50-317/318

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 24, 1996

ORGANIZATION: Baltimore Gas and Electric

SUBJECT: SUMMARY OF MEETING WITH BALTIMORE GAS AND ELECTRIC COMPANY (BGE) ON BGE LICENSE RENEWAL ACTIVITIES

On September 11, 1996, the Nuclear Regulatory Commission (NRC) management met with Baltimore Gas and Electric (BGE) management to discuss the results of the first phase of a two phase review for the five Integrated Plant Assessment (IPA) System and Commodity Reports submitted May 22, 1996. Attachment 1 is a list of attendees and Attachment 2 is a copy of the materials distributed during the meeting.

During the meeting, BGE presented an overview of the activities completed during the first phase of the review and some observations from BGE's perspective. The NRC staff summarized the key issues identified during the first phase of the review, as well as some observations from the NRC's perspective and the staff's conclusions. The NRC staff concluded that the BGE IPA System and Commodity Report Template (August 30, 1996, template version) should result in reports with sufficient format and content for the staff to begin a technical review if implemented properly. During the NRC presentation, NRC management provided some additional clarification on the intended function issue. NRC management stated that the discussion of intended functions should also include the identification of the loading conditions under which the intended function of the structures and components must be maintained.

At the conclusion of the meeting, the NRC management noted that although agreements in principle have been reached for each of the key issues discussed, BGE has not revised, nor has the staff reviewed, any of the reports that implement the agreements reached. Therefore, NRC management proposed a 90-day effort to fully exercise the template with respect to these key issues. BGE agreed to the proposal.

DF01

September 24, 1996

Following the meeting, the staff toured the Calvert Cliffs Nuclear Plant. Attachment 3 is a copy of the materials distributed during the tour.

Original Signed By:

Scott C. Flanders, Project Manager
License Renewal Project Directorate
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

Docket Nos.: 50-317 and 50-318

Attachments:
1. Attendance List
2. Meeting Handouts
3. Tour Handouts

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ATTENDANCE LIST
NRC MEETING WITH BALTIMORE GAS AND ELECTRIC
September 11, 1996

	NAME	ORGANIZATION
1.	Scott Flanders	NRC/NRR/DRPM/PDLR
2.	Scott Newberry	NRC/NRR/DRPM/PDLR
3.	P. T. Kuo	NRC/NRR/DRPM/PDLR
4.	A. W. Dromerick	NRC/PDI-1
5.	Sam Lee	NRC/NRR/DRPM/PDLR
6.	Scott Stewart	NRC/SRI - Calvert Cliffs
7.	R. E. Denton	BGE/Sr. Vice President
8.	W. T. Russell	NRC/NRR/Director
9.	T. T. Martin	NRC/NRR/DRPM/Director
10.	C. H. Cruse	BGE
11.	W. J. Lippold	BGE
12.	Tricia Heroux	for EPRI
13.	P. G. Chabot	BGE
14.	T. J. Camilleri	BGE
15.	M. E. Bowman	BGE
16.	B. M. Tilden	BGE
17.	Don L. Shaw	BGE
18.	Barth W. Doroshuk	BGE
19.	Karl R. Neddenien	BGE
20.	Alice Carson	Bechtel
21.	Robin Briggs	BGE
22.	Rebecca McSwain	BGE
23.	C. H. Poindexter	BGE
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ATTACHMENT 1

License Renewal Discussions with U S Nuclear Regulatory Commission

Barth W. Doroshuk
Principal Engineer

September 11, 1996

Presentation Objectives

- Review objectives of 90-day effort
- Discuss effort and status of deliverables
- Discuss BGE observations
- Discuss where we go from here

May 22, 1996 Submittal Overview

Submittal Included:

- Main Feedwater System IPA Report and Aging Management Report
- Area and Process Radiation Monitoring IPA Report and Aging Management Report
- Diesel Fuel Oil System IPA Report and Aging Management Report
- Component Supports Commodity IPA Report and Aging Management Report
- Class I Structures IPA Report and Associated Aging Management Reports

Primary Objectives of BGE's Request for Review

- BGE requests NRC review and approve as meeting requirements of 10 CFR 54.21 (a) and 10 CFR 54.29 (a) (1)

