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GUIDELINE FOR THE MANAGEMENT OF MATERIALS ISSUES

May 2003

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Guideline for the Management Of Materials Issues

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1. EXECUTIVE SUMMARY

The Industry Guideline for the Management of Materials Issues outlines the policy and practices that the industry commits to follow in managing materials aging issues. The guideline:

- documents the formal Industry Initiative on Management of Industry Materials Issues (the “Initiative”)
- states the policy upon which the Initiative is based
- defines the roles and responsibilities of the two groups established to oversee industry performance on the Initiative
- outlines the responsibilities of the utilities, the industry materials issue programs and INPO in supporting the Initiative and this guideline.

More specifically, the industry’s policy for managing materials issues (the “Policy”) provides the framework within which all materials degradation and aging management work will be performed. The guidelines define the scope to which they apply and provide guidance on how the utilities and the issue programs they fund operate to ensure that the Policy is effectively implemented. Two groups, one executive and one technical, are established under the NEI Nuclear Strategic Issues Advisory Committee (NSIAC) structure to assist the utilities and issue programs in Policy implementation. These two groups will not be directly involved in technical work, which will continue to reside in the relevant issue programs; rather they will provide a focal point that maintains an overall coordination and integration of the ongoing and needed work to meet the goals and monitor effective Policy implementation.

2. POLICY

2.1. Industry Initiative on the Management of Materials Issues

The Industry Initiative on Management of Materials Issues commits each nuclear utility to adopt the responsibilities and processes described in this document. The following commitment was adopted by the NSIAC as a formal Industry Initiative in May 2003:

The objective of this Initiative is to assure safe, reliable and efficient operation of the U.S. nuclear power plants in the management of materials issues.

Each licensee will endorse, support and meet the intent of NEI 03-08, Guideline for the Management of Materials Issues. This initiative is effective January 2, 2004.

The purpose of this Initiative is to:

- provide a consistent management process*
- provide for prioritization of materials issues*
- provide for proactive approaches*
- provide for integrated and coordinated approaches to materials issues*

Actions required by this Initiative include:

- commitment of executive leadership and technical personnel*
- commitment of funds for materials issues within the scope of this Initiative*
- commitment to implement applicable guidance documents*
- provide for oversight of implementation*

2.2 Management Policy Commitment

Through the activities described in the following sections, the industry will ensure that its management of materials degradation and aging is forward-looking and coordinated to the maximum extent practical. Additionally, the industry will continue to rapidly identify, react and effectively respond to emerging issues. The associated work will be managed to emphasize safety and operational risk significance as the first priority, appropriately balancing long-term aging management and cost as additional considerations. To that end, as issues are identified and as work is planned, the groups involved in funding, managing and providing program oversight will ensure that the safety and operational risk significance of each issue is fully established prior to final disposition.

2.3 Scope

The Industry Initiative applies to all NEI member utilities and the materials management programs that they fund and support. This specifically includes programs conducting work related to:

- PWR and BWR reactor pressure vessel, reactor internals and primary pressure boundary components
- PWR steam generators (SG)
- Non Destructive Examination (NDE) and chemistry/corrosion control programs that provide support to the focused programs above
- nuclear fuels materials issues to the extent that they impact or are impacted by plant materials management strategies (e.g., chemistry/corrosion control strategies)
- other materials related items as may be directed by the Materials Executive Oversight Group (MEOG).

The industry programs and areas (referred to herein as “issue programs”) governed by this guideline are listed in Appendix A. The applicability of the Initiative to new and revised programs will be assessed annually by the MEOG. Appendix A will be updated as needed.

2.4 Expectations

The approach to addressing materials issues embodied in the Policy is a substantial change from the current approach. It requires a high level of understanding, commitment and alignment in support of the Policy among industry executives. It is expected that:

- The body of materials work conducted across the industry will be forward-looking and coordinated, resulting in fewer unanticipated issues that could consume an inordinate level of resources and divert focus from an orderly approach to managing materials.
- This Initiative will enhance the issue programs’ ability to rapidly identify, react and effectively respond to emerging issues.

- Every utility will fully participate in the implementation of the materials management activities applicable to its plants.

