

Fukushima Daiichi Accident Study Information Portal Quality Assurance Review: Pre-Public Release

January 2012



The INL is a U.S. Department of Energy National Laboratory
operated by Battelle Energy Alliance

Fukushima Daiichi Accident Study Information Portal Quality Assurance Review: Pre-Public Release

January 2012

**Idaho National Laboratory
Idaho Falls, Idaho 83415**

<http://www.inl.gov>

**Prepared for the
U.S. Nuclear Regulatory Commission
Washington, DC 20555**

Idaho National Laboratory		Page: 1 of 2
Software Acceptance Test Plan for the Fukushima Daiichi Accident Database		Identifier: INL/EXT-12-24576 Revision: 0 Effective Date: January 18, 2012

REVISION LOG

<u>Revision Number</u>	<u>Effective Date</u>	<u>Affected Pages</u>	<u>Description of Change</u>
0	01/18/12	0	Initial issue

Idaho National Laboratory		Page: 2 of 2
Software Acceptance Test Plan for the Fukushima Daiichi Accident Database		Identifier: INL/EXT-12-24576 Revision: 0 Effective Date: January 18, 2012

CONTENTS

REVISION LOG.....	1
1. Introduction.....	1
1.1 Project Background and Objectives.....	1
1.2 Portal Design Review	1
2. Testing Approach.....	3
2.1 Features Not Tested	5
3. Quality Assurance Test Results	5
Appendix 1	7

Idaho National Laboratory		Page: 1 of 13
Software Acceptance Test Plan for the Fukushima Daiichi Accident Database		Identifier: INL/EXT-12-24576 Revision: 0 Effective Date: January 18, 2012

1. Introduction

1.1 Project Background and Objectives

The accident at the Fukushima Daiichi nuclear power station in Japan is one of the most serious in commercial nuclear power plant operating history. Much will be learned that may be applicable to the U.S. reactor fleet, nuclear fuel cycle facilities, and supporting systems, and the international reactor fleet. For example, lessons from Fukushima Daiichi may be applied to emergency response planning, reactor operator training, accident scenario modeling, human factors engineering, radiation protection, and accident mitigation; as well as influence U.S. policies towards the nuclear fuel cycle including power generation, and spent fuel storage, reprocessing, and disposal.

The NRC and DOE NE have agreed to jointly sponsor an accident reconstruction study as a means of assessing severe accident modeling capability. The lead NRC office will be the Office of Nuclear Regulatory Research and the lead DOE NE office will be the Office of Nuclear Reactor Technologies. The study team will include subject matter experts from:

Idaho National Laboratory (INL)
Oak Ridge National Laboratory (ORNL)
Sandia National Laboratory (SNL)

The overall effort will be led by SNL. This joint study is conducted under the authority of the Memorandum of Understanding between the U.S. NRC and U.S. DOE on Cooperative Nuclear Safety Research, dated April 22, 2009.

This study may serve to inform subsequent work to identify and recommend areas of improvement applicable to the safety of U.S. nuclear power plants and DOE nuclear facilities, e.g., research activities and adequacy of research-related capabilities such as ability to model and predict accident progression, radionuclide release, transport and atmospheric dispersion, enhancements to training and qualification programs (people), current hardware or future designs (parts or systems, subsystems, and components), or adequacy of operating procedures and severe accident management actions.

The Software Quality Assurance (SQA) member will provide oversight of documents relating to the Fukushima Daiichi Accident Database release management and quality, including the Acceptance Test Plan, QA Plan, and the System Test Plan.

1.2 Portal Design Review

This design review compared the current product with the original intent set forth in the initial internet portal design found in the document: Fukushima Daiichi Database Design, Revision 5. The current revision of the Fukushima Daiichi Accident Study Information Portal (FDASIP) is 1.0.21. This revision is one that restricts access for each user based on roles granted by the

Idaho National Laboratory		Page: 2 of 13
Software Acceptance Test Plan for the Fukushima Daiichi Accident Database		Identifier: INL/EXT-12-24576 Revision: 0 Effective Date: January 18, 2012

project administrator. The public access revision is currently on the test server and will be considered in this review as well.

