



CAMP – Cable Aging Management Program

Cable Aging Program Development and Maintenance

The Genesis® Cable Aging Management Program (CAMP) module is a complete cable aging solution. CAMP was designed as a comprehensive, auditable, management tool that provides a centralized source of information for cables in the monitoring program. CAMP is a verified 10 CFR 50 Appendix B compliant module of the Genesis Solution Suite®.

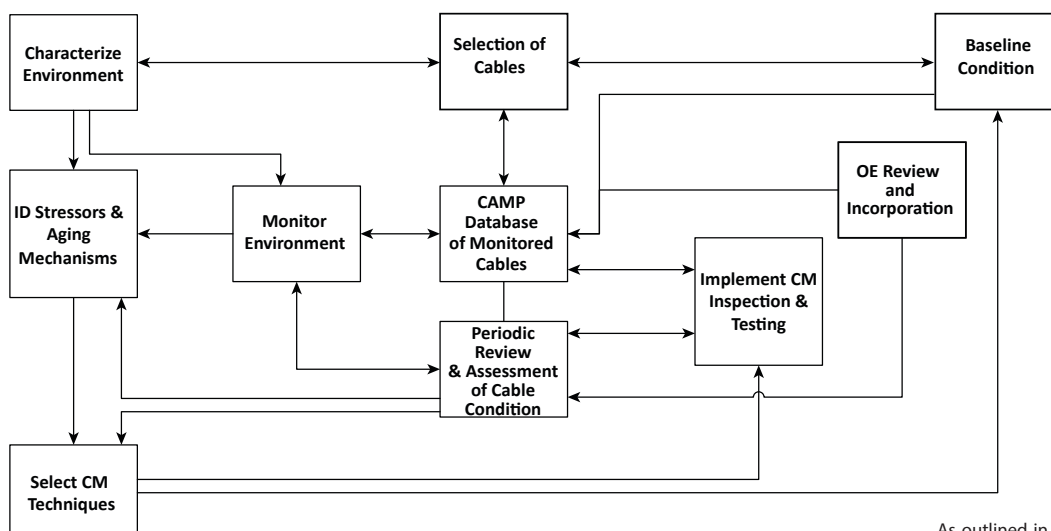
The purpose of the software is to serve as an aid in making program decisions by providing the necessary documentation and data evaluations. As operating experiences, industry guidance and regulatory requirements mature, plant cable aging programs will need to respond accordingly. Flexibility is incorporated in the design of CAMP to allow for program revision and growth, supporting license renewal, and long-term configuration.

Overview

CAMP was developed to align with EPRI and NRC guidance. NUREG/CR-7000 makes recommendations for categories of information to be included in a program database and it details program elements along with their interactions.

Program Elements:

- **CAMP Cable Record**
 - Cable characteristics
 - Justification for program inclusion/exclusion
- **Testing and Monitored Conditions**
 - Acceptance criteria
 - Tracking of Activities
 - Graphical Trending
 - Scheduling and e-mail Notification
- **Adverse Local Environments**
 - Identify stressors and aging mechanisms
- **Risk Ranking**
 - Customizable calculation
- **Compensatory Measures**
 - Tracking of implementation
 - Scheduling and e-mail Notification
- **Operating Experiences**
 - Tracking of review and incorporation



As outlined in NUREG/CR-7000

CAMP Features

Genesis® EDISON Integration

CAMP can be configured in a variety of ways:

- **Standalone CAMP** — to work independently.
- **EDISON CAMP** — to integrate with existing EDISON data.
- **SAFE CAMP** —to integrate with SAFE data.

Standalone CAMP contains data that is only maintained in and is completely editable in CAMP, on the following forms: Cable Codes, Cable Wires, Equipment, Rooms, Raceways and Fire Zones.

CAMP is fully integrated with Genesis® EDISON cable and raceway module. Data is drawn from the EDISON cable record in real-time, including information associated with cable and raceway design changes processed in EDISON. Data associations such as route, jacket material, insulation material, splice detail, etc. is shared seamlessly between modules.

To maintain data integrity, fields that pull from EDISON store data in uneditable cells with a grey background. Fields that are populated by the CAMP user store data in editable cells with a white background.

CAMP Cables Form screen

Import Plant Cables screen

Document and Note records that are linked to a cable in EDISON are available in CAMP. This feature allows the CAMP user to quickly associate relevant references.

