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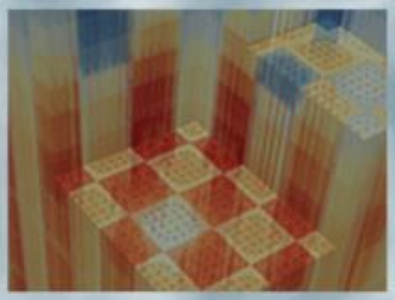

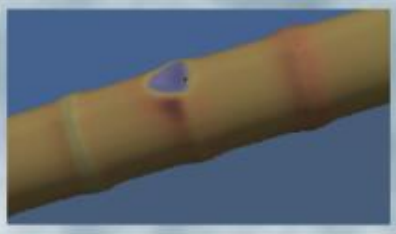

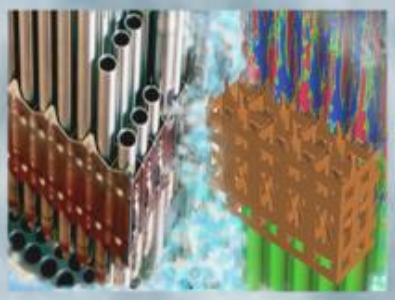

VERA-CS User Support Activities for PoR 15

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REVISION LOG

Revision	Date	Affected Pages	Revision Description
0		All	Initial Release

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EXECUTIVE SUMMARY

The purpose of this milestone is to document the user support activities that took place between 4/1/2017 and 9/29/2017 (PoR 15). In the normal PHI workflow, that also extends to several activities within RTM, a Kanban process is followed. This involves creating tickets for specific work items and track the progress to complete these specific work items.

The PHI Kanban is the primary source for the content of this report. The reader should note that there may be items missing from the report. Missing items would not be present for one of the following reasons:

1. The work was not documented using a Kanban ticket. Typically this applies to tasks that take less than an hour. Individually this may be a small item, but collectively over the PoR this may combine to non-trivial effort.
2. Information in the Kanban ticket was not properly entered.

The scope of this report summarizes all activities related to VERA-CS user support activities; where those activities may be providing direct support or indirect support.

Discussion of work related to the following components such: BISON, MAMBA, Tiamat, Cicada, and Shift, and VERAView are not included.

User support activities related to providing installations or releases to users are not discussed in this report.

During PoR 15 there were approximately 45 PHI Kanban tickets related to user support activities, either directly or indirectly. There were 45 new reported defects and 26 defects fixed in PoR 15.

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TABLES

ACRONYMS

BWR	boiling water reactor
CASL	Consortium for Advanced Simulation of Light Water Reactors
CI	Continuous Integration
CE	Combustion Engineering
CTF	COBRA-TF subchannel thermal-hydraulics code
DNB	departure from nucleate boiling
IFBA	Integral Fuel Burnable Absorber
MAMBA	MPO advanced model for boron analysis
MCNP	Monte Carlo N-Particle
NaN	Not a Number
PHI	Physics Integration
PoR	plan of record
PWR	pressurized water reactor
RIA	reactivity insertion accident
RTM	Radiation Transport Methods
UM	University of Michigan
VERA-CS	Virtual Environment for Reactor Applications – Core Simulator
WEC	Westinghouse Electric Corporation

1. INTRODUCTION

The purpose of this milestone is to document the user support activities that took place between 4/1/2017 and 9/29/2017 (PoR 15). In the normal PHI workflow, that also extends to several activities within RTM, a Kanban process is followed. This involves creating tickets for specific work items and track the progress to complete these specific work items. The format of this documentation is an HTML website that interfaces to an SQL database. This format is very useful for providing access, navigability, and record keeping. However, it is not particularly amenable to providing a coherent, complete, and distributable summary of activities.

CASL does the majority of its work scope definition and planning through milestones. However, there are regular tasks that arise that require individuals' efforts to address that were not necessarily contained within the scope of these milestones. From the software development side this can include fixing code defects, adding simple features to facilitate ease of use or analysis, adding major capabilities that enable new types of analyses, or research into potential methods to improve upon the existing methods. From an infrastructure point of view some of these activities can include deploying installations for individual users on target platforms, updating documentation or preparing a release, or providing user training or answering user questions via email. There is also analysis support to evaluate the accuracy of existing models or data and potentially improving upon these. Collectively, these activities may be thought of as user support activities.

The PHI Kanban is the primary source for the content of this report. The reader should note that there may be items missing from the report. Missing items would not be present for one of the following reasons:

1. The work was not documented using a Kanban ticket. Typically this applies to tasks that take less than an hour. Individually this may be a small item, but collectively over the PoR this may combine to non-trivial effort.
2. Information in the Kanban ticket was not properly entered. This happens more frequently than we think.