1.2.1 Portal User Roles Security and Access Privileges

The original design document identified the roles and access privileges of a contributor and an implied administrator. The contributor was defined as given privileges to add events and artifacts, associate artifacts to events and to also have editing privileges to remove associations, artifacts, etc... Other roles were developed as the portal development team undertook the project. These roles were defined in the online user's manual that was attached to the program, which has been used to update the design specifications.

The "contributor" role has not changed since the original design specification document. Three other roles were added since the original design specification: the administrator, reviewer, user, and public roles.

The "administrator" role was implied as necessary in the design specification since the portal is managed as a limited access system of information and organization. An administrator is required to grant access to the different roles at the very least. Some additional capabilities were added to the administrator's capabilities with a website statistics tab that includes user activities. There are database tool to download a data spreadsheet into the database. This became necessary to simplify addition of material from a myriad of sources. A version update tool is there for the designer under the administrator tab as well. A very nice feature not originally in the design is the report generator that is in the administrator tab. A pdf report is generated at any time that encompasses all the timelines for each unit, the events and artifacts, charts, links to reference documents in the database and more. The report comprehensively organizes and presents the portal information. This report can be viewed by contributors and others.

The "reviewer" role was added to separate contributors from those deemed capable to review the accuracy of reports; a more limited pool of experts. Reviewers can assign confidence levels of Hi, Medium or Low. The review function serves as an information validity level assignment.

A "user" role was added to allow those with security access beyond the general public to view all the information on the site, but not allow access to contribute or review information posted to the site.

Finally, a "public" role will allow access that will open up information to the site to anyone who visits without a login. This contains the majority of the information on the site and will free up administration activities formerly required to assign roles to grant public authorization on a request by request basis.

Multiple roles can be assigned to a single portal user. Privileges are cumulative and are accessed through a single login identity and password.

Idaho National Laboratory		Page: 3 of 13
Software Acceptance Test Plan for the Fukushima Daiichi Accident Database		Identifier: INL/EXT-12-24576 Revision: 0 Effective Date: January 18, 2012

1.2.2 Portal Database Design Features

The original design document identified the features of events, artifacts, causes and reviews. The attributes assigned to these functions included the contributor, pertinent dates and times relating both to the events and artifacts along with the addition or editing in the portal database, times, and other identifying remarks.

The basic structure outlined in the database design document has remained intact from its original concept and all features identified there are implemented.

1.2.3 Portal Utility Features

Events, artifacts, and reviews entry and editing are implemented as per the design specification.

Utilities were added as a result of the ongoing design team development effort. A charting utility was added along with a report utility. The charting utility is currently in a static mode with the possibility of adding a dynamic mode in a future release. The functionality tested for the static mode was added to the testing plan and reviewed for the current release. The chart options available are a bar timeline component state chart and a scatter plot parameter data chart.

The report utility in the Administration tab along with its view function available to all users in the Views tab consolidates the timelines, events and artifacts into one comprehensive report. This was added to the software test plan and tested.

Timelines were described briefly in the design specification and added as an html linked view menu in the portal. They are also set up in the report. Their navigation features were added to the test plan.

2. Testing Approach

The test approach used for the Fukushima Daiichi Accident Database for new releases during the developmental and operational phase of the product life-cycle is based upon a “touch all buttons” methodology. The nature of the application is a database repository and a web based portal application. Automated tests are not considered necessary for this application due to a lack of calculations performed for testing to quantify acceptance. Instead, manual tests will be performed to ensure the functionality requirements of the users. A checklist of the functions will be used to ensure compliance.

