COL Application Issues

Public Meeting with NRC
December 1, 2005

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Training and Qualification of Staff for New Nuclear Power Plants

NEI Meeting with NRC

December 1, 2005

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Approach

- NEI, INPO, vendors and utilities are working to develop a strategy to effectively train and qualify new NPP Personnel.
- This strategy is based on the existing training and accreditation process as recognized by NRC (10 CFR 55.31(a)(4) and 55.59(c)).
- Minimal adjustments to this training and accreditation process are needed to accommodate issuance of the combined operating license (COL) under Part 52 prior to unit construction.

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Goal

Define COL application elements sufficient to support a reasonable assurance finding by NRC on Training Program implementation, and develop guidance for COL applicants.

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Specifics—Process

- Complete National Academy for Nuclear Training accreditation process prior to fuel load consistent with existing INPO policies and guidance
  - Implement 10 CFR 50.120 training programs
  - Utility undergoes National Academy for Nuclear Training accreditation process
    - Pre-visits
    - Utility Accrediting Self Evaluation Report Submittal
    - Accreditation Team visits
    - Accrediting Board meeting and decision
    - Training is accredited in accordance with current INPO and NANT guidance.
  - NRC Operator License Examination and License Issuance

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Specifics—Licensing Basis

- COLs will include three license conditions
  - 10 CFR 50.120 Training Programs
    - Establish, implement and maintain the Training Program at least 18 months prior to fuel load and complete NANT accreditation prior to fuel load.
  - Licensed Operator Re-qualification (10 CFR 55.59(c))
    - Implement re-qualification program prior to fuel load
  - Licensed Operator Training Program
    - Provide and update the schedule for training program implementation (consistent with SECY-05-0197)

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Specifics—Licensing Basis

- FSAR description of Training Programs
  - Description of plan for training program implementation
  - Major milestones leading to accreditation
  - Commitment to complete NANT accreditation process prior to fuel load

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Related Discussion

- Phased implementation of Training Program
  - Completion of construction activities
  - Receipt of sources and fuel
  - Fuel load
- Use of existing qualified staff, e.g.,
  - Chemistry and RP technicians with appropriate overview training
  - Electrical and mechanical maintenance with minimal technology specific training and overview training
  - Fuel receipt and transfer operators
- Envisioned class-type training for AP1000, ESBWR, EPR
- Interpretation of 50.54(i-1) for Part 52 (requal program)
- Nominal implementation schedule

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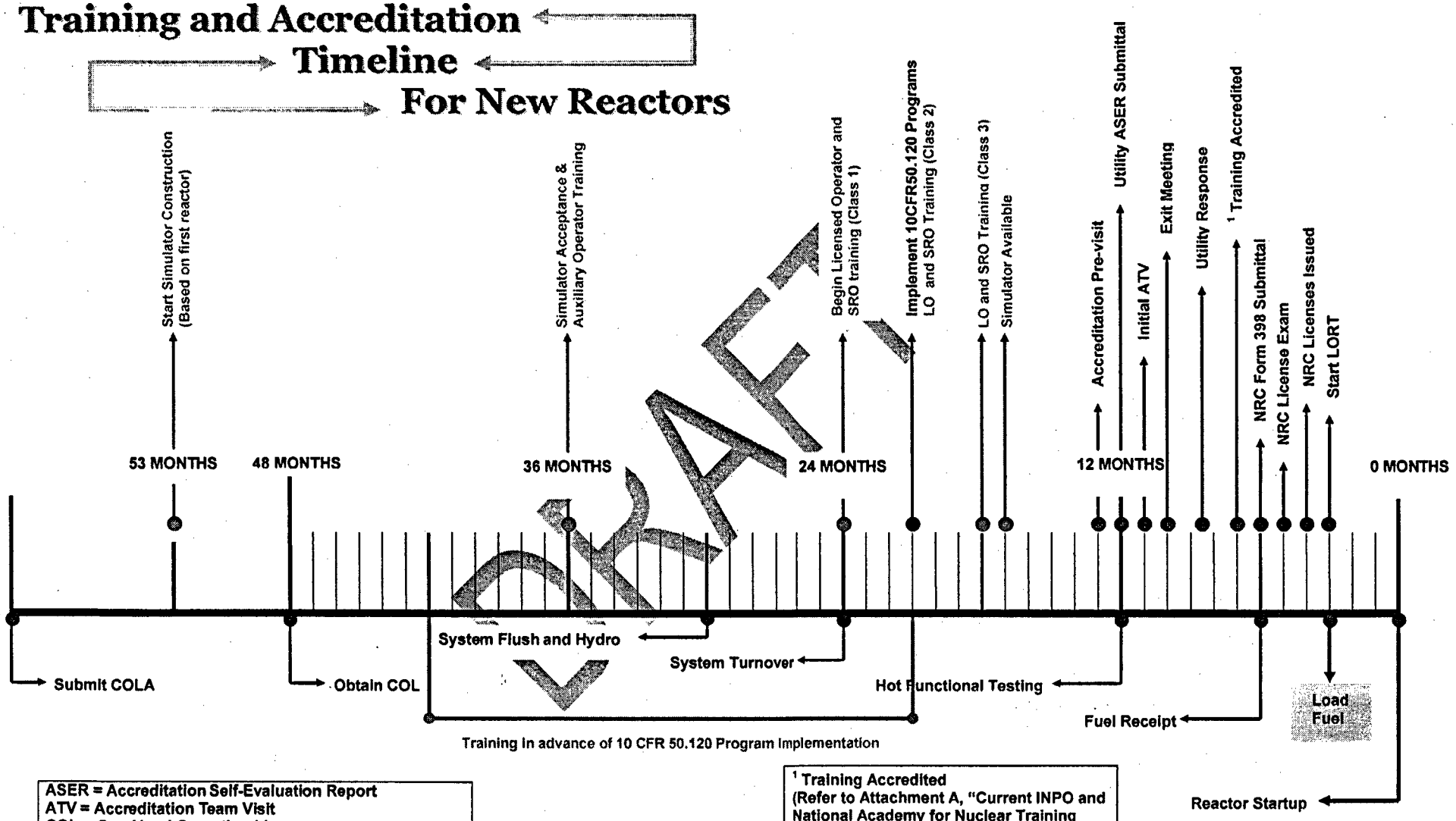
Training and Accreditation Timeline For New Reactors