- Should BGE submit application for renewed licenses it will reference this review and approval as allowed by 10 CFR 54.17 (e)

Secondary Objectives of BGE Submittal

- Resolve uncertainty(s) regarding technical information to be included in application to support demonstration
- Develop "Template" for License Renewal Application

Proposed Review Approach

- Two-stage review to be initiated:

Stage 1

- Initiate technical reviews on scoping and aging evaluation
- Develop "Template" and representative technical information to support demonstration using selected sections of all five (5) reports
  - » 90 day effort estimated

Stage 2

- Continue/complete NRC reviews
- Upgrade May 22, 1996 submittal reports
- Follow on submittals will be based on template developed

Stage 1 Milestones

- May 30th - Kickoff Meeting
  BGE delivers template Phase 1 (scoping)
- June 13th - NRC comments on template Phase 1
  BGE delivers template Phase 2 (aging mgmt)
- June 20th - NRC comments on template Phase 2
- July 3rd - BGE delivers Phase 1 samples
- July 18th - NRC comments on samples
- July 25th - BGE delivers Phase 2 samples
- Aug 8th - NRC comments on samples
- Aug 14th - Open issues discussed
- Aug 30th - Remaining issues settled
  NRC delivered RAIs

Stage 1 Deliverables

- Template for development of a License Renewal Application (technical content only)
  - Completed
- Exercised template across submittal topics
  - Completed
- 1st phase RAIs for the reports submitted May 22, 1996
  - Completed

BGE Observations

- BGE believes effort helped achieve another plateau of stability in LR process
- Template establishes guardrails for LRA but will not cover every detail
- One category of information will still be difficult to capture perfectly every time - Operating Experience
- BGE reconciled the comments received as a result of NEI Pilot Demonstration NRC visit
  - 100% of "level of detail" comments have been addressed as a result of this effort
  - Only open items involve TLAA technical and FSAR supplement effort

Next Steps

- Complete NRC reviews on current submittals
- Re-submit reports
- Complete balance of technical submittal preparation and submit

Status of System and Commodity AMRs

COMPLETED

- Feedwater (1)
- Containment Structure/System (1)
- Component Supports (1)
- Other Structures (1)
- Diesel Fuel Oil (1)
- Radiation Monitoring System (1)
- Auxiliary Building (1)
- Cranes & Fuel Handling (2)
- Reactor Vessel Internals (2)
- Reactor Vessel (2)
- Compressed Air (2)
- Electric Panels (2)
- Fire Protection (2)

(1) May 22, 1996 submittal; first group to be finalized with template

(2) Schedule for NRC submittal being evaluated

SEPTEMBER 1996

SYSTEM / STRUCTURE REPORT	COMPLETION SCHEDULE
Spent Fuel Pool Cooling	3rd Quarter
Auxiliary Feedwater	3rd Quarter
Environmental Qualification	3rd Quarter
Compressed Air	3rd Quarter
Main Steam	3rd Quarter
NSSS Sampling	3rd Quarter
Salt Water Cooling	4th Quarter
Heating, Ventilation & Cooling Systems	4th Quarter
Reactor Coolant System	4th Quarter
CVCS	4th Quarter
Safety Injection	4th Quarter
Containment Spray	4th Quarter
Time Limited Aging Analyses	1st Quarter 97
Containment Isolation Only	1st Quarter 97
Small Instrument Lines	1st Quarter 97

Baltimore Gas and Electric License Renewal Meeting

SEPTEMBER 11, 1996

Lusby, Maryland

SUMMARY OF 90 DAY REVIEW

- The staff completed its initial review of the scoping, intended functions, and aging effects portion of the five reports submitted May 22, 1996, and issued an RAI for all five reports on August 30, 1996.

- The staff reviewed and commented on the BGE template

  - The staff used 10 CFR Part 54 and the Nuclear Energy Institute (NEI) draft document NEI 95-10, Revision 0 as guidance.

  - The staff agreed to expand the scope of the template to include scoping, intended functions, and aging effects.

  - The staff reviewed examples BGE prepared to demonstrate its implementation of the template.

  - The staff identified 5 issues associated with BGE's implementation of the template.

  - Meetings were held with BGE to discuss these issues.