Import Plant Cables

The Plant Cable Import Tool allows the user to pull EDISON cables into CAMP by querying on Cable Codes, Raceways, To or From Equipment, Rooms, Fire Zones, or any other cable related information. These cables can then be dispositioned or monitored in CAMP on an individual basis.

CAMP utilizes a normalized relational data table set, which is capable of being integrated with external electrical design tools, such as cable and raceway databases other than EDISON.

Cable Risk Ranking screen

Cable Risk Ranking

Cable: 1DG1-0010/1 Installation Date: 1/1/1983

| RR Category | Risk Ranking Factor | Value | Multiplier Risk Ranking Factor | Value | Applied Value |
|------------------------|---------------------|-------|--------------------------------|-------|---------------|
| VISUAL INSPECTION | VIS_INSP_0 | 0 | | | 0 |
| INITIAL CLASSIFICATION | CLASSIFICATION_1 | 3 | CLASSIFICATION_4 | 1.5 | 4.5 |
| LOCATION | LOCATION_2 | 1 | | | 1 |
| WETTING | WETTING_0 | 0 | | | 0 |
| TAN DELTA TEST RESULTS | TAN_DELTA_TEST_3 | 0 | TAN_DELTA_TEST_6 | 1 | 1 |

Add Row

RR Category Risk Ranking Factor

Additional Factor 1: Value

Additional Factor 2: YEARS OF SERVICE YEARS_OF_SERVICE Value 3

Composite Risk Factor: 9.5 Save

Risk Ranking

The risk ranking calculation is user definable. The cable engineer can define Risk Categories and a subset of Risk Factors within each category. Each Risk Factor can have a value to be applied in the calculation for cables associated with the Risk Item. Risk Factors can be created as 'Multipliers' and the Risk Factors created as multipliers can be assigned to cables.

All cables can use the same calculation, however, the cable engineer has the ability to adjust the calculation on an

individual cable based on the Risk Factors assigned.

Cable Risk Factors may depend upon the cable age. The system automatically adjusts age related Risk Items.

Launch External Documents

All program elements include the capability to link reference documents. Prior to linking, that reference document is created as a stand-alone record to which an electronic file of any format can be tied. When a document is referenced, a view document button is available and will instantly open that document in a new window.

This feature is useful for quick access to highlighted cable route drawings, detailed pictures of local adverse environments, signed test data sheets, or any other relevant electronic document.

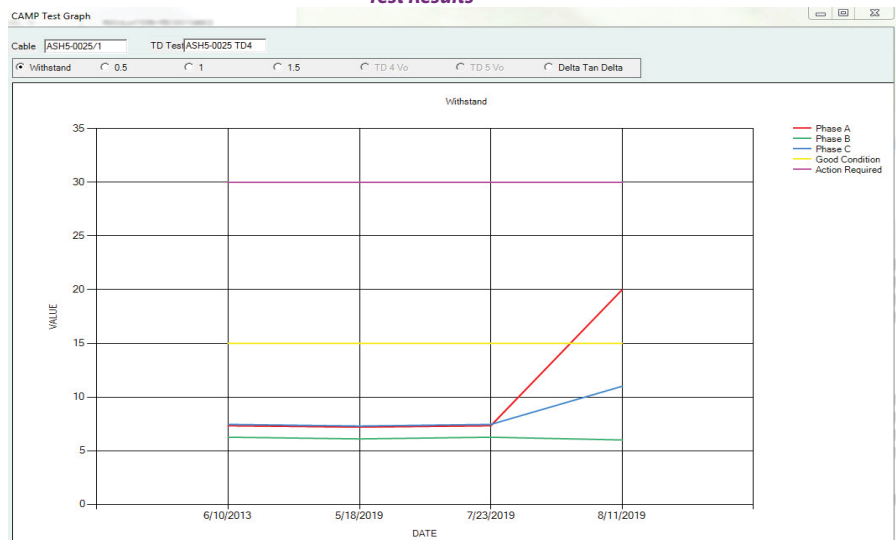
Graphical Trending of Test Data

Test results aggregated for each cable in CAMP are graphically trended to give the program owner a visual aid for program decisions.

Tracking

A tracking ticket is a tool used to schedule, check status and record data associated with program activities (i.e. testing, monitoring, compensatory measures). The scheduling parameters allow for tracking of recurrent events and an e-mail notification, as defined by the user. The data recorded includes acceptance criteria and reference fields for a maintenance program number and a corrective action program number.