ASER = Accreditation Self-Evaluation Report
ATV = Accreditation Team Visit
COL = Combined Operating License
COLA = Combined Operation License Application
LORT = Licensed Operator Requalification Training

[1] Training Accredited
(Refer to Attachment A, "Current INPO and National Academy for Nuclear Training Guidance" assumption 4 and "Current NRC Regulatory Guidance" assumption 2)

Attachment A

New Reactor Training and Accreditation Assumptions

Current INPO and National Academy for Nuclear Training Guidance

1) The purpose of the accreditation process is to assist INPO member utilities in developing training programs that will produce well-qualified, competent personnel to operate the nation's nuclear power plants. *(INPO 85-02)*
2) Each INPO member company that operates a nuclear-powered electric generating plant has made a commitment to achieve and maintain accreditation of its training programs. *(ACAD 02-002)*
3) The NRC published a series of endorsements of INPO-managed accreditation and, in 1993, a final rule establishing INPO accreditation as a means for compliance with federal regulations. *(ACAD 02-002)*
4) For new members, accreditation of the below listed programs should occur after implementation and prior to fuel load, or within the timeframe established by INPO and the operating company senior management. *(ACAD 02-002)*
5) Accreditation formally recognizes nuclear utility training as meeting the INPO accreditation objectives and criteria for the following training programs *(ACAD 02-002):*
   a) Nonlicensed operator
   b) Reactor operator
   c) Senior reactor operator
   d) Shift technical advisor
   e) Shift manager
   f) Continuing training for licensed personnel
   g) Instrument and control technician and supervisor
   h) Electrical maintenance personnel and supervisor
   i) Mechanical maintenance personnel and supervisor
   j) Chemistry technician
   k) Radiological protection technician
   l) Engineering personnel
6) The accreditation process consists of the following elements:
   a) Implementation of the systematic approach to training
   b) Preparation of an accreditation self-evaluation report
   c) On-site visit by the accreditation team
   d) Decision by the independent National Nuclear Accrediting Board
   e) Maintenance of accredited training programs

7) For initial accreditation, an accreditation team visit will be scheduled when the operating company submits an accreditation self-evaluation report. *(ACAD 02-002)*

8) The accreditation process consist of the following major milestones *(ACAD 02-002)*:

   a) Utility prepares the accreditation self-evaluation report describing how the training programs meet the accreditation objectives.