The details for the identification and management of industry materials issues are contained in this guideline.

2.5 Implementation

These guidelines will be implemented as an Industry Initiative adopted by the NEI Nuclear Strategic Issues Advisory Committee. Its requirements will be in place before January 2, 2004. Utility implementation of these guidelines will be verified as directed by the NSIAC (and recommended by the MEOG).

3. ORGANIZATION

The following two groups provide oversight of this Initiative.

3.1 Materials Executive Oversight Group (MEOG)

- Role – Overall coordination and broad policy guidance for the management of materials aging and degradation issues. The MEOG shall be responsible for addressing resource and issue accountability needs for materials issues that fall outside the assigned scope or the available resources of the issue programs.
- Responsibility – The MEOG reports to the NSIAC and is supported by the Materials Technical Advisory Group (MTAG).
- Membership – Membership on the MEOG shall be approved by the NSIAC and shall consist of approximately six industry executives who are closely involved with the various issue programs. A majority of its members should come from the NSIAC and should represent all reactor types and a mix of utility types (size, number of plants, etc.). NSSS vendor members of the NSIAC may be asked to participate in the MEOG in a non-voting role. The chairman shall be an NSIAC member and the chairmanship should rotate every two years. INPO and EPRI will serve on the MEOG in liaison roles.
- Lifetime – The MEOG is a standing committee. Every two years, the NSIAC shall determine the need for continuing the support and operation of this group.
- Membership Tenure – Membership on the MEOG shall be for two-year terms, with approximately half of the group being replaced each year. Members may serve for more than one term if the NSIAC determines that it is in the interest of the group, but no more than two consecutive terms.
- Administration – NEI shall provide administration and coordination for the MEOG.

3.2 Materials Technical Advisory Group (MTAG)

- Role – The MTAG advises the MEOG on materials issues and performs specific tasks as the MEOG may direct.
- Responsibility – The MTAG reports to the MEOG and provides technical advice and support as needed.
- Membership – Membership of the MTAG shall be determined by the MEOG and shall be made up of senior technical-level representatives from each of the issue programs that are

managing materials work within the scope of this guideline. In addition to the issue program representatives, the MTAG will have two to three at-large members. EPRI and INPO will serve on the MTAG in liaison roles. A commitment shall be obtained from the appropriate utility executive for each proposed member in order to ensure active participation and support by the members of the MTAG.

- Chairmanship – The chairman of the MTAG shall be a member of the MEOG, and shall be selected by the MEOG from among its members. A vice chairman selected from the MTAG membership shall support the chairman.
- Lifetime – The MTAG is a standing committee. Every two years, the NSIAC - with input from the MEOG - will determine the need for continuing support and operation of this group.
- Membership Tenure – Membership on the MTAG shall be for two - to four - year terms, with a portion of the group being replaced each year. Members may serve for more than one term if the MEOG determines that it is in the interest of the group, but no more than two consecutive terms.
- Administration – NEI will provide administration and coordination for the MTAG.

4. ROLES AND RESPONSIBILITIES OF MEOG AND MTAG

The MEOG and MTAG will take an active role in supporting the issue programs that fall within the scope of this guideline in the implementation of the Policy through the actions outlined below. This will include developing a plan to communicate the Policy across the industry and throughout the various organizations. This communications plan may include case studies or other means to review lessons learned in order to provide a practical understanding of the executive intent of the Policy.

At least annually, the MEOG will meet with the MTAG to review and assess the status of materials work, including how the items identified in Section 5 are being addressed. Part of this annual review will address current and projected funding needs required to meet the intent of the Policy. The MEOG will provide an annual update to the NSIAC on the results of this review and assessment.

4.1 MEOG

The MEOG is responsible for:

- concurring with and informing NSIAC of the strategic plan(s) and MTAG developed “roadmap” for managing materials issues
- ensuring appropriate priorities among the materials management issues that may be active at any time
- ensuring appropriate coordination among the issue programs that are working on active materials issues
- ensuring interface issues among the various industry issue programs are addressed effectively
- informing NSIAC regarding materials management issues that are not being addressed in a manner commensurate with their potential impact, along with planned actions

- ensuring that INPO is effectively integrated into the operation of the issue programs, both in supporting issue identification and in monitoring guidelines implementation and follow-up
- managing the following aspects of the major materials issue process discussed in Section 8.0:
 - providing additional funding to issue programs for research and emerging issues as necessary, except that significant additions to issue group funding (greater than \$500,000) requires NSIAC approval
 - concurring in and overseeing the regulatory strategy for major industry issues
 - ensuring that there are implementation verification requirements for major industry materials management issues.