The following items have been identified and tested by the designers and the SQA and have been deemed functional for release 1.0.21:

- Contributor Creation
- Artifact Creation

**Software Acceptance Test Plan
for the Fukushima Daiichi
Accident Database**

Identifier: INL/EXT-12-24576
Revision: 0
Effective Date: January 18, 2012

- Media file links
 - Video
 - Spreadsheet
 - Image
 - Word document
 - Text
- Parameter Data
- Component State
- Event Creation
- Review Creation
 - Review Artifact
 - Review Event
- Timeline View
 - Navigation
- Login Functions
 - Forgotten Password
- Chart Creation
 - Component State Chart
 - Parameter Data Chart
- Report Creation
 - Items included, events, artifacts, charts
 - Organization
- Report View
- Security
 - Navigation of non-public information outside login not allowed
 - Public access does not include copyrighted or controlled information
- Administrative Functions
 - Add contributor
 - Modify roles
- Home Page Quick Navigation

Idaho National Laboratory		Page: 5 of 13
Software Acceptance Test Plan for the Fukushima Daiichi Accident Database		Identifier: INL/EXT-12-24576 Revision: 0 Effective Date: January 18, 2012

- Timeline
- Recent additions

Manual exercise of the portal was used to test the above functions and all tests have passed.

2.1 Features Not Tested

Like most software-development projects, time and budget constraints prohibit exhaustive testing. The verification effort focuses on the major functions of the portal. For example, the tests performed do not verify use with every browser available to public use.

3. Quality Assurance Test Results

Interaction between the SQA and the development team was on a spot-check basis prior to an official quality assurance test was performed on release 1.0.22. The checklist for this exercise is presented in Appendix 1, Table 1. Issues found during this test included the following:

- The current date and time is kept behind the scenes as Greenwich Mean Time (GMT). The time is then translated to local time for the user to use. A problem arose that if the application sat idle for 20 minutes, it would revert all time to GMT.
 - This was addressed in release 1.0.23 by not automatically logging out a session that is idle for 20 minutes, which is a standard web-application operating procedure.
- When entering a time span for certain functions in the application, such as the component state charting function, there are options for using the canned radio button selected time spans or the time span can be set manually by a calendar and clock pop-up. The problem was that a radio button was left active on the canned time spans so there was no indication of what time span was being selected when manually set.
 - This was addressed in release 1.0.23 by adding a Set Manually button to the radio button field.
- Parameters are created without associating them to an event. When viewed, they are listed if they have times. If the parameter is not yet associated to an event it doesn't have a time assigned to it. Therefore, the possibility of duplicating parameters exists.
 - In release 1.0.23 a prominent note in red was placed on the parameter creation screen to alert the user that parameters do not have date/time information until associated with an event.
- Units in the parameter graphing y-axis, such as "miles" for length, would cause the numbering to show as all zeroes. The opposite case also caused display problems, such as "mm" causing the number display to cut off. There was some discussion as to the usefulness of the availability of very large units such as "miles" and "km", however, it is part of the graphing utility and a solution for the display problem was found.

Idaho National Laboratory		Page: 6 of 13
Software Acceptance Test Plan for the Fukushima Daiichi Accident Database		Identifier: INL/EXT-12-24576 Revision: 0 Effective Date: January 18, 2012

- In release 1.0.23 the numbers display across all selections.

Another test was performed on release 1.0.23 to verify the resolution of issues found and to see if any other issues were created. The test passed all categories.

Idaho National Laboratory		Page: 7 of 13	
Software Acceptance Test Plan for the Fukushima Daiichi Accident Database		Identifier: INL/EXT-12-24576	
		Revision: 0	
		Effective Date: January 18, 2012	

Appendix 1

Test checklist table and results of the two Quality Assurance reviews prior to public release:

Table 1 Quality Assurance test performed on version 1.0.22

Test of Fukushima Daiichi Accident Study Information Portal Revision 1.0.22			
Item	Pass/Fail	Comment/Corrective Action	Image
Contributor Creation	Pass		
Artifact Creation	Pass		
media file links	Pass		
video	Pass		
spreadsheet	Pass		
image	Pass		
word document	Pass		
text	Pass		
pdf document	Pass		
Parameter data	Fail	It is not clear to the user if a parameter is associated to an event.	Repair noted in Appx. 1 Fig. 4
Component state	Pass		
Event Creation	Pass		
Review Creation	Pass		
Review Artifact	Pass		
Review Event	Pass		
Timeline View	Fail	Timeline span not intuitive between manual entry and radio buttons. Can be mis-read that the active radio button is controlling the time span when the manual set points over-ride the radio button.	
Navigation	Pass		
Login Functions	Pass		
Forgotten Password	Pass		
Chart Creation	Pass		
Component State Chart	Fail	Timeline span not intuitive between manual entry and radio buttons. Can be mis-read that the active radio button is controlling the time span when the manual set points over-ride the radio button.	Appx. 1 Fig. 2