SUMMARY OF ISSUES

Issue: In reviewing the five examples, the staff noted inconsistencies in BGE's implementation of the "template".

Status: BGE has stated that this issue will be addressed in the revised reports.

Issue: On July 3, BGE proposed that a process with the ability to generate an onsite "list" of structures and components (SCs) subject to an aging management review is sufficient to serve as the on-site documentation that identifies the SCs subject to an aging management review.

Status: On August 30, 1996, BGE clarified the on-site documentation which it believes is readily available and identifies the SCs subject to an aging management review.

Issue: BGE did not believe it was necessary to discuss corrective actions as a part of the aging management program in the template because corrective actions are already required by Appendix B to Part 50.

Status: Changes were made to the template that discuss BGE's corrective action program.

SUMMARY OF ISSUES

Issue: The template requires BGE to identify the portion of the system within scope and the reason why. The staff noted that BGE did not, specifically, identify why the portion of the system identified is within scope.

Status: BGE agreed to provide a discussion that describes why the system is within the scope of license renewal and the role the system plays in each regulated event (SBO, ATWS, FP, etc).

Issue: BGE is reluctant to provide operating experience as the technical justification that existing programs are adequate to manage the effects of aging for the period of extended operation.

Status: BGE has agreed to provide relevant operating experience or historical results as they contribute to decisions made during the conduct of the IPA with respect to plant aging and, in some cases, program effectiveness. The staff believes operating experience should be included when demonstrating the effectiveness of existing programs.

CONCLUSION

- The staff concludes that when properly implemented, the template should result in reports with a format and content sufficient for the staff to begin a technical review.

License Renewal Inspection Discussions

September 11, 1996

ATTACHMENT 3

Discussion Topics

- **Age Related Degradation Inspections**
  - Introduction to ARDIs
  - Cabling ARDI
  - Fluid system ARDI
- **License Renewal Fatigue Issues**

Purpose of Age-Related Degradation Inspections for License Renewal

- **To provide additional assurance that the effects of aging are being managed or need not be managed for the period of extended operations.**
  - e.g. a particular design feature is preventing aging from occurring as designed (wrapped underground piping).
  - e.g. a particular mitigation/prevention program is actually preventing the effects of aging (chemistry control of water in the feedwater piping).

ARDI vs Current Plant Operations

- ARDIs are restricted to circumstances where there is no concern for the effects of aging on current plant operations.
- If aging effects are a concern for current plant operations, an aging management program will be credited for license renewal.