4.2 MTAG

The MTAG is responsible for:

- Creating and maintaining a high-level “road map”/strategic plan that identifies the highest priority materials challenges and the work needed to address these challenges. This plan will include identification of specific items that need to be addressed and the expected schedule and milestones for resolution.
- Performing additional duties assigned by the MEOG, including reviewing individual issue program strategic work plans and operations. Based on an annual report from each of the issue programs (see Section 5), the MTAG will provide an annual report to the MEOG that:
 - assesses coordination of generic, cross-cutting issues (issues affecting multiple reactor types and/or multiple technical disciplines) among issue programs
 - assesses the ability to rapidly react to or proactively identify new issues that need to be addressed using input from existing issue programs, international experience, and government agencies
 - provides appropriate cost-benefit analyses and evaluations of the risk significance of materials management issues when necessary to resolve prioritization questions
 - makes recommendations to the MEOG regarding materials management issues that are not being addressed in a manner commensurate with their potential impact
 - makes recommendations to the MEOG regarding the resolution of conflicting or missing areas of responsibility among the issue programs
- providing independent review and consideration of domestic and international operating experience on relevant materials issues
- providing support for the major materials issue process discussed in Section 8.0 by:
 - evaluating and describing the effectiveness of the regulatory interface strategy
 - evaluating and providing recommendations on implementation verification requirements
 - tracking resolution.

The specific operations of the MEOG and MTAG are described in Appendix B.

5. ROLES AND RESPONSIBILITIES OF ISSUE PROGRAMS

In the context of this guideline, the term “issue program” refers to industry groups that address materials issues, which includes the EPRI Issue Programs as well as related EPRI Programs and NSSS Owners Group Programs. The specific groups/programs are listed in Appendix A. Each issue program retains the primary responsibility for managing issues within its scope. In this respect, each program is responsible for identifying and appropriately prioritizing work, completing projects with the highest level of quality and focus on safety, and obtaining the necessary funding and resources needed to address the issues. The issue programs shall keep the MEOG and MTAG informed of completed, ongoing, and planned activities and of any other situations where MEOG or MTAG involvement is necessary. At least annually, each issue program will provide a written report to the MTAG to support preparation of the annual MTAG report to the MEOG.

This guideline will be implemented across the issue programs within the scope of the Industry Initiative through the activities outlined below.

5.1 General

All industry issue programs are responsible for:

- meeting the intent of the industry Initiative on the Management of Materials Issues
- following accepted industry practices for the management of materials issues
- resolving materials issues that fall within the scope of their programs
- informing the MTAG of situations that affect the disposition of materials issues
- providing high quality deliverables that meet the intent of this guideline for all issues addressed
- establishing and maintaining a nuclear safety focused culture
- performing periodic self assessments and gap analyses
- defining the regulatory interface responsibilities at the outset of addressing any major issue
- identifying implementation requirements for deliverables and guidelines
- developing a process to determine which deliverables require industry enforcement and implementation follow-up
- appropriate lateral communication among groups
- developing and maintaining a Strategic Work Plan (The expected elements of a plan are provided in Appendix C.)
- reporting annually to the MTAG and MEOG on the status of materials issues under its cognizance.

5.2 Charter and Administrative Procedures

Each issue program will have a formal charter and the necessary procedures to implement the items outlined below.

5.3 Utility Oversight and Participation

- Utility oversight shall be provided by both technical and executive level group(s)

within each program or industry structure, irrespective of the program management organization (e.g., EPRI, OG, etc.).