Idaho National Laboratory		Page: 8 of 13
Software Acceptance Test Plan for the Fukushima Daiichi Accident Database		Identifier: INL/EXT-12-24576 Revision: 0 Effective Date: January 18, 2012

Parameter Data Chart	Fail	Y-axis labels (numbers) not fitting on charts depending on the units selected.	
Report Creation	Pass		
Items included, events, artifacts, charts	Pass		
Organization	Pass		
Report View	Pass		
Security	Pass		
Navigation of non-public information outside login not allowed	Pass		
Public access does not include copyrighted or controlled information	Pass		
Administrative Functions	Pass		
Add contributor	Pass		
Modify roles	Pass		
Generate Report	Pass		
Home Page Quick Navigation	Pass		
Timeline	Fail	Generally happens throughout the application: GMT shows up instead of local time if the session is idle for 20 minutes.	
Recent additions	Pass		

Table 2 Quality Assurance Test performed on version 1.0.23

Test of Fukushima Daiichi Accident Study Information Portal Revision 1.0.23			
Item	Pass/Fail	Comment/Corrective Action	Image
Contributor Creation	Pass		
Artifact Creation	Pass		
media file links	Pass		
video	Pass		
spreadsheet	Pass		
image	Pass		
word document	Pass		
text	Pass		
pdf document	Pass		
Parameter data	Pass	Added note to make it clear when a parameter is not associated to an event due to time stamp from event being required for parameter tracking	Appx. 1 Fig. 4
Component state	Pass		
Event Creation	Pass		
Review Creation	Pass		

**Software Acceptance Test Plan
for the Fukushima Daiichi
Accident Database**

Identifier: INL/EXT-12-24576
Revision: 0
Effective Date: January 18, 2012

Review Artifact	Pass		
Review Event	Pass		
Timeline View	Pass	A manual select radio button was added to avoid confusion.	
Navigation	Pass		
Login Functions	Pass		
Forgotten Password	Pass		
Chart Creation	Pass		
Component State Chart	Pass	Timeline selection corrected to allow a manual select radio button to activate when the calendar/clock entry is used.	
Parameter Data Chart	Pass	Corrected the problem of numbers not fitting on charts depending on the units selected.	
Report Creation	Pass		
Items included, events, artifacts, charts	Pass		
Organization	Pass		
Report View	Pass		
Security	Pass		
Navigation of non-public information outside login not allowed	Pass		
Public access does not include copyrighted or controlled information	Pass		
Administrative Functions	Pass		
Add contributor	Pass		
Modify roles	Pass		
Generate Report	Pass		
Home Page Quick Navigation	Pass		
Timeline	Pass	The session times out at 20 minutes and requires the user to login again. This corrected the reversion to GMT throughout the application.	
Recent additions	Pass		

Idaho National Laboratory		Page: 10 of 13
Software Acceptance Test Plan for the Fukushima Daiichi Accident Database		Identifier: INL/EXT-12-24576 Revision: 0 Effective Date: January 18, 2012

FUKUSHIMA DAIICHI ACCIDENT STUDY INFORMATION PORTAL
[\[Log In \]](#)


[Home](#)
[Help](#)

WELCOME TO THE FUKUSHIMA DAIICHI ACCIDENT STUDY INFORMATION PORTAL

Portal information is limited access.

Session timed out because of inactivity. New login required.

Please [\[Log In\]](#) or access the [\[Public\]](#) available view



VERSION 1.0.23

DEVELOPED AND MAINTAINED AT THE IDAHO NATIONAL LABORATORY (INL).

