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Do not include proprietary materials.*

DATE OF MEETING
06/13/2000

The attached document(s), which was/were handed out in this meeting, is/are to be placed in the public domain as soon as possible. The minutes of the meeting will be issued in the near future. Following are administrative details regarding this meeting:

Docket Number(s)	PROJECT NUMBER 669
Plant/Facility Name	EPRI
TAC Number(s) (if available)	
Reference Meeting Notice	MAY 19, 2000
Purpose of Meeting (copy from meeting notice)	DISCUSSION OF EPRI REPORT ON SINGLE LOOP CONTROLLERS

NAME OF PERSON WHO ISSUED MEETING NOTICE
L.N. OLSHAN

TITLE
PROJECT MANAGER

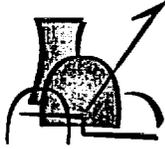
OFFICE
NRR

DIVISION
DLPM

BRANCH
PD II-1

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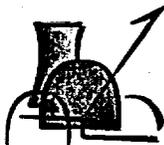


EPRI / Utility / NRC Meeting 'Generic Qualification' of Single Loop Controllers

**June 13, 2000
White Flint, Md**

IEEEequal1099

EPRI

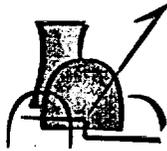


Purpose of this Meeting

- **'Generic Qualification' project represents pilot applications of EPRI COTS guideline, TR-106439**
- **Want to gain assurance that approach and results will be successful in future applications**
- **In this meeting we want to explore and understand options for NRC review of project deliverables**
 - **type and content of submittals**
 - **mechanisms for staff feedback**
 - **cost / schedule of review cycle**
 - **benefits / usefulness in future implementations**

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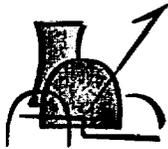


Contents

- **Project Review** **20 min**
 - **Background**
 - **Activities**
 - **Results**
 - **Reports**
- **Future Interaction with staff** **20 min**
 - **Options**
 - **Goals**
- **Discussion** **TBD**

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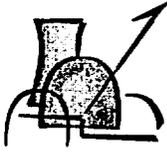


“Generic Qualification” Project

- **Minimize utility cost and effort to use components in safety-related applications**
- **Target candidate replacements for obsolete components**
- **Apply latest EPRI and NRC guidance**
- **Plan, perform, and document required tests, analyses, evaluations, surveys, etc.**
- **‘Generic’ = independent of plant application**

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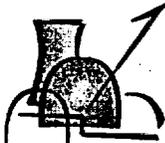


EPRI Guidelines on Use of Commercial Digital Equipment

- **EPRI TR-106439, *Guideline on Evaluation and Acceptance of Commercial Grade Digital Equipment for Nuclear Safety Applications*, October 1996.**
 - 'What-to-do' guidance based on NP-5652 approach
 - Developed by utility/supplier/EPRI working group
 - Endorsed by NRC in SER, July 1997
 - Referenced in SRP
- **EPRI TR-107339, *Evaluating Commercial Digital Equipment for High Integrity Applications, a Supplement to EPRI Report TR-106439*, December 1997.**
 - More detailed, 'how-to' guidance

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Popular Components

Smart transmitters

Single loop controllers **

Recorders

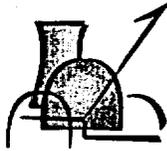
Timing Relays

P and Δ P switches

** 1st to be evaluated

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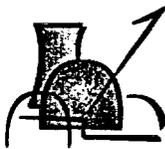
Single Loop Controller

Basic Functional Requirements

- Read process variable input (4-20 mA)
- Read a remote setpoint input (4-20 mA)
- Perform proportional-integral-derivative (PID) control algorithm
- Produce corresponding control output (4-20 mA)
- Generate one or two discrete (on/off) outputs that can be switched (e.g., generate alarm output if process variable exceeds a setpoint)

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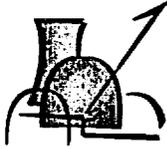
Single Loop Controller, cont'd

Complexity

- Several control algorithms available
- Requires 'configuration' or 'application software'
- Could incorporate other features, e.g.
 - TC compensation
 - Sensor signal validation
 - Self diagnostics
- Still simple compared to PLC
- Complex compared to panel meter

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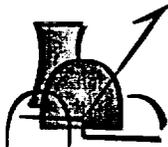