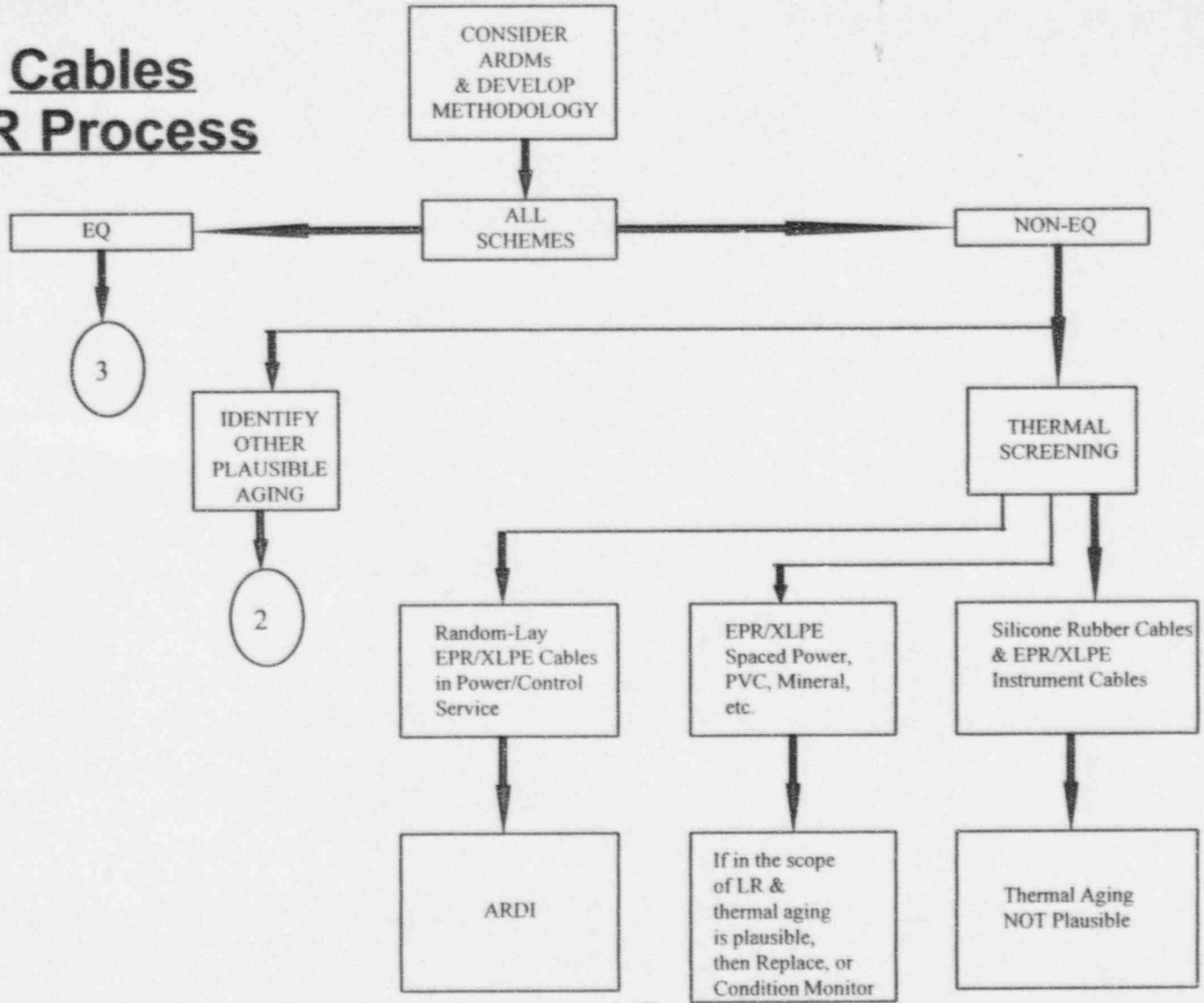
ARDI Characteristics Under Development

- Population requiring coverage.
- Inspection techniques to be used.
- Sample size selected to bound or represent the population.
- Corrective action and follow-up.
- When to schedule the inspections -
  - Maximize inspections of opportunity coincident with other plant events.
  - Credit well-documented past inspections as appropriate.

Examples of ARDIs Under Development

- **Two ARDIs will be discussed today.**
  - Electrical cables - Carl Yoder
  - Fluid piping systems - Todd Conner
- **Others under development.**
  - Normally inaccessible structural steel locations.

Cables LR Process



Thermal Screening

(1) Determine a 60 year service limiting temperature for each insulation material in use.

EPR - 184F	XLPE - 182F
SR - >194F	PVC - 112F (None in scope of LR)

(2) Determine if ohmic heating of the cable is a factor.

- Ohmic heating is not a factor for Instrumentation Cables.

(3) Determine maximum ambient temperatures to which cables are exposed.

- 160F

(4) Determine which cables are not subject to significant thermal aging during 60 years of service; i.e., operating temperature does not exceed 60 year service limit.

- 13,573 Instrumentation Service Cables
- 11,677 Power Service Cables *

* Bulk of these cables are Silicon Rubber insulated for which the 60 year service limiting temperature exceeds the plant derated insulation temperature rating. Some EPR cables with maintained cable spacing are also included.