Figure 1 Session timed out due to 20 minutes inactivity

**Software Acceptance Test Plan
for the Fukushima Daiichi
Accident Database**

Identifier: INL/EXT-12-24576

Revision: 0

Effective Date: January 18, 2012

FUKUSHIMA DAIICHI ACCIDENT STUDY INFORMATION PORTALWelcome **vedrkg** ! [[Log Out](#)]
[Change Password](#)[Home](#) [Events](#) [Artifacts](#) [Reviews](#) [Views](#) [Tools](#) [Admin](#) [Help](#)**Component State**

Area

Unit1

Time Display Option Japan Standard Time

[Select Page](#)[Clear Page](#)[Select All](#)[Clear All](#)

Area	System	Type	Component
Unit1	AC Power System	Emergency diesel generator	EDG 1
Unit1	AC Power System	Emergency diesel generator	EDG 2
Unit1	DC Power	Battery	125 V Battery
Unit1	Power Conversion	Main steam isolation valve	MSIVs
Unit1	Isolation Condenser	System level event	IC A
Unit1	Reactor Protection	Actuation Train	Reactor
Unit1	Offsite Electrical Power	System level event	Offsite Power Sources
Unit1	Service Water System	Motor driven pump	CCSW

[K](#) [<](#) [1](#) [2](#) [>](#) [X](#)

Page size: 8

12 items in 2 pages

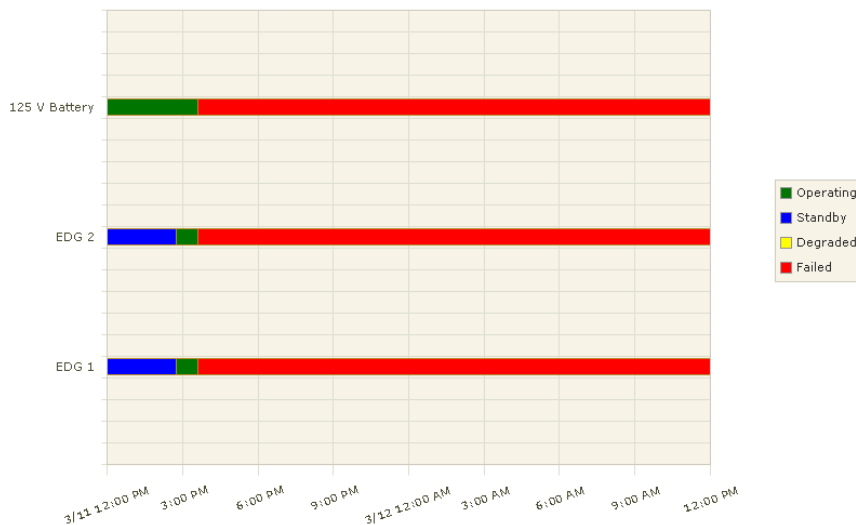
Chart Time Span (JST)

