOR model inputs

Input	Code Package	Location	Property
CV_PDIA	Control Volumes (CVH)	Category Node	User specified pool diameter
NCG_SC	Sensitivity Coefficients	Create Menu	NCG (2090-2099)
FDI_SC	Sensitivity Coefficients	Create Menu	FDI (4602-4699)
COR_BL	Core (COR)	Attribute Group	Beam Length
COR_GOX	Core (COR)	General Property	Oxidation Modeling
COR_MHU	Core (COR)	General Property	Hold-up behavior
COR_CMT2	Core (COR)	Attribute Group	Secondary Materials
COR_CNV	Core (COR)	General Property	Convective Heat Transfer
COR_LHM	Core (COR)	Attribute Group	Melting Model

UI Improvements – Core Properties



- Split Panel Makes Use of Greater Visual Space
 - All Values from All Axial and Radial Levels Displayed
- Graphical Guidance for Users
 - Help Info Accessible Adjacent to Each Property Type
 - Enabling Information Displayed
- Multi-Row/Column Functionality Supported
 - Editable Properties
 - Copy-Pasting





Deprecated

UI Improvements – COR User-Defined Heat Transfer Paths



- Data for Multiple HT Paths available (view & edit) from Single View
 - Previously only a single HT path visible/editable at a time
 - Rows can be re-ordered
- Toggle Specification Modes
 - Input by range
 - Input by single cell
- Improved User Interface
 - Column Removal Reduces Crowding
 - Descriptive Enumerations
 - Previously only abbreviated names displayed
 - Simplistic Inline Editors
 - Descriptive Header Tooltips.

					Heal	t Transfer Edit				8
	~ ~									
Specific	ation Format	Individual Cells	-							
· ·										
Index	From Cell	From Component	From Rod Group	To Cell	To Component	Heat Structure	Heat Structure Side	To Rod Group	Path Type	Path
	1 1 0 1	Multi-rod Fuel	2	306	Multi-rod Fuel			1	[1] Constant Radiate	4.0
	2 209	Multi-rod Clad	4	103	Multi-rod Clad			2	[2] Constant Conduct	2.0
	3 31 3	Multi-rod Non-supp	5	301	Multi-rod Non-su			3	[3] Control Radiate	YT CF 1 (VALVE
	4 208	Fuel		313	Fuel				[4] Control Conduct	또한 CF 2 (FRACT
	5101	Fuel			Heat Structure	3 HS 10001 (WE	Left Hand Side		[1] Constant Radiate	6.0
	6101	Fuel			Heat Structure	3 HS 10002 (DR	Right Hand Side		[1] Constant Radiate	8.0

				Heat Transfer Ed	lit			8
	~							
Specificatio	on Format Control Fu	nction Range 💌						
Index	Core Cell From	From Component	From Rod Group	To Component	To Rod Group	Core Cell To	Path Type	Path
1	l <none></none>	Multi-rod Fuel	2	Multi-rod Fuel	1	<none></none>	[1] Constant Radiate	4.0
	2 <none></none>	Multi-rod Clad	4	Multi-rod Clad	2	<none></none>	[2] Constant Conduct	2.0
:	3 <none></none>	Multi-rod Non-supportin	5	Multi-rod Non-suppor	3	<none></none>	[3] Control Radiate	또한 CF 1 (VALVE-OPE
	4 <none></none>	Fuel		Fuel		<none></none>	[4] Control Conduct	와 CF 2 (FRACT-OPE
	5 <none></none>	Fuel		Heat Structure		<none></none>	[1] Constant Radiate	6.0
(6 <none></none>	Fuel		Heat Structure		<none></none>	[1] Constant Radiate	8.0
				OK Cano	el			

Edit Core Heat Transfe Heat Transfer Heat Transfer 2 Heat Transfer 3 Heat Transfer 4 Heat Transfer 5 Heat Transfer 6 Add Remove General Show Disabled Specification Format Individual Cells - ? First Component - ? 1 ÷ Z First Cell 1÷ 🔊 💡 - ? Second Component | FU 3 🗧 Z Second Cel 6÷ 🕄 💡 [1] Constant Radiate Path Type - ? View Eactor * Area 4.0 (-) 🕀 🦓 OK Cancel