Qualification Activities

- **Seismic testing IEEE 344-1987**
- **EMC testing EPRI TR-102323 R1**
- **Functional & challenge testing**
- **Critical digital review**
 - **software architecture**
 - **failure modes**
 - **abnormal behaviors**

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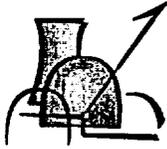


Qualification Activities, cont'd

- **Operating history assessment (non-nuclear)**
- **Review vendor processes & documentation**
 - **software development**
 - **configuration management**
 - **corrective actions**
 - **manufacturing**
- **Assess preponderance of evidence for 'reasonable assurance'**

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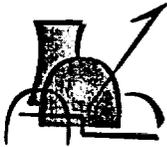


General Results

- Evolutionary development
- Experienced development team
- Good manufacturing controls
- Successful operating history
- Software development documentation lacking
- "Continue to run" design philosophy
- Limited diagnostics
- Failed parts of EMC tests

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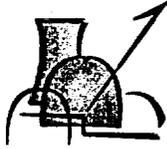


Preliminary Conclusions

- Controllers OK for "supporting" safety apps
 - PID control only
 - EMC issues need closure
- Application-specific issues not addressed
- Anticipate implementations under 50.59
 - High quality, improved reliability
 - No new malfunction results
- Good pilot project
 - Real device
 - Real limitations
 - Engineering judgment

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Generic Qualification Plans

- **Develop/demonstrate EMC fixes**
- **Explore options for NRC review**
- **Several precedents likely**
 - **Automated test equipment**
 - **EMC mitigation - filter, shield, other**
 - **Use of operating history**
- **Streamline process for future components**
- **Now starting work on smart transmitters**

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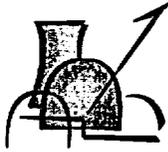


Interaction with Staff - Goals

- **Support specific SLC implementations**
- **Gain confidence that future implementations of COTS components will be 'successful'**
 - **Technically adequate**
 - **Predictable regulatory treatment**
 - **qualification / dedication**
 - **10 CFR 50.59 rationale**
 - **software CMF treatment**

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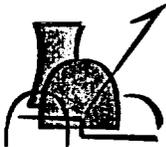


'Option 0' - No Submittal to NRC

- **Implementations of SLCs would reference EPRI qualification reports**
 - **Qualification**
 - **Dedication**
 - **10 CFR 50.59 evaluations**
- **Expect implementations to be done under 50.59**
- **Utility concern about regulatory risks**
 - **High review costs for many submittals**
 - **Problems discovered after installation**
 - **Unclear regulatory position**

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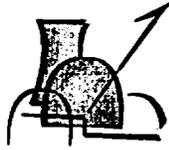


'Option 1' - SLC Qualification Reports (2)

- **Contents**
 - **Applies to specific brand / model number device**
 - **Descriptions of qualification / evaluation activities**
 - **All evaluation and test results**
 - **Conclusions and limitations of 'generic qualification'**
- **Size of document - approx. 600 pages**
- **Vehicle for staff comments - SER (one for each device)**

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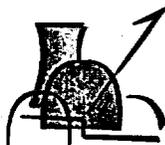


'Option 1', cont'd - SLC Qualification Reports

- **Anticipated review fees \$112 - \$225K for each report**
- **Schedule ???**
- **Benefits of SERs in SLC implementations**
 - **Qualification results**
 - **10 CFR 50.59 considerations**
 - **Software CMF resolution**
 - **.....**
- **Applicability of SERs to other components ???**

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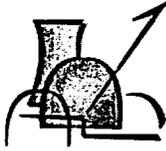


'Option 2' - Case History Appendix to TR-106439

- **Contents**
 - **Not vendor / model specific**
 - **Focus on strategy and activities used in application of TR-106439, e.g.,**
 - **selection of tests and evaluation activities**
 - **use of operating history**
 - **use of automated test equipment**
 - **rationale for compensation for deficiencies**
 - **Summary of test results**
 - **Discusses conclusions / limitations**

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**'Option 2' cont'd -
Case History Appendix to TR-106439**

- **Size of document - approx. 50 pages, to be published as an appendix to TR-106439**
- **Vehicle for staff comments - Revise SER on TR-106439 ???**
- **Anticipated review fees - we would request review under NRC generic issues budget**
- **Schedule ???**
- **Benefits / applicability of SER to SLCs ???**
- **Applicability of SER to other components ???**

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