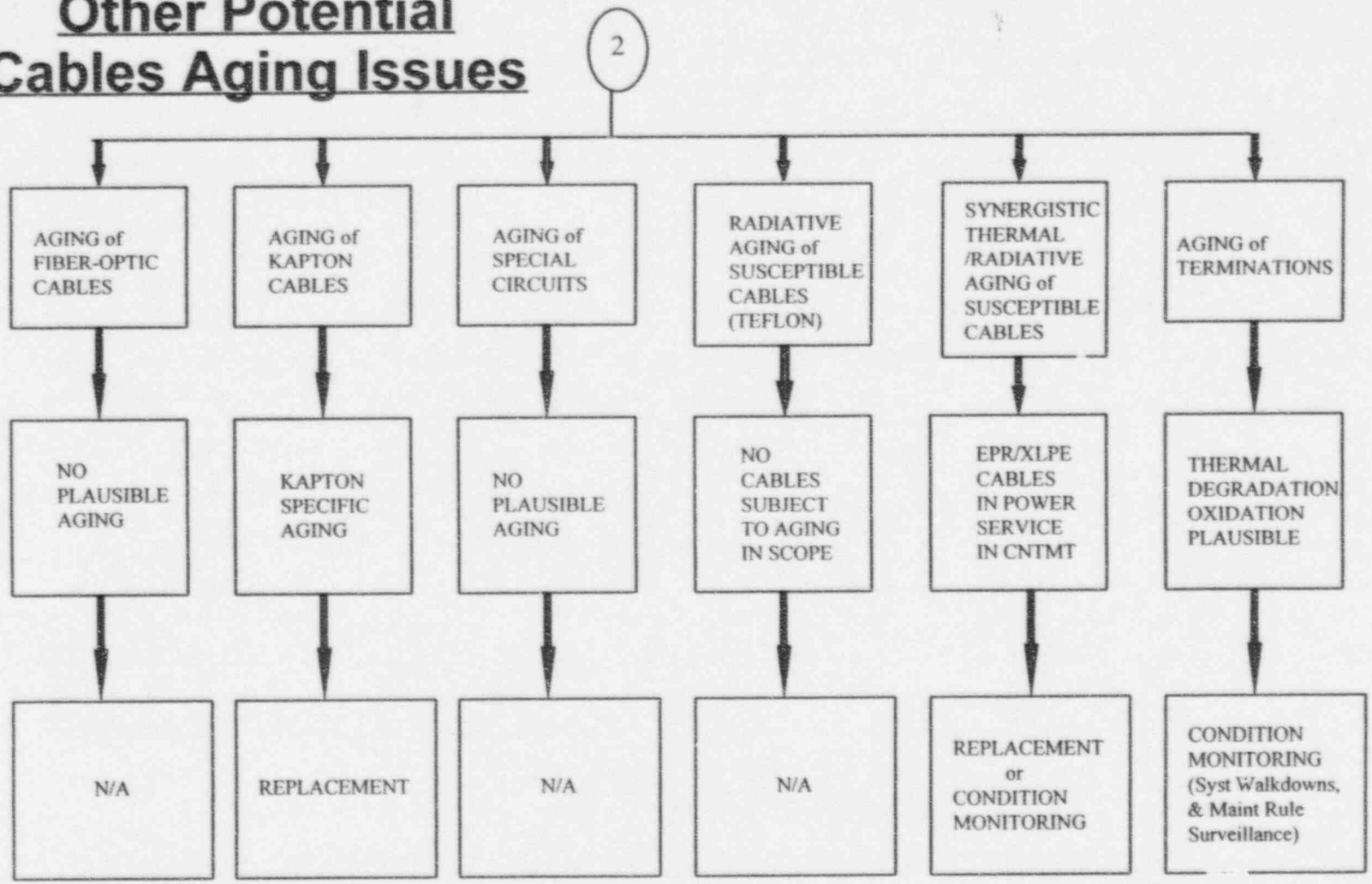
Random-Lay Pwr/Cntrl Service ARDI

- Needed to assess approximately 1000 EPR, XLP cables in power and control service.
- Development of an all-encompassing model to predict internal cable bundle temperature is not feasible due to the wide range of factors affecting cable service temperature.
  - All cables in the target group were considered whether in or out of LR scope.
- Process steps -
  (1) Rank all 480V continuously energized power service cables by a simple model.
  (2) Identify cable routing features affecting convective cooling of cables.
  (3) Perform a thermal survey of candidate "hot" tray locations.
  (4) Install temperature probes at best locations.
  (5) Collect service temperature data over sufficient time to capture peak operating temperatures.
  (6) Compare data with 60 year service limiting temperatures.