Starting Date/Time

3/11/2011 12:00 PM

Ending Date/Time

3/12/2011 12:00 PM

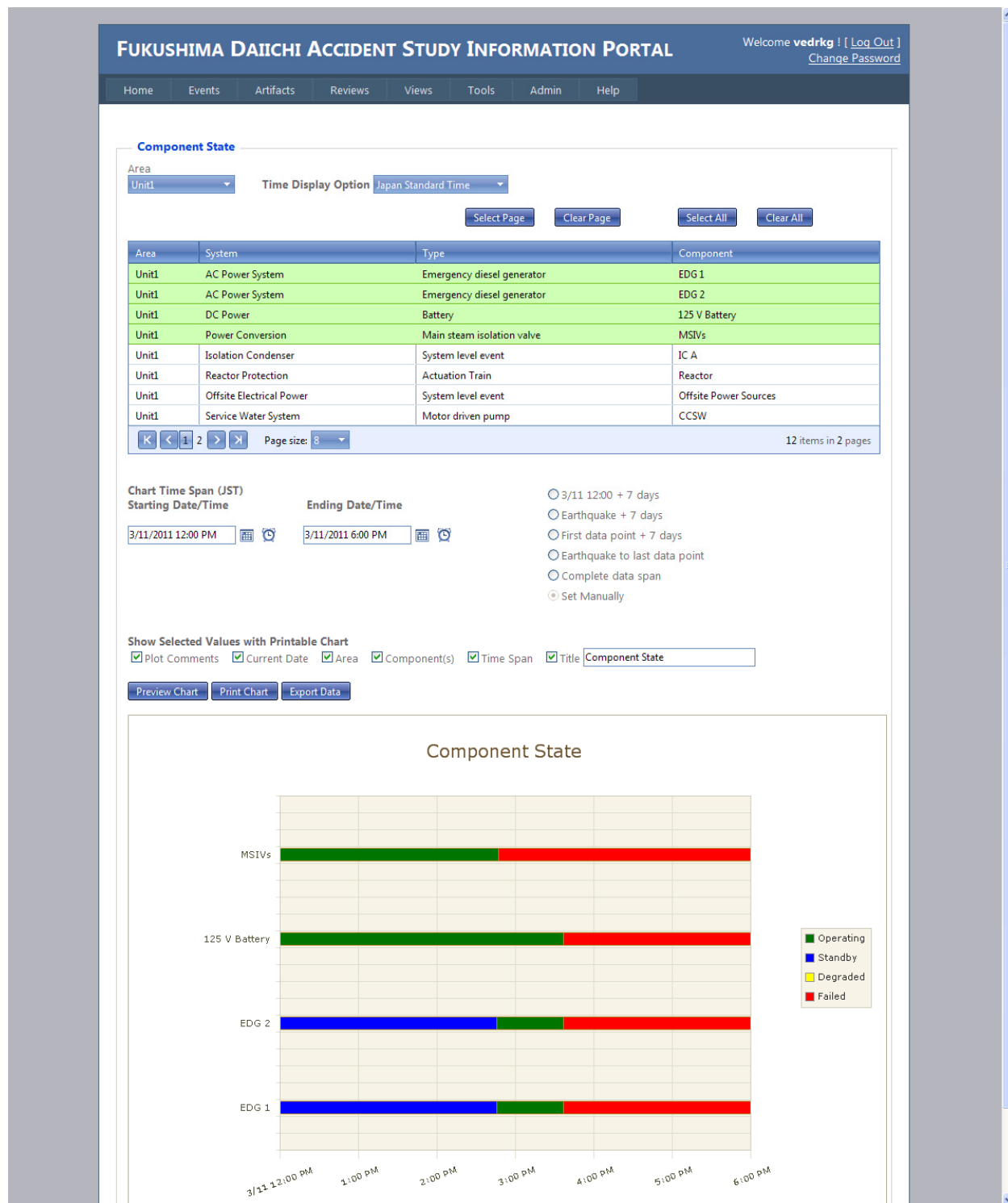
☒ 3/11 12:00 + 7 days☐ Earthquake + 7 days☐ First data point + 7 days☐ Earthquake to last data point☐ Complete data span**Show Selected Values with Printable Chart**☒ Plot Comments☒ Current Date☒ Area☒ Component(s)☒ Time Span☒ Title [Preview Chart](#)[Print Chart](#)[Export Data](#)**Component State****Figure 2 Timeline controlled component state chart that did not have the manual radio button**

**Software Acceptance Test Plan
for the Fukushima Daiichi
Accident Database**

Identifier: INL/EXT-12-24576

Revision: 0

Effective Date: January 18, 2012

**Figure 3 Component state chart with Set Manually radio button**

**Software Acceptance Test Plan
for the Fukushima Daiichi
Accident Database**

Identifier: INL/EXT-12-24576
Revision: 0
Effective Date: January 18, 2012

FUKUSHIMA DAIICHI ACCIDENT STUDY INFORMATION PORTAL Welcome **vedrkg** ! [[Log Out](#)]
[Change Password](#)

Home Events Artifacts Reviews Views Tools Admin Help

Artifact

Artifact Description:

Source Description:

Classification Level: **Public**

Artifact Type: **Parameter Data**

Parameter Values

Area: **Unit1**

Parameter: **Reactor Pressure** [Add New Parameter](#)

Sensor: **Channel A** [Add New Sensor](#)

Measurement: **Level**

Value: **m**

Value Type: **Calculate - MAAP**

Plot Comment

NOTE: Parameter will NOT reflect a date/time until associated with an Event.

[Add Artifact](#) [Cancel](#)

Figure 4 Red NOTE reminder that a parameter must be associated with an event before reflecting a date and time