- The executive level group shall determine the strategy for the regulatory interface at the beginning of every issue to ensure the interface is managed with the long-term goals of the associated projects in mind. This includes consideration of the impact on existing activities and the need to make changes in approaches and priorities.
- Membership policies of the industry groups shall address specific responsibilities, tenure and rotation, including methods to ensure that the appropriate level of participation, oversight and guidance is provided.
- Each issue program shall define its liaison with NEI, EPRI, INPO, OGs and OEMs.

5.4 Scope

The technical scope and physical boundaries within which work and issue management will take place shall be clearly defined. When appropriate, this should include an assessment and ranking of all systems and components that fall within the scope using safety and operational risk assessment approaches to prioritize and plan work.

5.5 Funding

As funding needs are determined, the following will be addressed:

- the overall need for a more forward-looking approach to the body of work. This activity, along with the next two items below, should include defining a process for identifying to the MEOG/MTAG structure any funding shortfalls that would limit the group's ability to manage its program to meet the intent of the Guideline for the Management of Materials Issues.
- the need to develop and fund long-term research needs and mitigation measures
- the need to budget for emerging issues so that ongoing activities and long-term research are not hindered
- the need for equity among those who fund and those who benefit from the work
- the appropriate funding method including the benefits and limitations of "cafeteria-style" funding, when used.

5.6 Issue Identification

A formal process for issue identification and prioritization shall be defined. This should include use of the INPO Operational Experience (OE) process, international experience, and domestic operating experience. The domestic experience shall include events that result in licensee event reports (LERs) as well as those events that do not rise to the LER level. It also should include a protocol for contacting the MTAG or MEOG if important issues are identified that cannot be addressed in a timely manner.

5.7 Conduct of Work

The process for planning and conducting the work shall clearly address the intent of this guideline and the underlying culture required, both by the issue program and within the individual utilities supporting the program. Specifically, the work shall be managed to emphasize safety and operational risk significance as the first priority, appropriately balancing long-term aging management and cost as additional considerations. Additionally, the work must continue to have the ability to identify, react and effectively respond to emerging issues. As issues are identified and work is planned, the entities involved in funding, managing and providing direct program oversight shall ensure that the safety and operational risk significance of each issue is fully understood prior to final disposition.

5.8 Issue Resolution and Implementation Follow-Up

The best approach to ensuring that recommendations and resolutions to important materials issues are appropriately implemented shall be determined. As deliverables or guidelines are developed, actions should be classified as to relative level of importance:

- mandatory – to be implemented at all plants where applicable
- needed – should be implemented whenever possible but alternative approaches are acceptable
- good practice – implementation is expected to provide significant operational and reliability benefits, but the extent of use is at the discretion of the individual plant/utility.

INPO's role in assisting the issue program in implementation and follow-up should be defined.

5.9 Regulatory Interface

The approach to be used in interfacing with the NRC shall be determined at the beginning of any project where such interface is required, and this approach should be closely monitored and controlled by the executive-level body of the issue program.

5.10 Communications

- A protocol/process for communicating with other materials groups and with the MEOG and MTAG shall be defined. The need for electronic distribution of information and the development of an internet Website shall be addressed.
- Effective communication between the technical and executive levels within each issue program and to the same levels within the utilities participating in each program shall be ensured.
- An annual report to the MTAG explaining the progress on the materials issues it is managing shall be provided. The report also shall list materials issues the group is aware of, but is not addressing, and why the work is not under way. Specifically, the report should address the following areas as applicable:
 - major near-term deliverables
 - program funding, both for the current year as well as expected needs for the following two to three years

- any projected funding shortfalls
- ongoing and new ‘cross-cutting’ issues
- the status of implementation of strategic plans
- the status of performance relative to the strategic plans
- the results of self-assessments and gap analyses
- problems and issues that need to be brought to the attention of the MEOG, including important materials issues that are not being addressed.

5.11 Self-Assessments and Gap Analyses

Processes for conducting periodic focused self-assessments and gap analyses shall be developed. These should include periodic review of budget performance, schedule performance, quality and applicability of deliverables, etc.

5.12 Work Plan

A multi-year resource-levelized plan that includes project budgeting, the approach to establishing and managing priorities, and appropriate metrics to measure performance shall be developed.

Appendix C provides guidance on the planning and conduct of work to address specific issues.