Deprecated

nterface

UI Improvements – RN Release Combinations



- Multi-Editable Tables
- Additive Class Pane Displayed on Selection of Acceptor Class
- RN Class Selectors
 - Alternatively, Additive and Acceptor Classes Pasting from External Sources
- Simple Toolbar buttons (Add, Remove and Reorder)

	Edit	Combination Clas	ses				
010		8 8					
Class Name	Acceptor Class	Additive Cla	155	Transferred M	oles (-)		
CLC1	JF CSI	JF CS	5		1.0		
		JF 12			0.5		
						Select from RN Classes	(
			Avail	able Compor	ients		
				Number		Component	
			1		CSI		
			2		cs		
			3		BA		
			4		TE		
		OK Cancel	5		MO		
			6		CE		
			7		U02		
			8		CD		
			9		46		
			Displ	ay All Comp	onents	*	
						OK Cancel	

RN Combo Clas	ss: 1	
ar combo ciuc		
	Add Combination	Remove Combination
A.7		
Name	CSI	
Acceptor Clas	ss 'CSI'	5
A	dditive Class	Transfered Moles
CS	S	
2		
2		
12	Add Class	Remove Class

Deprecated Interface

UI Improvements – Core Oxidation Modeling



- Define Multiple Oxidation Models
 - Add/Remove/Re-order models
- Oxidation Model Property View
- Enabling Information Display
- Oxidation Rates Property Editor
 - Reactions automatically added
 - Displays oxygen rates for each reaction
 - Add/Remove/Re-order input

	* General					2	Shew Disabled	
	Metal			III MP 13 (PCA) 51 1				
Oxidation Model 1 Oxidation Model 2	Owner			Daam a G				
Oxidation Model 3	made .	Death			0			
Oxidation Model 4	Okide Tarata	Oxide			0		5° T	
Oxidation Model 6	Minimum Tempe	Minimum Temperature				< Detac	Y 00 00 2 1	
Oxidation Model 7	Maximum Temp	erabure				< Defau	R > 00 0 7	
Oxidation Model 8	Model Status			< inactive >	-		7	
	Number of Read	tions					3 7	
	Enable Reaction	n Equatio	n	True Q Fals			7	
	Enable Reaction	n Paramet	ters	True O Fals	ie .		7	
	Enabled Ovidati	ion Rate P	harameters	True 🔾 Fak	ie		7	
	Oxidation Rates			[3] Oxidation Reactions				
	Reaction Equ	ations	Reaction	Parameters				
	Heat of	Ga	IS DIT	Arrhenius	Weight of	Molar Weight of	Malar Weight	
	Parallel Par	Reaction Constant		Correlation	HEACTRUS (-)	PORISCIALIN	0.0718464	
	-2.4956	8	1.616-9		0.74	0.055847	0.071828	
	-2.4956	5	1.618-3	<inactive></inactive>	0.74	0.055847	0.071846	
	-2.4956 2.4422 3.5166		1.616-3 1.616-3 1.616-3		0.74	0.055847 0.051996 0.02698155	0.101960	
	-2.4956 2.4422 1.5166		1.616-3 1.616-3 1.616-3 Эк с	<inactive> <inactive> <inactive> <inactive> <inactive> </inactive></inactive></inactive></inactive></inactive>	0.74 0.21 0.05	0.055847 0.031996 0.02698155	0.15190	
	-2.4956 2.4422 1.5166	S S S Editi	1.616-3 1.616-3 1.616-3 ак с	conactives conactives conactives cancel on Rate Data	0.74 0.21 0.05	0.055847 0.031996 0.02698155	0.13190	
Reaction 1	-2.4956 2.4422 3.5166	S S T Editi	1.616-3 1.616-3 1.616-3 0K (C	<machies whaches <hachies cancel</hachies </machies 	0.74 0.21 0.05	0.055847 0.031996 0.02698155	0.13190	
Reaction 1 Reaction 2 Reaction 3	-2.4956 2.4422 3.5166	is io io Edita Temper	1.616-3 1.618-3 1.616-3 0K C ng Coldath	-charches- -rharches- -charches- cancel en Rote Data	e, 74 0.21 0.05	0.035847 0.031996 0.02698155	0.15196 0.101960	
Reation 1 Reation 2 Reation 3	-2.4556 2.4422 2.5166 1.5166 Lower Temperature (b0) Temperature (b0) 1100.0	Edita Edita Temper	1.616-3 1.616-3 1.616-3 0K C ng Oxidati pper reture (c) 1853.0	-charches- -charches- -charches- cancel en Rate Data Coefficie A(c) 0 3	e, 74 0, 21 0, 05 erit C 1438, 928	0.035847 0.031996 0.02698155	0.15190 0.101960	