   b) Accreditation team manager conducts previsit to meet with line and training managers to discuss purpose and scope of team visit. (T= -24 weeks)

   c) Utility submits accreditation self-evaluation report. (T= -20 weeks)

   d) Accreditation team conducts an independent review of training programs and corroborates the information in the station accreditation self-evaluation report. (T= -16 weeks)

   e) Following the on-site visit, the accreditation team prepares an accreditation team report to describe the results of the visit. The accreditation team report and the team-identified strengths are reviewed with station management at the exit meeting. (T= -12 weeks)

   f) Following the exit meeting, the operating company submits a written response describing the causes and corrective actions for team-identified findings and updates the status of unresolved station-identified findings. (T= -6 weeks)

   g) Members of the National Nuclear Accrediting Board meet as a voting board to consider the training programs for initial accreditation. The operating company CEO will be notified of the Accrediting Board decision by telephone and by a written summary of the basis for the decision. (T= 0)

Current NRC regulatory guidance

1) Systematically designed training programs for the following disciplines will be implemented 18 months prior to fuel load*(10CFR50.120):*

   a) Nonlicensed operator

   b) Shift supervisor

   c) Shift technical advisor

   d) Instrument and control technician

   e) Electrical maintenance personnel

   f) Mechanical maintenance personnel

   g) Chemistry technician

   h) Radiological protection technician

   i) Engineering support personnel

2) Minimum shift complement at fuel receipt is one fuel handling senior reactor operator and one radiation protection technician.

3) Minimum shift complement at fuel load is one senior reactor operator, one reactor operator and one radiation protection technician.

4) Minimum shift complement at reactor startup is one shift manger, one senior reactor operator, two reactor operators, and one shift technical advisor.

5) Within three months after issuance of an operating license, the licensee shall have in effect an operator requalification training program. *(10CFR50.54i-1)*

COL Guidance

Information Addressing Regulatory Criteria

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COL Regulatory Criteria Info

1) 52.79(b) requires COLA contain technically relevant information required for OL by 50.34
2) 52.47 contains info requirements for Design Certification that result in COL Information Requirements

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2

COL Regulatory Criteria Info

3) COLAs to address:

a) USI/GSI info (52.47(a)(iv)) (NUREG-0933)

b) Regulatory Guides (as indicated in DCD)

c) Operating Experience (50.34(f)(3)(i)

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COL Regulatory Criteria Info

d) TMI Requirements (50.34(f))

e) SRPs (50.34(h))

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COL Regulatory Criteria Info

4) NEI 04-01 Guidance

a) Section 4.3.9.1.3 (evolving)

b) Currently includes specific requirements for AP1000 reference

- Table 4.3.9.1-1 USI/GSI
- Table 4.3.9.1-2 Reg Guides
- Table 4.3.9.1-3 TMI

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COL Regulatory Criteria Info

c) General guidance given for Operating Experience (4.3.9.1.3) and SRPs (4.3.9.1.5)

d) ABWR items will be added to NEI 04-01, Rev. 0

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COL Regulatory Criteria Info

5) Challenges

a) SRPs – Changes under way will affect addressing DCD issues

b) DCDs fixed at time of certification – COLAs will need to address more recent standards

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Special change process for severe accident issues

Section VIII.B.5.c of the design certification rules:

A proposed departure from Tier 2 affecting resolution of a severe accident issue identified in the plant-specific DCD, requires a license amendment if:

> (1) There is a substantial increase in the probability of a severe accident such that a particular severe accident previously reviewed and determined to be not credible could become credible; or
>
> (2) There is a substantial increase in the consequences to the public of a particular severe accident previously reviewed.

Dec. 1 Discussion Topics

0. History of issue

1. Scope of applicability of Section VIII.B.5.c

AP1000 NOPR says the following:

> The Commission believes that the resolution of severe accident issues should be preserved and maintained in the same fashion as all other safety issues that were resolved during the design certification review (refer to SRM on SECY-90-377). However, because of the increased uncertainty in severe accident issue resolutions, the Commission has proposed separate criteria in paragraph B.5.c for determining if a departure from information that resolves severe accident issues would require a license amendment. **For purposes of applying the special criteria in paragraph B.5.c, severe accident resolutions would be limited to design features when the intended function of the design feature is relied upon to resolve postulated accidents when the reactor core has melted and exited the reactor vessel, and the containment is being challenged.** These design features are identified in section 1.9.5 and appendix 19B of the DCD, with other issues, and are described in other sections of the DCD. Therefore, the location of design information in the DCD is not important to the application of this special procedure for severe accident issues. However, the special procedure in paragraph B.5.c would not apply to design features that resolve so-called "beyond design basis accidents" or other low probability events. The important aspect of this special procedure is that it would be limited to severe accident design features, as defined above. Some design features may have intended functions to meet "design basis" requirements and to resolve "severe accidents." If these design features are reviewed under paragraph VIII.B.5, then the appropriate criteria from either

paragraphs B.5.b or B.5.c would be selected depending upon the function being changed.