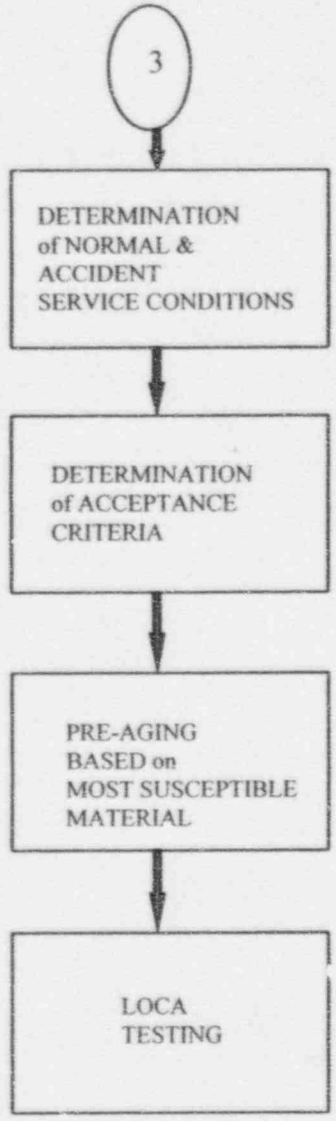
Status of Cables ARDI Development

- Identify plausible aging.
- Develop ranking scheme to determine sample points.
- Apply ranking scheme to population to identify target groups for monitoring.
- → Gather data from selected sample points. (i.e. temperature monitoring).
  - In bundle temperature probe installation/monitoring in progress.
- Identify other aging management programs needed (if any) based on results of monitoring.