UI Improvements - General

Flow Area Thermodynamic Ir Pool Flag

Select from Materials Available Components Category Number Component 1 NCG 1 (POOL) {Default Gas} Noncondensable Gasses (NCG) Noncondensable Gasses (NCG) 2 NCG 2 (FOG) {Default Gas} III Noncondensable Gasses (NCG) 3 NCG 3 (H20-VAP) {Default Gas} III Noncondensable Gasses (NCG) 4 NCG 4 (N2) Noncondensable Gasses (NCG) 5 NCG 5 (02) Noncondensable Gasses (NCG) 6 NCG 6 (H2) III Noncondensable Gasses (NCG) 7 NCG 7 (CO2) Noncondensable Gasses (NCG) 8 NCG 8 (CO) III Noncondensable Gasses (NCG) 9 NCG 9 (CH4) III Noncondensable Gasses (NCG) Display -All Components None III Materials (MP) III Noncondensable Gasses (NCG)

	Select Control Types 🛛 😣
Filter pow	e* 🗸
Value	Description
POWER-I	Raises the argument to the integer power.
POWER-R	Raises the argument to the real power.
POWER-V	Raises the first argument to the second argument power.
1	OK Cancel

- Real vs Control reference property editor
 - Inline mode selection
 - Enter real values
 - Control Function selection
 - Default value mode
- Component Selection Editor
 - Filterable categories
 - None option
- Named Value Selector
 - Filterable
 - Search wildcards

			- •
Flow Area	The set (DC CC-VAC-RV_1)	S 🕈	٩ 1
Thermodynamic Input	[3 XIY Control psphere	- 2	3
Pool Flag	[3 T Default	- 2	3



UI Improvements – General Continued



- Real array table editor updates
- Standard for simple real tables
- New toolbar layout of features
- Sort values button
- Orders ascending dependent values
- Plot from Table Button:
- APTPLOT Automatically configured
- Configurable independent and dependent plot variables



MELCOR Job Command-line Arguments



- MELGEN/MELCOR Command lines
- Examples:
 - C=xx, DTMAX=xx, N++= xx, NCF= xx NQE=xx, NT=xx,OW=xx, SCnnn(m)=xx, SF=xx, ST=xx, TEND=xx, VAR=xx MAXNCYCLE=xx, NEWNCYCLE=xx, CPUEND=xx
 - See UG (EXEC-UG)
- Supported on 1.8.6 and 2.2 job steps
- Supported for MELGEN & MELCOR separately

 Ŷ- ŠŽ Job Streams [1] Ŷ- ◇ 1component Ŷ- ⊕ Stream Step > ● ● MELGEN > ● ● MELCOF 	s [2] I Step 1 (MG_Step) R Step 2 (MC_Step)				-	plication Arguments
A V	MELGEN Step 1 (MG_Step)			G-	q	Argument
Relative Location			Y	38	1	•
View in Job Status	● Yes ◯ No		2	?		
Keywords	No Keywords	E	2	2 ?		
Conditional Logic	None	S	2	2 ?		
Input Files	[1] Inputs Defined	E	2	2 ?	-	
Output Files	[8] Outputs Defined	E	2	2 ?		
Custom Processing	None	E	2	2 ?		OK Cancel
Command Line Arguments	[1] dtmax=10.0 [2] n++=ON		E	8		

Import/Export Resources



Retain SNAP Meta Resources

- Notes
- Views
- Cases
- Numerics
- Streams
- ASCII Header Mapping Directive
- Externally Modify ASCII
 - Notepad++
 - Word
- Exportable for MELGEN
 - MELCOR cases permit **ASCII** modifications