To facilitate comprehension of the remainder of this report, the following subsections provide some definitions and categories that are used throughout this document. The remainder of the document is organizes as follows: Section 2 describes all the defects fixed in PoR 15.

1.1 Definitions

1.1.1 VERA-CS

For the purposes of this milestone report VERA-CS constitutes the following components:

- COBRA-TF
- MPACT
- ORIGEN
- VERAIn
- Cross section library data for MPACT

Discussion of work related to other components such as: BISON, MAMBA, Tiamat, Cicada, and Shift, and VERAView are not included.

Additionally, user support activities related to providing installations or releases to users are not discussed in this report.

1.1.2 User support activity

This term is used in a very broad sense to encompass any activity that is performed to directly or indirectly provide support to a user.

1.1.3 Defect

A defect constitutes a problem with an existing feature that does not work as intended. These are typically identified by users.

1.1.4 Feature

A feature constitutes a capability that was not previously available that is requested by a user or on a users' behalf.

1.2 Categories of User Support Activities

1.2.1 Direct support

Activities that provide direct support include things like: providing an install for a user on some particular platform, fixing a defect, or adding a feature with a component in the input.

1.2.2 Indirect support

Activities that would be examples of indirect support are things like: updating the theory manual or documentation, developing a new algorithm that allows the code to run faster, improving nuclear data, evaluating or assessing the accuracy of an existing model, or adding a more rigorous numerical method.

2. DEFECTS

This section summarizes all the defects discovered and fixed during the PoR. Each subsection lists the defects relevant to the components of VERA-CS.

A total of 45 new defects were reported, and a total of 26 defects were resolved.

2.1 MPACT

Table 1 lists all new defects reported for MPACT. There were 27 defects reported. Table 2 lists all defects closed for MPACT. There were 18 defects that were resolved.

Table 1. New defects for MPACT reported in PoR 15

PHI Kanban Ticket #	Ticket Description
#5108	(Defect) HDF5 file /CORE/rated_power not right for symmetry cases
#5105	(Defect) Error when homogenizing lower nozzle and large water rods
#5098	(Defect) Multiple MPACT and VERAShift tests failing in Heavy run
#5084	(Defect) Instability Observed in Watts Bar Cycle 1 with RC3
#5083	(Defect) GenPinMesh produces empty FSR's for some meshes
#5072	(Defect) Figure out why Futility call to PETSC's MatTranspose hangs in docker
#5070	(Defect) AP1000 full core input crashes during control rod bank initialization
#5056	(Defect) MPACT Detector Edits Initialization Time Too Long
#5053	(Defect) MPACT_exe_testValid_transient_1a_rampVT timing out on CDash Docker build
#5042	(Defect) MPACT_Driver array allocation error with vis_edits=fsr
#5011	(Defect) MPACT does not run with multiple instances of "feedback on"
#4994	(Defect) MPACT bombs with 2 detectors defined
#4991	(Defect) Massive increase in amount of memory needed in recent builds
#4986	(Defect) Cannot Run With Larger Assembly Gaps
#4983	(Defect) Pin loadings are not folded to full-assembly on internal boundaries
#4981	(Defect) MPACT does not handle an axial mesh boundary inside of a spacer grid.
#4980	(Defect) MPACT seg faults if no MPACT block is in input.
#4956	(Defect) Fix stability issues with transient
#4947	(Defect) Resolve Radial Decomposition Issues with Coupler_Shift
#4944	(Defect) Add Testing to Capture Radial Decomposition Control Rod Bug
#4925	(Defect) MPACT expects inconsistent CTF input file names in some situations
#4923	(Defect) MPACT errors if there is no COBRATF group in the XML file
#4917	(Defect) Segfault during BWR control rod set up
#4914	(Defect) Restart file error due to not being closed
#4913	(Defect) Full Core models with control rods segfault during initialization
#4893	(Defect) Parallel restart doesn't work with large water rods
#4860	(Defect) VERA-CS crashes when 'parallel' not in COBRA-TF block