2. Compatibility of VIII.B.5.c criteria to the scope prescribed in the SOC

Section B.5.c suggests applicability to a broader scope of severe accident issues than defined in the Statements of Consideration

- "departure ... affecting resolution of a severe accident issue"
- Criterion B.5.c(1) focus on probability of a "severe accident"

3. Expectations regarding applicability of VIII.B.5.b to the beyond design basis issues, features and analyses described in the balance of Chapter 19 of the DCD

4. Industry recommendations

- Scope of applicability
- Screening & evaluation Process
- Definition of "substantial increase"
- Definition of "credible"

5. Discussion

Severe Accident Change Process

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Main Topics

- Rule Language
- Background
- Scope of Applicability and Compatibility of Criteria
- Conceptual Process
- Examples
- Discussion

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Rule Language

For departures from Tier 2 that affect resolution of a severe accident issue, Section VIII.B.5.c of the design certification rules provide these standards for determining whether a change identified in the plant-specific DCD requires prior NRC approval:

(1) There is a **substantial increase** in the probability of a severe accident such that a **particular severe accident** previously reviewed and determined **to be not credible** could become **credible**; or

(2) There is a **substantial increase in the consequences** to the public of a particular severe accident previously reviewed.

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Background

- "Substantial Increase" is used in recognition that a *more than minimal Standard (B.5.b criteria)* would be too restrictive given the uncertainties and methods employed in severe accident analyses
- Historical Perspective
  - Basis for Language
  - Scope of Applicability

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History

- 1986 Severe Accident Policy Statement
  - Expectation that future plants "will achieve a higher standard of severe accident safety performance"
- SRM on SECY-90-377
  - "The staff should ensure that this [50.59-like] process requires preservation of the severe accident, human factors, and operating experience insights that are part of the certified design."
- Design certification rules issued
  - Included severe accident design features and analyses
  - Established special "B.5.c" change process for severe accident issues/info
- 1999 Revision of 10 CFR 50.59
  - Three questions become eight
  - Key definitions established for screening and evaluation
  - NEI 96-07, Rev. 1and RG 1.187

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Scope of Applicability and Compatibility of Criteria

- B.5.c Rule Language includes:
  - Substantial Increase in Probability or Consequences as Standards
  - Not Credible and Credible
- Scope of B.5.c Criteria clarified in DCR SOC focused on Ex-vessel Features
  - "When the intended function of the design feature is relied on to resolve postulated accidents when the core has melted and exited the reactor vessel…"
  - Prevention of Severe Accidents is Not Explicitly Addressed
  - Beyond Design Basis Accidents are excluded
- Relationship of B.5.c to SOC lacks Clarity
  - Ex-vessel Design Features Only?
  - CDF and LRF?
- B.5.b applies to Departures that affect Design Basis accidents/issues.

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Conceptual Process

- Evaluation Scope
  - Probabilistic and Deterministic Analyses as appropriate
  - Ex-vessel, CDF, and LRF
  - Basis for limiting Evaluation to Ex-vessel Features in not clear
  - 10CFR 50.59 does not apply to severe accidents (core damage, in-vessel, ex-vessel)
- Severe Accident Change Evaluation to be Part of Plant Change Process
- For Severe Accident evaluations, process would include
  - Screening of changes having no impact on severe accident topics, such as a change in a BOP SSC with no impact on Initiating Events or mitigation.
  - Qualitative Assessment, where the change cannot be screened out but the Potential Impact of the proposed change can be determined to not be substantial without conducting probabilistic analyses.
  - Quantitative (Probabilistic) Assessment, for cases where qualitative assessment does not provide resolution.

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Conceptual Process (cont.)

- Substantial
  - Change is not Substantial if Conclusions are not changed.
    - Example 1: Qualitative Measure (If time to reach Level C Containment conditions remains greater than goal, change is not substantial.)
    - Example 2: Quantitative Measure (CDF or LRF change as defined in Guidance documents (to be developed))
  - Result can change. Change in Conclusion is the measure.
  - Applied to both Deterministic and Probabilistic Goals
- Credible
  - Use Rule language directly (Credible is not defined)
  - However, Not limited to severe accidents "previously reviewed and determined to be not credible..."