<pre>* NUMERIC MAP *ned:/home/dul/Downloads/Cont *udn:r1,n:\$r1,v:1234.0 *n: SNAP:Symbolic Nuclear Ana *n: PLUGIN:MELCOR Version 2.8 *n: CODE:MELCOR Version 2.2 *n: DATE:2/15/24 1</pre>	rol_Volume_Input.med lysis Package, Version 4.2.0, October 27, 2023 .4
!'FUKUSHIMA UNIT 1'	Select file in which to export the MELGEN deck.
g	Image: Second
	Files of Type: MELGEN ASCII Input (*.gen, *.inp, *.txt, input) Export MELGEN ASCII Cancel
	Select an Option 8
	The selected input model contains a resource model reference to /home/dul/Downloads/Control_Volume_Input.med

Yes

No

Cancel

Partial ASCII Import/Export

- Import component(s):
 - Replaces existing components if previously defined.
 - Overwritten (deleted) component(s) removed
 - If object number matches but name does not match an existing object then a new object is created rather than replacing
 - Individual or multiple objects can be imported from a file
 - All objects in ASCII file are imported
 - Partial import item off model node



• Export

- Previously only possible by Show ASCII>Copy ASCII for component to Clipboard>Paste into text file.
- Export ASCII of selected components
- Filterable component export UI

Model Opt	Import	•				
Accumula	Export >		MELGEN			
Burn (BUF Tools			Composite			
Containm Containm Control S Select Left Side to Comp		ns	Partial ASCII Model			
		npi	s	elect From Available C	omponents	8
CV 10	Engineering Units	Avai	lable Components			
CV 11	Close		Category	Number	Component	
- CV 12	(·····y=)		Control Volumes (CVH)	112	CV 112 (DC)	-
- 🖽 CV 130	(Rina 3)		Control Volumes (CVH)	120	CV 120 (LP)	
			Control Volumes (CVH)	150	CV 150 (DOWNCOMER)	
			Control Volumes (CVH)	200	CV 200 (WETWELL)	
			Control Volumes (CVH)	300	CV 300 (WETWELLB)	
			Control Volumes (CVH)	301	CV 301	
		10	Core		Core	
		20	Decay Heat Package		Decay Heat	
		>>> F	low Paths (FL)	1	FP 1 (2turbine)	
		>>> F	low Paths (FL)	2	FP 2 (feedwater)	
		>>> F	low Paths (FL)	11	FP 11 (DOWNCOMER>CHANNEL)	
		>>> F	low Paths (FL)	12	FP 12 (DOWNCOMER>BYPASS)	
		>>> F	Flow Paths (FL)	13	FP 13 (Jet Pumps)	
		>>> F	Flow Paths (FL)	14	FP 14 (Channel>Lower Plenum)	
		Disp	lay All Components All Components		und l	
			Condenser			
			Control Functions			
			Control Volumes (CVH)			
			Core			



Support for Unrecognized Input Records

- Need for SNAP to allow unrecognized input records
 - SNAP development lags behind MELCOR development.
 - Inherent consequence of development by 3rd party.
 - Provide Users access to new model features/capabilities within SNAP environment
 - Particularly important for use at Workshops.
- Implementation
 - Extra MELGEN/MELCOR record input can now be specified in SNAP
 - Input for each package.
 - Future development will allow new fields on existing records or new records for MELCOR objects (HS, FL, CVH, ...)

Ranges [1] Control Volumes (CVH) [6] Core (COR) Axial Levels [10] Axial Levels [10] Badial Rings [1] Decay Heat (DCH) {Disabled} Ex-vessel Debris Cavities (CAV) [0] FL Counter Current Flow Models (FL_CCF) [0] Fan Coolers (FCL) [0] Flow Paths (FL) [4] Control)] Volume	Extra Deck Data CVH_NEW New Unrecognized Record	×
Heat Transfer Calculation Option	[0] Of	OK Cancel	
Use Pool-Atmosphere Interaction Model		True False	_
Courant Condition Basis	-	Inactive >	_
Extra MELGEN Records	< none	-> E 🕾 ? Job Stream (DTDZ_a)	Twos

SNL/ISL MELCOR SNAP Discussions

- One week in-person meeting between MELCOR code developer and the GUI plug-in developer
 - February 19 February 23, 2024
 - Improved alignment between MELCOR and SNAP developers
 - Extremely positive and successful meeting
- Discussions and Topics
 - Latest updates to the MELCOR plug-in
 - New capabilities in SNAP that could be implemented into MELCOR plug-in
 - Recent model developments at Sandia and future GUI support requirements
 - Feedback from MELCOR/SNAP users
 - Discussion on SNAP bugs/issues