Table 2. Closed defects for MPACT reported in PoR 15

PHI Kanban Ticket #	Ticket Description	Status/ Resolution
#5098	(Defect) Multiple MPACT and VERAShift tests failing in Heavy run	Closed
#5072	(Defect) Figure out why Futility call to PETSC's MatTranspose hangs in docker	Closed
#5056	(Defect) MPACT Detector Edits Initialization Time Too Long	In Review
#5053	(Defect) MPACT_exe_testValid_transient_1a_rampVT timing out on CDash Docker build	Closed
#5042	(Defect) MPACT_Driver array allocation error with vis_edits=fsr	Closed
#5011	(Defect) MPACT does not run with multiple instances of "feedback on"	Closed
#4994	(Defect) MPACT bombs with 2 detectors defined	In Review
#4991	(Defect) Massive increase in amount of memory needed in recent builds	Closed
#4986	(Defect) Cannot Run With Larger Assembly Gaps	Closed
#4980	(Defect) MPACT seg faults if no MPACT block is in input.	Closed
#4956	(Defect) Fix stability issues with transient	Closed
#4947	(Defect) Resolve Radial Decomposition Issues with Coupler_Shift	Closed
#4925	(Defect) MPACT expects inconsistent CTF input file names in some situations	Closed
#4923	(Defect) MPACT errors if there is no COBRATF group in the XML file	Closed
#4917	(Defect) Segfault during BWR control rod set up	Closed
#4914	(Defect) Restart file error due to not being closed	Closed
#4893	(Defect) Parallel restart doesn't work with large water rods	Closed
#4860	(Defect) VERA-CS crashes when 'parallel' not in COBRA-TF block	In Review

2.2 COBRA-TF

Table 3 lists all new defects reported COBRA-TF. There were 15 new defects reported. Table 4 lists all defects closed for COBRA-TF. There were a total of 6 defects resolved.

Table 3. New defects for COBRA-TF reported in PoR 15

PHI Kanban Ticket #	Ticket Description
#5121	(Defect) Fix the gas and contact conductance terms in the dynamic gap conductance model
#5115	(Defect) Test failures in standalone CTF build in Docker
#5111	(Defect) CTF solver doesn't work for models where gaps connect same channels multiple times
#5089	(Defect) xml2ctftests failing in docker but not other dev machines
#5088	(Defect) CTF test failures on docker
#5086	(Defect) bcvel option in CTF is not working right
#5046	(Defect) IAPWS tables crash on negative enthalpy for counter-current flow problem
#5026	(Defect) Clean up CTF Error/Warning messages
#5009	(Defect) CTF tests failing on James/Natasha but not other testing machines
#4948	(Defect) xml2ctf crashes for system-80 full core model
#4927	(Defect) TKE being passed to MAMBA is wrong
#4926	(Defect) CTF pre-processor crashes for Problem 6 with no COBRATF input block
#4924	(Defect) CTF pre-processor crashes for Problem 6 with no COBRATF input block

#4916	(Defect) COBRA-TF segfaults during initialization in full core symmetry
#4863	(Defect) Fix BFBT P6 series input decks

Table 4. Closed defects for COBRA-TF reported in PoR 15

PHI Kanban Ticket #	Ticket Description	Status/ Resolution
#5089	(Defect) xml2ctftests failing in docker but not other dev machines	Closed
#5088	(Defect) CTF test failures on docker	Closed
#4948	(Defect) xml2ctf crashes for system-80 full core model	Closed
#4927	(Defect) TKE being passed to MAMBA is wrong	In Review
#4926	(Defect) CTF pre-processor crashes for Problem 6 with no COBRATF input block	Closed
#4924	(Defect) CTF pre-processor crashes for Problem 6 with no COBRATF input block	Closed

2.3 ORIGEN

Table 5 lists all new defects reported for ORIGEN. Table 6 lists all defects closed for ORIGEN. There was a total of 1 new defect reported and 0 defect resolved.

Table 5. New defects for ORIGEN reported in PoR 15

PHI Kanban Ticket #	Ticket Description
#5028	(Defect) Running a VERA model with molybdenum burnable insert results in run-time errors

Table 6. Closed defects for ORIGEN reported in PoR 15

PHI Kanban Ticket #	Ticket Description	Status/ Resolution

2.4 VERAIn

Table 7 lists all new defects reported VERAIn. Table 8 lists all defects closed for VERAIn. There was a total of 2 new defect reported and 2 defect closed.

Table 7. New defects for VERAIn reported in PoR 15

PHI Kanban Ticket #	Ticket Description
#5025	(Defect) VERAIn no longer supports dashes in assembly IDs
#4933	(Defect) REACT2XML doesn't produce error message when axial elevations are not increasing

Table 8. Closed defects for VERAIn reported in PoR 15

PHI Kanban Ticket #	Ticket Description	Status/ Resolution
#5025	(Defect) VERAIn no longer supports dashes in assembly IDs	Closed
#4933	(Defect) REACT2XML doesn't produce error message when axial elevations are not increasing	Closed

3. CONCLUSIONS

During PoR 15 there were approximately 45 PHI Kanban tickets related to user support activities, either directly or indirectly. There were 45 new reported defects and 26 defects fixed in PoR 15.

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