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Examples

- Overall Process for Assessing Departures
  - Proposal to Promote Mutual Understanding of Rule Implementation
  - Use a checklist example to promote dialogue
  - Could test several examples to exercise various scenarios
  - See attached example
- Severe Accident Change Examples

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Discussion

- Scope
- Conceptual Process
- Substantial Increase
- Credible and Not Credible
- Path Forward

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EXAMPLE EVALUATIONS
10 CFR 52, DCR VIII.B.5

Applicant/Licensee specific departures from a certified design's Tier 2 information are governed by the certification rule appendix (DCR) for each certified design in DCR VIII.B.5. Two subsections that provide requirements for prior NRC approval are VIII.B.5.b (departures that do not affect a severe accident issue) and VIII.B.5.c (departures that do affect a severe accident issue). The following checklist illustrates a process that could be used to evaluate departures from DCD Tier 2 information to determine if prior NRC approval is required per DCR VIII.B.5. The following examples are based on the current version of 10 CFR 52. The draft language for a proposed revision to 10 CFR 52 updates the criteria in VIII.B.5.b to reflect the changes in 10 CFR 50.59. .

DCD Departure Checklist

This checklist would be used as part of the process for evaluation of departures from generic DCD information. It would provide part of the documentation required to demonstrate compliance with 10 CFR 52, Appendix D, DCR VIII.B.5.

1) Provide a reference for the specific section in the generic DCD for which departure(s) are proposed and a brief description of the change.

   This section would provide a description of the change and a markup of the DCD Tier 2 language.

2) Does the proposed departure involve a change to or departure from Tier 1 information?

   Yes _____. If yes, the change must be processed as an exemption from 10 CFR 52, App. D.

   No _____. If no, go to 3.

3) Does the proposed departure involve a change to or departure from Tier 2* or generic Technical Specification information?

   Yes _____. If yes, the proposed change must be processed per 10 CFR 50.90.

   No _____. If no, go to 4.

4) Is the proposed change a "departure"? (See the attached definition.)

Yes _____. If yes, go to 5.

No _____. If no, the change may be processed. The record keeping and reporting requirements of DCR X.A and B apply.

5) a) Does the proposed departure result in a substantial increase in the probability of a severe accident such that a particular severe accident previously reviewed and determined to be not credible could become credible?

Yes _____. If yes, the change must be processed per 10 CFR 50.90.
No. _____. If no, go to 5b.

b) Does the proposed departure result in a substantial increase in the consequences to the public of a particular severe accident previously reviewed?

Yes _____. If yes, the change must be processed per 10 CFR 50.90.
No. _____. If no, proceed to 6.

6a) Does the proposed departure result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the plant-specific DCD?

Yes _____. If yes, the change must be processed per 10 CFR 50.90.
No. _____. If no, proceed to 6b.

b) Does the proposed departure result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system or component (SSC) important to safety previously evaluated in the DCD.

Yes _____. If yes, the change must be processed per 10 CFR 50.90.

No. _____. If no, go to 6c.

c) Does the proposed departure result in more than a minimal increase in the consequences of an accident previously evaluated in the DCD?

Yes. _____. If yes, the change must be processed per 10 CFR 50.90.

No. _____. If no, go to 6d.

d) Does the proposed departure result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the DCD.

Yes. _____. If yes, the change must be processed per 10 CFR 50.90.

No. _____. If no, go to 6e.

e) Does the proposed departure create a possibility for an accident of a different type than any previously evaluated in the DCD.

Yes. _____. If yes, the change must be processed per 10 CFR 50.90.

No. _____. If no, go to 6f.

f) Does the proposed departure create a possibility for a malfunction of an SSC important to safety with a different result than any previously evaluated in the DCD?

Yes. _____. If yes, the change must be processed per 10 CFR 50.90.

No. _____. If no, go to 6g.

g) Does the proposed departure result in a design basis limit for a fission product barrier as described in the plant specific DCD being exceeded or altered?

Yes _____. If yes, the change must be processed per 10 CFR 50.90.

No. _____. If no, go to 6h.

h) Does the proposed departure result in a departure from a method of evaluation described in the DCD used in establishing the design bases or in the safety analyses?

Yes. _____. If yes, the change must be processed per 10 CFR 50.90.

No. _____. If no, the change may be processed. The record keeping and reporting requirements of DCR X.A and B apply.