Issue: Error in SNAP Degradation Display



SNAP Degradation Display







- SNAP displays null cells as though they were active.
 - SNAP shows PD in upper outer ring which should be null
- Upper levels of MP2 in rings 1 and 2 for SNAP are different where they are approximately the same for HTML.
- HTML displays blocking of conglomerate between fuel rods.
- SNAP is showing large formation of PD on core support plate (likely conglomerate mass)
- Water is below core support plate in HTML and fully flooded in SNAP
- HTML shows relocated PD on lower head



- Full ASCII Model Contents
 - No Export Required
 - Case Data Appended
- ASCII View Highlighting
- Search Capabilities
- Deltailed Breadcrumb information
- Quickly Navigate from ASCII view to GUI Edit Location
 - Double-click to Jump
 - Editors Opened
 - Table Cells and Modes Selected
- Available in ASCII views

E ¹ Heat Stru	cture 3560 → In	itial Tempe	erature → Axia	al Node 4,	Radial	Node 2				
•qT1x0C02 •	0.0 0									
 dhtstrz + 	1.7242595									
• rdx •	1.5707963									
 radrd 	7.1443	7.455	7.7657	8						
matrd *	54	54 6	8							
 nfax * 	3 e									
 rftn * 	504.474	512.423	515.354	8						
•										
*d: Converted	from RS: Heats	structure	3560 Split)	1						
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<pre>idbcon * gflxbcol *</pre>	2 0.0 e	2	2		2 .					
<pre>idbcon * qflxbcol * qflxbcol *</pre>	2 0.0 • 0.0 •	2	2		2 .					
<pre>idbcon * qflxbcol * qflxbcol * qflxbcol *</pre>	2 0.0 e 0.0 e 0.0 e	2	2		2 .					
<pre>idbcon * qflxbcol * qflxbcol * qflxbcol * qflxbcol * qflxbcol *</pre>	2 0.0 e 0.0 e 0.0 e 0.0 e	2	2		2 .					
<pre>idbcon * qflxbcol * qflxbcol * qflxbcol * qflxbcol * qflxbcol * </pre>	2 0.0 e 0.0 e 0.0 e 355	2	2		2 .		E	idit Initial Te	emperatures	•
idbcon * qflxbcol * qflxbcol * qflxbcol * qflxbcol * hcomon2 *	2 0.0 e 0.0 e 0.0 e 355 356	2	2		2 •		E	idit Initial Te	mperatures	8
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idbcon aflxbcol aflxbcol aflxbcol aflxbcol hcemon2 hcemon2 hcemon2 hcemon2 aflxbcol call aflxbcol aflxbc	2 0.0 e 0.0 e 0.0 e 355 356 356 356 1.5586172 1.	2 1 3 2 1 5586172	2 0 0 1.5586172	1.55861	2 e 0 e 0 e 0 e 72 e	Axial Node	E	idit initial Te Radial Node 1 (F)	Radial Node 2 (F)	Radial Node 3 (F)
idhcon aflxbcol aflxbcol aflxbcol hcomon2 hcomon2 hcomon2 hcomon2 hcomon2 aflxbcol hcomon2	2 0.0 e 0.0 e 0.0 e 355 356 356 356 1.5596172 1. 24.508302 e	2 1 3 2 1 .5586172	2 0 0 1.5586172	1.55861	2 e 0 e 0 e 72 e	Avial Node	E	idit Initial Te Radial Node 1 (F) 524.851	mperatures Radial Node 2 (F) 525.412	Radial Node 3 (F) 527.011
idbcon iqflxbcol iqflxbcol iqflxbcol iqflxbcol hcomon2 hcomon2 hcomon2 hcomon2 iddtstrz rdx rdx rdx rdx	2 0.0 e 0.0 e 355 356 356 356 1.5586172 1. 24.508302 e 0.0	2 1 3 2 1 .5596172 0.236	2 0 0 1.5586172 0.472	1.55061	2 e 0 e 0 e 72 e	Axial Node 1 2	E	dit Initial Te Radial Node 1 (F) 524.851 507.806	mperatures Radial Node 2 (F) 525.412 506.429	Radial Node 3 (F) 527.011 502.929
idbcon * idflxbcol * idflxbcol * idflxbcol * idflxbcol * hcemon2 * hcemon2 * hcemon2 * hcemon2 * iddtstrz * rddr * rddr *	2 0.0 e 0.0 e 0.0 e 355 356 356 356 356 356 1.5586172 1 24.508302 e 0.0 54	2 1 3 2 1 5586172 0.236 54	2 0 0 0 1.5596172 0.472	1.55861	2 e 0 e 0 e 72 e	Avial Node 1 2 3	5	dit Initial Te Radial Vode 1 (F) 524.851 507.806 507.79	Radial Node 2 (F) 525.412 506.429 506.411	Radial Node 3 (F) 527.011 502.929 502.909