6. ROLES AND RESPONSIBILITIES OF INDIVIDUAL UTILITIES

Each utility is committed to the Industry Initiative on Management of Materials Issues and will meet the following expectations:

- implement the Industry Initiative, and
- participate in the materials management groups, including:
- funding the programs
- contributing technical resources and executive leadership to industry materials efforts
- sharing all materials operational experience
- implementing appropriate guidelines and recommendations
- evaluate current business and strategic plans for appropriate focus on materials issues.

7. ROLES AND RESPONSIBILITIES OF INPO

INPO will take an active role in promoting a forward-looking, proactive and sustainable approach to industry materials issues that impact safety and reliability. In this role, INPO will continue to promote a standard of excellence in its interactions with the industry. Specific roles and responsibilities include:

- participating at all levels of the industry materials management initiative, from issue programs to the MEOG and MTAG
- on-site reviewing and evaluating plant activities against industry-developed guidelines and standards of excellence
- providing periodic updates to the industry, as appropriate, on observed trends of performance that need additional attention

- monitoring, reviewing and analyzing domestic and international operating experience and communicating important data or trends to the industry
- obtaining technical advice from appropriate industry groups to resolve controversial materials issues identified at a specific plant or utility.

The quality and depth of INPO's review programs depend heavily on the availability of qualified INPO staff and the participation of experienced industry peers. In each case, the level of resources required will be determined as the specific program guidelines and standards are developed.

8. MAJOR Industry Materials Issue PROCESS

Each issue program should develop a protocol for rapidly identifying and assessing extraordinary issues that have the potential for a major operational, regulatory or financial impact on the industry. These issues will then be evaluated by the MTAG and MEOG as described below (see figure in Appendix D). (Emerging issues that can be dealt with effectively by the responsible issue program need not rise to this level. Such issues should be reported to the MEOG through the normal communication and reporting process.)

8.1 Issue Identification

Sources include:

- individual utilities
- existing issue programs – work that is beyond available resources
- domestic operating experience (INPO)
- international operating experience (WANO)
- NEI
- EPRI
- Owners Groups
- NSSS vendors
- NRC
- DOE/Naval Reactors

8.2 Data Collection and Assessment

The MTAG will assess the issue and provide follow-on recommendations to the MEOG. This includes addressing the following:

- scope
- consequences
- regulatory issues/aspects
- risk implications
- cost projection
- timeline/schedule/milestones

8.3 MEOG Disposition

The MEOG may:

- direct that the issue be handled through existing OG or EPRI program structure in the routine course of business without extraordinary oversight by the MTAG and MEOG
- take action to obtain broad industry commitment to support issue resolution.

8.4 MEOG Action

If the second action under Subsection 8.C is taken, the MEOG and MTAG become more directly involved in assisting the responsible group(s) with the resolution and in providing status and feedback to the NSIAC for some high-impact issues.

Appendix A

Applicable Industry Materials Issue Programs

The following issue programs' activities in the area of materials management are governed by the intent of this guideline.

- EPRI BWR Vessel and Internals Project (BWRVIP)
- EPRI Materials Reliability Program (MRP)
- EPRI Robust Fuels Program (RFP)¹
- EPRI Steam Generator Management Program (SGMP)
- The EPRI Non-Destructive Examination (NDE) Program and the industry's Performance Demonstration Initiative (PDI)²
- The EPRI Chemistry and Corrosion Research Programs
- The materials management activities in the four NSSS Owners Group Programs (WOG / CEOG, B&WOG, BWROG).

¹ Robust Fuels Program activities related to clad and chemistry issues will be reviewed by MTAG.

² At this time, PDI is an industry activity that is separate from the EPRI NDE Program; however, consideration is being given to incorporating it into the EPRI advisory structure.

Appendix B

Operating Plan for Materials Oversight Groups: MEOG and MTAG

MEOG/MTAG OPERATING PLAN

1. GOAL

The overall goal of this Policy and the associated guidelines is to ensure that the industry's management of materials degradation and aging is forward-looking, focused on issues commensurate with their safety significance, and coordinated to the maximum extent practical. Additionally, the industry will continue to rapidly identify, react and effectively respond to emerging issues. When properly implemented, this should result in fewer unanticipated issues that consume an inordinate level of industry resources, and divert the focus from an orderly approach to managing materials performance.