Test Results



Tan Delta Report screen

| Tan Delta Test | | | | | |
|--|-------------------------------------|------------------------------------|---------------------------------|---------------|---------------|
| Primary Cable: BSM8-9030/1 | | | Cable Condition: GOOD CONDITION | | |
| Tan Delta Test ID: BSM8-9030 TD1 | Work Order: 02005135 | Test Date: 6/13/2015 | | | |
| Rated Voltage: 5000 | Rating (Kv): 5 | Insulation Type: | | | |
| Test Report | Actual Length (Cable/TD): 765 / 765 | Operating Voltage (V): 4160 | | | |
| Remarks: | | | | | |
| Acceptance Criteria | | | | | |
| Tan Delta | Tan Delta Good Condition: 15 | Tan Delta Action Required: 30 | | | |
| Delta Tan Delta | Delta Tan Delta Good Condition: 3 | Delta Tan Delta Action Required: 8 | | | |
| Standard Deviation | % SD Good Condition: 0.02 | % SD Action Required: 0.04 | | | |
| Test Criteria | | | | | |
| TD Vo Selection: | 0.5Vo | 1Vo | 1.5Vo | Vo | Vo |
| Test Vo: | 1200.89 | 2401.78 | 3602.67 | | |
| Duration: | | | | | |
| Use for DTD: | YES | | YES | | |
| Withstand Voltage (V): | | | | | |
| Test Results | | | | | |
| Withstand | 0.5Vo | 1Vo | 1.5Vo | Vo | Vo |
| Test Voltage: | Test Voltage: 1.2 | Test Voltage: 2.4 | Test Voltage: 3.6 | Test Voltage: | Test Voltage: |
| TD A: 5.69 | TD A: 5.69 | TD A: 5.73 | TD A: 5.69 | TD A: | TD A: |
| TD B: 5.89 | TD B: 5.89 | TD B: 0 | TD B: 5.89 | TD B: | TD B: |
| TD C: 5.67 | TD C: 5.67 | TD C: 0 | TD C: 5.67 | TD C: | TD C: |
| % SD A: 0 | % SD A: 0 | % SD A: 0 | % SD A: 0 | % SD A: | % SD A: |
| % SD B: 0 | % SD B: 0 | % SD B: 0 | % SD B: 0 | % SD B: | % SD B: |
| % SD C: 0 | % SD C: 0 | % SD C: 0 | % SD C: 0 | % SD C: | % SD C: |
| GOOD CONDITION | GOOD CONDITION | GOOD CONDITION | GOOD CONDITION | | |
| Associated Cables: BSM8-9030/1 BSM8-9030/4 | | | | | |
| | | BSM8-9030/2 | | BSM8-9030/3 | |
| Associated Notes: NO RECORDS FOUND | | | | | |
| Associated Documents: NO RECORDS FOUND | | | | | |

Reports

Standard reports document the real-time status of program elements. CAMP generates this documentation in a format that can be exported to the Microsoft Office suite.

Ad Hoc Query Tool

CAMP provides a graphical query tool for accessing the CAMP data set (and the EDISON and/or SAFE data set) based on the CAMP configuration.

Configuration Management

CAMP features an integrated revision process to support program changes from inception through closeout. The cable records under revision are statused by using electronic signatures for preparer, reviewer, and approver. Upon approval, the revised record becomes the live program record and an electronic history report is created for the superseded version. A history report is created as a .pdf file that is viewable from within the module, or as an independent document.

User Security/Ownership

The Genesis® administration tool enables the System Administrator to control, read and write access to all CAMP tables and fields, based on user or group privileges. The tool enforces ownership of program records, allowing multiple users to maintain control over the data.

For more information, contact Vincent Renzi at vrr@epm-inc.com or 508-532-7167

CAMP Version 3.0.0

CAMP DEPLOYMENT REQUIREMENTS:

Server:

Database Management System
Oracle® 10g (or greater)
Operating System - Microsoft® Windows Server 2012 or Unix/Solaris
Disk Space - 6 GB (minimum)
Memory - 6 GB (minimum)

Client:

Operating System - Microsoft® Windows 7 or greater
Disk Space - 4 GB
Memory - 6 GB (minimum)
Microsoft® .NET Framework 4.6.1



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