idhcom + qflxhcol + qflxhcol + qflxhcol + thcemon2 + hcemon2 + hcemon2 + hcemon2 + dtstrz + rdx + rdx + rdx + matrd + matrd +	2 0.0 e 0.0 e 355 356 356 356 356 1.5586172 1. 24.508302 e 0.0 54 3 354	2 1 3 2 1 5586172 0.236 54	2 0 0 1.5596172 0.472	1.55861	2 e 0 e 0 e 72 e	Avial Node 1 2 3 4	E	dit Initial Te Radial Vode 1 (F) 524.851 507.806 507.79 508.755	Radial Node 2 (F) 525.412 506.429 506.411 507.239	Radial Node 3 (F) 502.929 502.909 503.296
idDecon + qflbcol + qflbcol + qflbcol + totol + totol + hcemon2 + hcemon2 + hcemon2 + hcemon2 + rdx + r	2 0.0 e 0.0 e 355 356 356 356 356 356 356 356 356 356	2 1 32 1 5596172 0.236 54 3 525,412	2 0 0 1.5596172 0.472 527.011	1.55861	2 e 0 e 0 e 72 e 3 e 06 s	Axial Node 1 2 3 4	E	dit Initial Te Radial Node 1 (F) 507.806 507.79 508.755	Radial Node 2 (F) 525.412 506.429 506.411 507.239	Radial Node 3 (F) 527.011 502.929 502.909 503.296
idhcom + qflxhcol + qflxhcol + qflxhcol + thormon2 + hcomon2	2 0.0 e 0.0 e 355 356 356 356 1.5586172 1 24.508302 e 0.0 54 3 524.851 556.429	2 1 3 2 1 .5596172 0.236 54 3 2 2525.412 502.929	2 0 0 1.5596172 0.472 3 527.01 507.79	1.55961 507.8 505.4	2 e 0 e 0 e 0 e 72 e 3 e 06 s 11 s	Avial Node 1 2 3 4	, ,	dit Initial Te Radial Vode 1 (F) 524.851 507.806 507.79 508.755	Radial Node 2 (F) 525.412 506.429 506.411 507.239	Radial Node 3 (F) 502.929 502.909 503.296
idbcom + idflxbcol + idflxbcol + idflxbcol + idflxbcol + hcemon2 + hcemon2 + hcemon2 + hcemon2 + iddtstrz + rdx + rdx + rdr + rdr + rfr + rfr + rfr + rfr +	2 0.0 e 0.0 e 355 356 356 356 356 356 1.5586172 1. 24.568302 e 0.0 54 3 54 3 54 3 54 35 54,851	2 1 3 2 1 5586172 0,236 54 525,412 502,929 508,755	0 0 0 1.5596172 0.472 537,011 507,79 507,239	1,55861 507.8 505.4 503.2	2 e 0 e 0 e 0 e 72 e 3 e 95 e	Attal Node 1 2 3 4	5 	dit Initial Te Radial Vode 1 (F) 524.851 507.806 507.79 508.755	Radial Node 2 (F) 505.412 506.429 506.411 507.239	Radial Node 3 (F) 502.929 502.909 503.296
idDecon + qflxbcol + qflxbcol + qflxbcol + hcemon2 + hcemon2 + hcemon2 + hcemon2 + dntstrz - radrd + matrd + mfax + rftm + rftm +	2 0.0 e 0.0 e 0.0 e 355 356 356 356 356 1.5566172 1. 24.506302 e 0.0 54 3 524.851 506.429 502.909	2 1 3 2 1 5586172 0,236 54 3 525,412 502,929 508,755	2 0 0 0 1.5596172 0.472 3 527.01 507.79 507.29	1.55061 507.8 505.4 503.2	2 e 0 e 0 e 72 e 3 e 06 s 11 s 95 e	Avial Node 1 2 3 4	E	dit Initial Te Radial Vode 1 (F) 524.851 507.806 507.755	Radial Node 2 (F) 505.429 506.411 507.239	Radial Node 3 (F) 527.011 502.929 502.909 503.296
idDecon + iqflxbcol + iqflxbcol + iqflxbcol + incemon2 + hcemon2 + hcemon2 + hcemon2 + incard + rdr + rdr + rft + rft + rft + rft + * d. Converted	2 0.0 e 0.0 e 355 356 356 356 356 1.5586172 1. 24.508302 e 0.0 54 3 524.851 506.429 502.909 from R5: Heat:	2 1 3 2 1 5586172 0.236 54 3 525.412 502.929 508.755 structure	0 0 0 1.5586172 0.472 507.79 507.239 3570 Split 1	1.55961 507.8 505.4 503.2	2 e 0 e 0 e 0 e 72 e 3 e 96 e	Axial Node 1 2 3 4	E	dit Initial Te Radial Node 1 (F) 524.851 507.806 507.79 508.755	mperatures Radial Node 2 (F) 525.412 506.429 506.411 507.239	Radial Node 3 (F) 502.929 502.909 503.296