2. STRATEGY

The MEOG and MTAG will support the individual issue programs in developing, implementing, and assessing the effectiveness of strategic plans that are consistent with this Policy. These plans will contain the features identified in Appendix C and will be structured in such a way that, when viewed together, they provide a complete picture (i.e., "roadmap") of ongoing and needed work to achieve the goals outlined above. By reporting through the NSIAC, the MEOG will be able to address issues that need collective industry action and support. The NSIAC then can provide the commitment to effect the needed actions.

3. OPERATIONS OF MEOG AND MTAG

A. Initial Support

1. *Surveys and Recommendations:* The MTAG will assist the applicable issue programs, as requested, in developing the plans and schedules to address the opportunities for improvement or needed enhancements identified in the surveys conducted during fall of 2002. This activity will include developing a plan for future self-assessments and program gap analyses.

2. *Standard Guidance:* The MTAG shall develop standard guidance to assist the issue programs in implementing the Policy (e.g., formats and/or protocols for strategic plans, self-assessments, gap analyses, periodic reports, issue identification, etc.).

3. *Strategic Plan:* The MTAG shall assist issue programs, as requested, in developing the appropriate strategic plans. The MTAG then shall review the plans from all the issue programs to develop a complete overview of the current body of work. This activity should result in an overall industry "road map"/strategic plan that identifies, at a high level, the major materials challenges and the work needed to address/resolve the challenges. This high-level plan should identify specific items that need to be addressed, the schedule associated with addressing the items/challenges, and the issue program responsible for the actions (including, in some cases, identification of the fact that the issue is not being addressed based on resource constraints, lack of technology etc.). This plan then shall be maintained by the MTAG as part of its annual activities (below).

4. Annual Activities

A. MTAG

The MTAG shall meet at least four times a year, including at least one face-to-face meeting. A major purpose of the face-to-face meetings will be to review and assess the annual reports provided by the issue programs and to provide the annual report to the MEOG. The MTAG shall assess the overall approach to managing materials issues, and will review:

- issue program strategic plans
- the self-assessments and gap analyses performed, and corrective measures identified, by the issues programs
- domestic and international operating experience and any new problems
- cross-cutting issues
- the funding needs of each program, and assess the overall adequacy of funding
- the approach being taken to increase the support from - and interaction with - DOE, Naval Reactors, and international sources
- the effectiveness of issue program product implementation
- the adequacy of the lateral communications among the issue programs and across the industry in general

The output of this review will be an update of the industry materials “roadmap” and the annual report of the MTAG to the MEOG.

The MTAG will be available to provide support as requested by the issue programs.

B. MEOG

The MEOG will meet as required to make decisions on the prioritization and funding of strategically important issues, to review the annual report of the MTAG and to provide its report to the NSIAC.

5. Reports

A. MTAG

The MTAG will prepare an annual report to the MEOG. This report will document the results of the review of the issue programs and will identify as a minimum:

- major near-term deliverables
- funding by program, as well as overall industry funding, for the current year and projected for the next two to three years
- any projected funding shortfalls
- ongoing and new cross-cutting issues
- implementation status of strategic plans
- performance relative to the strategic plans
- the results of the self-assessments and gap analyses

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- problems and issues that need to be brought to the attention of the NSIAC.

B. MEOG

The MEOG will report to the NSIAC annually on the overall status of materials management and the status of performance relative to this Policy.

Appendix C

Elements of Issue Program Strategic Plans

Issue Program Strategic/Work Plan Elements

Each issue program included in the Initiative will have a plan that reflects the intent of this Policy. Specifically, the materials work should be forward-looking and coordinated among issue programs conducting similar work. Within each program, the work should be planned and managed to emphasize safety and operational risk-significance as a first priority, appropriately balancing long-term materials management and cost as additional considerations. At the same time, the plans must maintain the issue program's ability to rapidly identify, react and effectively respond to emerging issues. The plans should incorporate the elements outlined below as appropriate. For some issue programs (e.g., WOG/CEOG Materials, EPRI BWRVIP) all the elements will apply, while for other programs (e.g., EPRI Robust Fuels Program, EPRI Chemistry Program), only some apply. The goal is for the plans to be structured such that, when viewed together, they provide a complete picture of ongoing and needed work to achieve the goals of the Policy. At the outset, the MTAG will assist the issue programs in preparing the plans, which will then become a part of the annual report of the programs to the MTAG.

