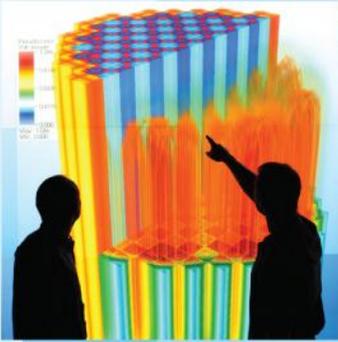




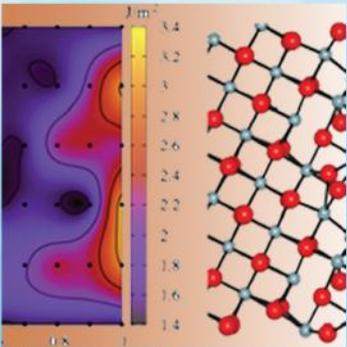
Power uprates and plant life extension



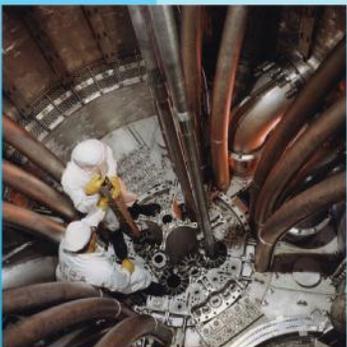
Engineering design and analysis



Science-enabling high performance computing



Fundamental science



Plant operational data

# Proposed Test Stand Selection Criteria

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## REVISION LOG

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0	9/28/12	All	Original Report
1	1/23/2013	All	Sections 3, 4, and 5 removed to create an Unlimited version.

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## 1. INTRODUCTION

The Consortium for Advanced Simulation of Light Water Reactors (CASL) is developing modeling and simulation capabilities to provide predictive performance of reactors with a specific focus on several challenge problems to support power uprates, life extension, and use of higher burnup fuels. A critical element of the success of the CASL M&S hub will be the ability to transfer the technology (both methods and software) developed by CASL to external stakeholders (including the industry, regulatory and research communities) and for these stakeholders to apply these methods and tools to address critical issues related to the long-term efficient and safe operation of commercial NPPs. An important element to enable the achievement of this objective is the development and deployment of industry Test Stands, which are intended to serve as a primary mechanism for initial deployment of CASL developed technology to these stakeholders.

The Test Stand concept was included in the CASL proposal to DOE as means for deployment outside of the CASL development activities. In 2011 a CASL report on *Test Stands: Process Steps and Examples* [1] was created to expand the definition of Test Stands and provide the steps for selecting Test Stands and how they would be executed. In Plan of Record 5 (POR 5), the Advanced Modeling Applications (AMA) Focus Area work included a milestone L3:AMA.REQ.P5.01 to solicit Test Stand proposals from the CASL Industry Partners and to provide alternatives to the CASL Senior Leadership Team for selection. An additional development has been that CASL has created a new position, CASL Product Integrator, with the responsibility for coordinating Test Stands and an expanded set of deployment approaches was developed.

This report documents the proposed Test Stand selection criteria. The selection criteria provided in this document are to be used to guide selections that will be made for Test Stands. These criteria are also useful to guide organizations to better understand the priorities for the selection of Test Stand activities. Each of the three CASL industry partners have expressed interest in deploying Test Stands and are anticipated to each have a Test Stand, which may be deployed in a time phased approach. Additional Test Stands may be deployed to members of the Industry Council or other organizations.



## 2. PROPOSED TEST STAND SELECTION CRITERIA

It is envisioned that the Test Stands, as applications of the CASL-developed technology, will provide value to both the performing organization as well as CASL. Thus, it is likely that CASL will deploy multiple Test Stands, and all three CASL industry partners have expressed interest in utilizing VERA through the Test Stand process. It should be noted that the Test Stands are intended as a feedback tool for alpha- and beta-testing the CASL-developed technology; thus, capabilities of VERA may be limited due to the time of deployment within the CASL development timeline. However, it is envisioned that the Test Stands be upgraded as newer VERA versions are released and the technology evolves to a more complete set of capabilities.

In order to provide an objective selection process to prioritize Test Stand deployment activities, a set of metrics have been developed that can be used to score the proposed projects. The proposed metrics (and means of scoring) are presented below. It is recommended that the CASL FA Leads and Production Applications Coordinator score each of the proposed Test Stand applications and then use these scores to provide an initial ranking of projects from which the selected Test Stand projects can be prioritized. If the proposed metric scoring standards are used, it should be noted that a lower score represents higher priority projects.

Again, it should be emphasized that these criteria and scoring are to be used to guide the Test Stand selection, which will ultimately be approved by the CASL SLT.

### 1. Relative importance of problem to proposing organization

The Test Stands are intended to address problems of interest to the proposing industry participant and preference should be given to projects that have the highest relative interest to the participant. These scores should be provided by the proposing organization. It should be noted that the proposing organizations have already limited the listings (see Sections 3, 4, and 5) to only those problems having high interest within their organization.