idDecon + qflbecol + qflbecol + qflbecol + hcemon2 + hcemon2 + hcemon2 + hcemon2 + dhtstrz - radrd + matrd + mfax + mftn + rftn + d: Converted	2 0.0 e 0.0 e 0.0 e 0.0 e 355 356 356 356 356 1.5566172 1. 24.508302 e 0.0 54 3 524.851 506.429 506.50 506.429 506.420	2 1 3 2 1 5586172 0.236 54 3 3 525.412 502.929 502.929 503.929 503.929	2 0 0 1.5596172 0.472 3 527.011 507.79 507.239 3570.5011 1 3570 Split 1 userid	1.55861 6 507.8 506.4 503.2	2 e 0 e 0 e 72 e 3 e 06 s 11 s 96 e compo	Axial Node 1 2 3 4		dit Initial Te Radial Node 1 (F) 507.806 507.79 508.755	Radial Node 2 (F) 525.412 506.429 506.411 507.239	Radial Node 3 (F) 502.929 502.909 503.296
idbcom + iqflxbcol + iqflxbcol + iqflxbcol + idtxbcol + ibcemon2 + ibcem	2 0.0 e 0.0 e 355 356 356 356 356 1.5586172 1 24.508302 e 0.0 54 3 524.851 524.851 524.851 524.999 from RS: Heats 357	2 1 3 2 1 5596172 0.236 54 3 525.412 502.929 508.755 508.755 508.755	0 0 0 1.5596172 0.472 3 527.011 507.79 507.239 3570 Split : userid 1	1.55861 507.8 505.4 503.2	2 e 0 e 0 e 0 e 72 e 3 e 06 s 11 s 96 e compo	Avial Node 1 2 3 4	e 	dit Initial Te Radial Vode 1 (F) 524.851 507.806 507.79 508.755	mperatures Radial Node 2 (F) 525.412 506.429 506.411 507.239	Radial Node 3 (F) 502.929 502.909 503.296
idDecon + iqflxbcol + iqflxbcol + iqflxbcol + incemon2 + hcemon2 + hcemon2 + hcemon2 + incemon2 + incemon	2 0.0 e 0.0 e 0.0 e 355 356 356 356 1.5586172 1. 24.508302 e 0.0 54 3 54 35 54 54 502.909 from RS: Heatt a nu 357 rg rids	2 1 3 2 1 5586172 0.236 525,412 502,929 508,755 502,929 508,755	2 0 0 0 1.5596172 3 527.011 507.239 3570 Split 1 userid 1 hscyl	1.55961 507.8 506.4 503.2 1 ichf	2 e 0 e 0 e 72 e 3 e 06 s 11 s 96 e compo	Atial Node 1 2 3 4		dit Initial Te Radial Vode 1 (F) 524.851 507.79 508.755	Radial Node 2 (F) 505.412 506.429 506.411 507.239	Radial Node 3 (F) 502.929 502.909 503.296
idbcom + idflubcol + idflubcol + idflubcol + idflubcol + hcemon2 + hcemon2 + hcemon2 + hcemon2 + iddtstrz - rdx + rdx + rftm + rftm + id: converted htstr + nzhstr + nzhstr +	2 0.0 e 0.0 e 0.0 e 355 356 356 356 356 356 356 356 356 356	2 1 3 2 1 5596172 0.236 54 3 525.412 502.929 508.755 5102.929 508.755	2 0 0 0 1.5596172 0.472 (3 527.011 507.79 507.299 3570 Split : userid hscyl 1	1.55861 507.8 505.4 503.2 1 ichf 1	2 e 0 e 0 e 72 e 3 e 06 s 11 s 96 e compo	Avial Node 1 2 3 4		dit Initial Te Radial Vode 1 (F) 524.851 507.806 507.79 508.755	Radial Node 2 (F) 505.429 506.429 506.411 507.239	Radial Node 3 (F) 502.929 502.909 503.296
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idbcom idflabcol idflabcol idflabcol idflabcol hceenol hceenol hceenol hceenol hceenol iddistrz rdx rdx rdx iddistrz rdx iddistrz iddistrz rdx iddistrz iddi	2 0.0 e 0.0 e 355 356 356 356 356 1.5586172 1 24.508302 e 0.0 54 3 524.851 506.429 502.909 from R5: Heats a nu 357 r grid 2 frid c plane 1 c 2 frid 5	2 1 3 2 1 5596172 0.266 54 525.412 502.929 508.755 508.755	2 0 0 0 1.5596172 0.472 0 3 527.011 507.79 507.239 3570 Split 1 1serid 1 hscyl 1 liqlev 0 ofcil	1.55961 e 507.8 506.4 503.2 1 ichf 1 iaxcnd 0 hdri	2 e 0 e 0 e 0 e 72 e 3 e 06 s 11 s 96 e compo	Axial Node 1 2 3 4	, ,	dit Initial Te Radial Vode 1 (F) 507.806 507.79 508.755	mperatures Radial Node 2 (F) 525.412 506.429 506.411 507.235	Radial Node 3 (F) 502.929 502.909 503.296
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Future Improvement: Default/Full view of MELCOR Input