1. **Goals and Objectives:** There should be a clear statement of the specific goals and objectives of the materials management work being conducted by the issue program. This section of the strategic plan should identify the capability gaps and barriers to achieving the desired endpoint. These elements can help to define the forward-looking work such that the program will not be totally reactive in nature.
2. **Scope:** There should be a clear definition of the scope of the program that falls under the purview of this policy (e.g., for the BWRVIP, it is "BWR reactor pressure vessel, reactor internals and primary pressure boundary components, both safety and non-safety related").
3. **Identification of Areas Susceptible to Failure:** Within the physical boundaries defined by the scope, all items susceptible to failure that can or should be addressed by the materials management work should be identified.
4. **Rank:** The items identified in 3 above should be ranked by a process that addresses risk from the following broad perspectives:
 - total risk from both the safety and an investment protection/investment management standpoints, with first priority on safety per the Policy statement
 - both short-term and long-term risk factors
 - both prevention and mitigation, including system response¹
 - consideration of both uncertainty and defense-in-depth, so that ranking and decision-making are realistic and respectful of appropriate margins of safety
 - regulatory significance.
5. **Prioritize:** Develop a prioritization for addressing the above items identified in element 4. This area should address how the work will be conducted to ensure that issues/items will be

¹ In this context, considering "system response" as part of the prioritization activity means to address not only the risk of failure of a particular component, but to factor in the performance of other components or systems that come in to play to mitigate the consequences of the initial failure.

critically evaluated to avoid pre-dispositioning before the evaluation of safety and risk significance is completed. This will need to be factored into elements 6 through 8.

6. **Short-Term and Long-Term Actions:** Determine the areas/items that can and should be addressed by near-term actions and those that will require longer-term work to fully address.
7. **Develop Work Plan and the Metrics to Measure Performance:** Develop the overall approach/plan, including regulatory approach, for performing the work. The implementation follow-up approach needs to be defined for the solution(s) that ultimately will be the outcome of the work (see element 10 below). Metrics by which the success of the program can be measured should also be defined. Metrics can be tangible, such as on-time delivery of solutions and guidelines, performing within pre-established budgets and funding plans, the number of successfully implemented solutions, etc.; or intangible, such as a reduction in level of regulatory concern. (One example of a tangible metric is an item used to measure Steam Generator (SG) Program performance for a number of years - the number of industry-wide forced outages due to SG tube leaks.) There also should be administrative metrics, e.g., level of “active” utility participation (providing personnel and funding), per-utility meeting attendance, etc.
8. **Regulatory Interface:** The approach to be used in interfacing with the NRC shall be determined at the beginning of any project where such interface is required, and this approach should be closely monitored and controlled by the executive-level body of the issue program throughout the project.
9. **Implement Work Plan:** Identify how the work will be conducted and managed. Identify funding plan, milestones and schedule and the major deliverables/products to be provided in each area of work. For many programs addressing materials issues the following broad areas may be applicable:
 - assessment
 - inspection
 - repair
 - mitigation
 - replacement
 - regulatory interface.
10. **Implementation of Results:** Identify the best approach to ensuring that recommendations and resolutions to important materials issues are appropriately implemented. As deliverables or guidelines are developed, they should be classified as to relative level of importance:
 - mandatory – to be implemented at all plants where applicable
 - needed – should be implemented whenever possible, alternative approaches are acceptable
 - good practice – implementation is expected to provide significant operational and reliability benefits, but the extent of use is at the discretion of the individual plant/utility.

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INPO's role in assisting the issue program in implementation and follow-up should be defined.

NOTE: The BWRVIP provides a good example of the approach outlined in elements 1 through 8 above.

Appendix D

Materials Issue Management Process Flow Chart

Nuclear Materials Process For Major Emerging Issues