Other Potential Cables Aging Issues



EQ Cables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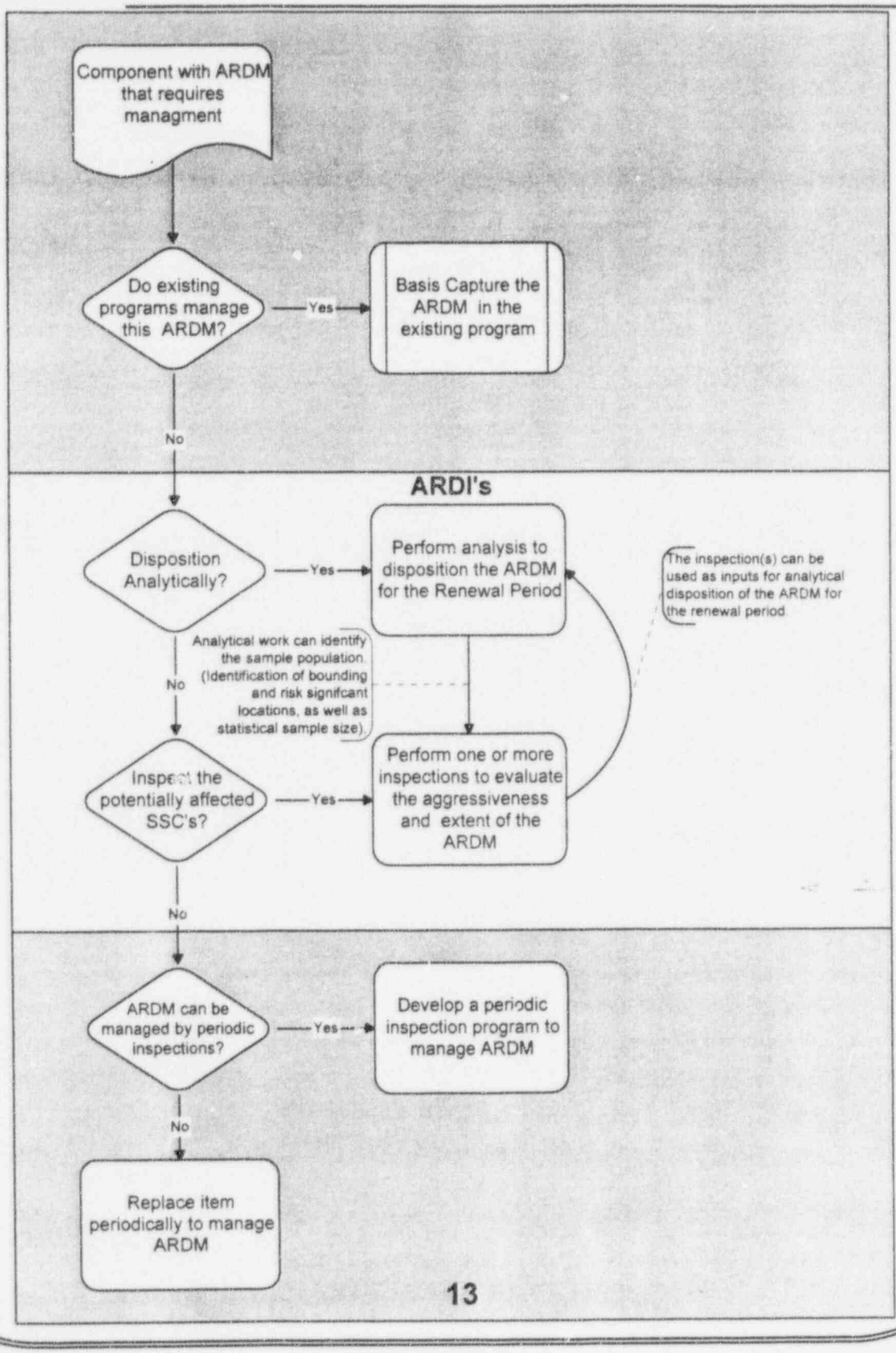
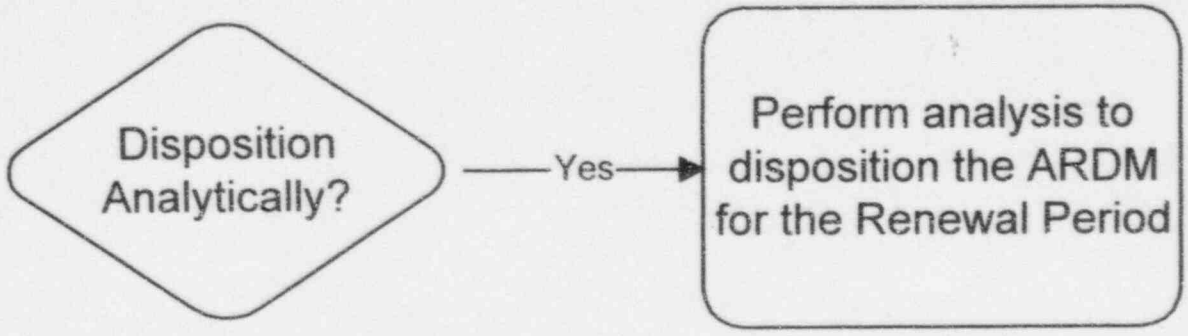
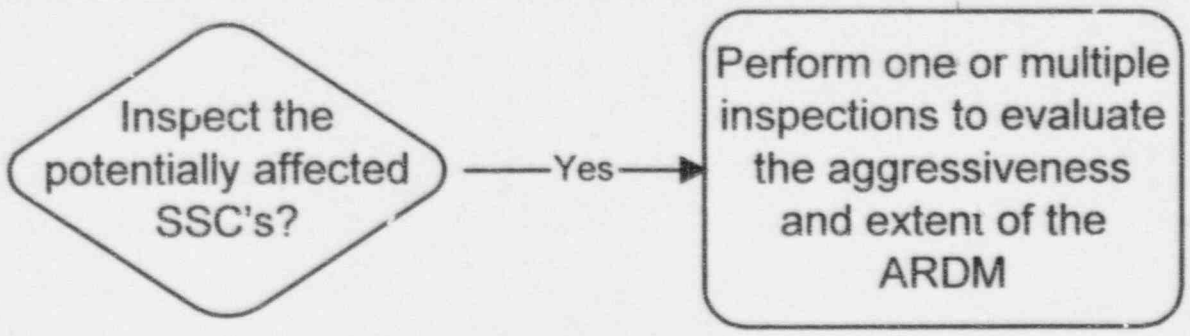
DETERMINATION of NORMAL & ACCIDENT SERVICE CONDITIONS
DETERMINATION of ACCEPTANCE CRITERIA
PRE-AGING BASED on MOST SUSCEPTIBLE MATERIAL
LOCA TESTING