- MELCOR is feature rich and allows users access to many input parameters and optional models.
 - Overload of input requirements available to new MELCOR users invites problems with user/effects
 - Though many options are available, the default view should only show that data that is required or frequently modified by the user
 - Optional data should be masked out by default
 - Toggle could hide optional input from view (unless user has made changes to this input)

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	- Conoral		v Die	ł	 Release Model 			
	Enabled	True False	1015	Į	Release Model		hacis/e:>	
	Description	<none></none>	F		Gap Release G	ap Rel	lease Cells (8)	E
[Default Scheme	186 Standards	Ţ		Release Comb. C	lass c	ombinations (1)	E
١				1	 [RN1_ASP] Aero 	osol Se	ectional Parameters	
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	Absorption Length	Valid values	E۳		Surface Deposition	ı	Defined surfaces (1)	E
	Cvol Split	RN Split Data (0)	E٩		Intervolume Trans.		Defined flows (5)	E
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ĺ	Pool Scrubbing	RN scrub data (2)	E	L	Resuspension		Resuspension data set.	E
ļ	Filters	RN Filters (2)	E		▼ [RN1_PT] Cond	itions f	or Aerosol Coefficients	
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	Aqueous Species	. Valid values	E*		Particle Slip		1.257 (-) 🛛
	Flashing-Jet Model	Valld values	E		Particle Stick		1.0 (-) 🕸
l	Film Entrainment	Valld Values	E		Turb. Dissipation	V	1.0E-3 (m ² /s ³) 🕸
	Pool Concentrate	[0] Ratios Defined	E		Conductivity Ratio	×	0.05 (-) 🕸
	Fachle	C False			Accommodation		2.25 (-) 🗤
	Aerosol Sections	10			Diffusion Thicknes	s 🖌	1.0E-5 (m) 🗤
	Aerosol Cmpts	2		٦	 Condensation E 	vapora	ation	





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