Proposed scoring:

- 1 = highest interest
- 2 = median interest
- 3 = lowest interest

### 2. Ability for VERA to support Test Stand project

The CASL tools (VERA) are being developed with a primary focus of addressing the CASL Challenge Problems. Given the breadth of the challenge problems, the resulting tools will have applicability to a wide range of problems. However, depending upon the proposed projects, VERA may or may not have sufficient capability at the time of the initial Test Stand deployment to support a proposed Test Stand project. It is also possible that the proposed Test Stand application is not consistent with the planned CASL technology development. CASL FA leads will provide recommendations on the appropriate CASL tools as well as a score on the ability of CASL tools to support the proposed Test Stand application.

Proposed Scoring:

- 1 = VERA available with full capabilities for Test Stand project
- 2 = VERA available with partial capabilities for Test Stand project
- 3 = VERA does not yet have capabilities to support Test Stand project.
- 4 = Needed capabilities are outside of CASL planned development scope



### 3. CASL Return on Investment – Rigor of Use

It is desired that the Test Stands approximate independent installations and usage of CASL tools, in order to obtain independent feedback from a user perspective. The Test Stand must be used rigorously to exercise its functionality and to provide feedback on usability and capabilities. It should be noted that each Test Stand project will be required to provide a detailed usage report to CASL with specific feedback on VERA (to be developed in future). This feedback and information is important to improve the CASL tools and support the development process and should include a comparison with current industry simulation approach, computer resource requirements (run times and memory) versus industry practice, difficulty of utilization, physical model improvement required/desired, usability features required/desired, etc.

Proposed Scoring:     1 = multiple coupled VERA subcomponents exercised  
                               2 = two coupled VERA subcomponents or multiple standalone VERA subcomponents utilized  
                               3 = one VERA subcomponent utilized

### 4. CASL Return on Investment – Support for Validation of VERA

Although CASL will invest in some validation of VERA, CASL funding is limited. Additionally, some data readily available to CASL industry partners cannot be distributed to the project. Thus, there is an opportunity to provide value to CASL through validation and preparation of example cases, and preference should be given to those projects that can provide validation simulations and supporting data.

Proposed Scoring:     1 = validation report with data to be provided  
                               2 = validation report to be provided  
                               3 = report will not provide a comparison to experimental or operational data

### 5. CASL Return on Investment – External Staff Funding

Additionally, it is desirable to minimize the cost to CASL of staffing the Test Stand. While CASL must fund some installation and user support activities, preference should be given to those projects where the proposing organization offers to fund some of, or all of, the costs of operating the Test Stand.

Proposed Scoring:     1 = 320 hr or more funded externally  
                               2 = 160 hr or more funded externally  
                               3 = 80 hr or more funded externally



### 3. REQUESTED TEST STAND PROPOSAL INFORMATION

In order to support the selection process the following information is desired from the performing organization:

- 1. Performing organization:** *Company name, division, department, and point of contact.*
- 2. Test Stand Title:** *One sentence title*
- 3. Test Stand Description:** *Few paragraph description of proposed test stand, what will be achieved, and importance of project to performing organization, and potential benefit to CASL. Please also discuss any potential restrictions on the use of the results of the Test Stand.*
- 4. Proposed schedule:** *Provide the proposed time frame (months, dates, etc) for performing the project.*
- 6. Modeling Capabilities Required:** *Describe modeling capabilities required. If possible name CASL codes that will be used.*
- 7. Validation, Operation, or Experimental Data:** *Describe any data associated with the Test Stand that will be provided to CASL as part of the deliverable.*
- 8. Computational Platform:** *Describe computational platform that will be used for Test Stand including hardware description and compilers, etc. Also indicate the availability of Information Technology staff to support VERA deployment and any special administrative or computer security issues. Note that the performing organization must either possess or have arranged for the necessary computing resources to perform Test Stand activity.*
- 9. Performing Organization Effort Commitment:** *Number of hours of effort committed to project. CASL will provide initial installation and deployment support and basic user support. At the discretion of the CASL SLT, additional support or collaborative activities may be authorized.*
- 10. Additional Information:** *Any additional information that the performing organization believes to be useful to CASL regarding the proposed Test Stand activity.*



## 4. CONCLUSIONS

In this document a set of proposed Test Stand selection criteria have been provided. The proposed selection criteria provide a means to quantitatively rank the proposed projects to guide the project selection by the CASL SLT and Product Applications Coordinator. It should be noted that CASL does not intend to withhold Test Stands, as each of the CASL industry partners have proposed extremely interesting projects and are well qualified to study them; however, some objective process must be established to provide a means to maximize CASL's benefit while minimizing CASL's cost to derive a prioritized deployment approach.

Alpha Test Stands can be deployed to CASL Industry Partners; Beta Test Stands may be deployed to partners or Industry Council Members.

EPRI, TVA, and WEC each provided proposed Test Stand projects and additional projects that have been proposed as part of the Industry Council Pilot Project selection are available. After review of the proposed criteria and projects, it is recommended that they be scored and used to guide selections and decisions.



## REFERENCES

1. *Test Stands: Process Steps and Examples*, Deliverable for Milestone OPS.Y1.02, CASL, April 20, 2011.
2. *Evaluation of Industry Council Pilot Project Alternatives*, CASL-U-2012-0026-000, February 29, 2012.