Component with ARDM that requires managment
Do existing programs manage this ARDM?
Yes
Basis Capture the ARDM in the existing program
No
ARDI's
Disposition Analytically?
Yes
Perform analysis to disposition the ARDM for the Renewal Period
The inspection(s) can be used as inputs for analytical disposition of the ARDM for the renewal period
No
Analytical work can identify the sample population (Identification of bounding and risk signifcant locations, as well as statistical sample size).
Inspect the potentially affected SSC's?
Yes
Perform one or more inspections to evaluate the aggressiveness and extent of the ARDM
No
ARDM can be managed by periodic inspections?
Yes
Develop a periodic inspection program to manage ARDM
No
Replace item periodically to manage ARDM



Use of Analytical Methods - Considerations

- Plausibility is dependent on particular material properties that can be established.
  - Delta ferrite (thermal embrittlement)
  - Yield stress (SCC)
  - Copper/nickel content (neutron embrittlement)
- Direct measurement of aging effect is not feasible or practicable.
  - Thermal embrittlement
  - Radiation embrittlement



Use of Inspection Methods - Considerations

- Plausibility is unlikely but the material/environment may be conducive to the aging effect.
- The material and environmental factors affecting the ARDM are not well established prior to the period of extended operation.
- The aging effect is sensitive to material, fabrication, installation, or environmental variables that aren't possible or practicable to establish with sufficient certainty.
- The aging effect is known to proceed very slowly for the material/ environment, component failure consequences are high, the effect and existing discovery activities cannot be shown to bound the component with sufficient assurance.
- Direct measurement of aging effect is feasible and practicable.
- Can inspections at other plants demonstrate non-plausibility for CCNPP?

Status of ARDI Development for Fluid Systems

- Population being identified.
- Actively working with industry groups (ASME) to address technical aspects of certain aging mechanisms.
  - e.g. small bore piping for Class 1 systems.
- Define work scope for EPRI sponsored pilot project by end of October '96.
- Anticipate methodology for ARDI completed 2nd quarter '97.
- Inspections to be completed prior to end of current operating license.

License Renewal Fatigue Issues

1. CCNPP has an extensive Fatigue Monitoring Program (FMP) for Class 1 SCs currently in place. Enhancements to this program are being evaluated for two reasons -
   A. To address thermal stratification under the current license per NRC Bulletins 88-08 and 88-11, IE Bulletin 79-13, INFON 91-38 and 93-20.
   B. To resolve the LR TLAA associated with fatigue including -
      - GSI 166 (GSI 78 rolled into 166);
      - Environmental concerns, including regulatory assessment of NUREG/CR-6260;
2. A pilot project is in progress to address both of these potential issues.

Description of Project to Evaluate FMP Enhancements

1. Development of Methodology
   - A. Methodology will specify what fatigue history/data is necessary.
   - B. The methodology will include methods to address NRC issues such as environmental effects and thermal stratification.
   - C. Program will contain specific details necessary to manage fatigue for period of extended operations.

Description of Project to Evaluate FMP Enhancements (Cont.)

2. Methodology Testing

   A. The methodology will be executed on three identified CCNPP groups of SCs.

   B. The SCs are -

      » PZR surge line (Class 1 with thermal stratification),

      » Charging/letdown (Class 1/2), and

      » Feedwater (Class 2 with thermal stratification)

Description of Project to Evaluate FMP Enhancements (Cont.)

3. System evaluations will provide:
   - A. Condition of CCNPP current design basis with respect to new issues;
   - B. Acceptability of FMP to manage fatigue given these new issues;
     - » Monitoring correct transients/critical components.
     - » Inclusion of special conditions such as environmental effects and thermal stratification.
     - » Potential extension of FMP to non-class 1 SCs for LR.

Status of FMP Evaluation Project

- Methodology and pilot application scheduled to be completed by March 97.
- Once methodology is applied to other systems, results will classify SCs into four categories -
  - Already included in FMP with no further action needed. (e.g. RPV studs)
  - Included in FMP but enhancements to FMP are needed to address new issues. (e.g. accounting for thermal stratification in the PZR surge line)
  - Not in FMP, but needs to be added to account for thermal fatigue issues. (e.g. potentially the NSSS sampling valves)
  - Thermal stresses are such that fatigue is not plausible and no management is needed for this aging effect. (e.g. Service Water System)