Example 1: Example that does affect a severe accident issue

During the preparation of a COL application, the applicant determines that it is necessary to utilize manual gate valves instead of orifices in the four passive containment cooling water storage tank outlet lines. The designer agrees with the change, but a departure from the wording on page 6.2-20 of the DCD is required.

DCD Departure Evaluation

This checklist would be used as part of the process for evaluation of departures from generic DCD information. It would provide part of the documentation required to demonstrate compliance with 10 CFR 52, Appendix D, DCR VIII.B.5.

1) Provide a reference for the specific section in the generic DCD for which departure(s) are proposed and a brief description of the change.

p. 6.2-20: ~~**Flow Control Orifices**~~ **Manual Gate Valves** ~~Orifices~~ Manual gate valves are installed in each of the four passive containment cooling water storage tank outlet pipes.

2) Does the proposed departure involve a change to or departure from Tier 1 information?

Yes _____. If yes, the change must be processed as an exemption from 10 CFR 52, App. D.

No __x____. If no, go to 3.

3) Does the proposed departure involve a change to or departure from Tier 2* or generic Technical Specification information?

Yes _____. If yes, the proposed change must be processed per 10 CFR 50.90.

No __x____. If no, go to 4.

4) Is the proposed change a "departure"? (See attachment 1)

Yes __x___. If yes, go to 5.

No _____. If no, the change may be processed. The record keeping and reporting requirements of DCR X.A and B apply.

5 a) Does the proposed departure result in a substantial increase in the probability of a severe accident such that a particular severe accident previously reviewed and determined to be not credible could become credible?

Yes _____. If yes, the change must be processed per 10 CFR 50.90.
No. __x___. If no, go to 5b.

b) Does the proposed departure result in a substantial increase in the consequences to the public of a particular severe accident previously reviewed?

Yes _____. If yes, the change must be processed per 10 CFR 50.90.
No. __x__. If no, proceed to 6.

6a) Does the proposed departure result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the plant-specific DCD?

Yes _____. If yes, the change must be processed per 10 CFR 50.90.
No. __x__. If no, proceed to 6b.

b) Does the proposed departure result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system or component (SSC) important to safety previously evaluated in the DCD.

Yes _____. If yes, the change must be processed per 10 CFR 50.90.

No. __x__. If no, go to 6c.

c) Does the proposed departure result in more than a minimal increase in the consequences of an accident previously evaluated in the DCD?

Yes. _____. If yes, the change must be processed per 10 CFR 50.90.

No. __x__. If no, go to 6d.

d) Does the proposed departure result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the DCD.

Yes. _____. If yes, the change must be processed per 10 CFR 50.90.

No. ___x___. If no, go to 6e.

e) Does the proposed departure create a possibility for an accident of a different type than any previously evaluated in the DCD.

Yes. _____. If yes, the change must be processed per 10 CFR 50.90.

No. ___x___. If no, go to 6f.

f) Does the proposed departure create a possibility for a malfunction of an SSC important to safety with a different result than any previously evaluated in the DCD?

Yes. __x____. If yes, the change must be processed per 10 CFR 50.90.

No. _____. If no, go to 6g.

g) Does the proposed departure result in a design basis limit for a fission product barrier as described in the plant specific DCD being exceeded or altered?

Yes _____. If yes, the change must be processed per 10 CFR 50.90.

No. _____. If no, go to 6h.

h) Does the proposed departure result in a departure from a method of evaluation described in the DCD used in establishing the design bases or in the safety analyses?

Yes. _____. If yes, the change must be processed per 10 CFR 50.90.

No. _____. If no, the change may be processed. The record keeping and reporting requirements of DCR X.A and B apply.

Attachment 1

DEFINITION OF DEPARTURE

A meaningful process for evaluating departures from a generic DCD for potential impact on severe accident or design basis
issues requires the establishment of a threshold for proposed departures (deviations from the wording in a generic DCD) that distinguishes between proposals that have negligible potential impact and those that should be evaluated further. This concept has been established for current operating plants in the NEI guidance for implementing 10 CFR 50.59 (NEI 96-07) and has been endorsed by the NRC in Regulatory Guide 1.187. The following proposed definition is based on a similar concept.

Definition: A departure from the facility as described in the generic DCD is a plant-specific deviation that describes a facility with a different a) design function, b) method of performing or controlling the function, or c) evaluation that demonstrates that the function can be accomplished from those of the facility proposed in the generic DCD. For example, page 6.2-20 (AP1000) discusses flow control orifices in the passive containment cooling water storage tank outlet

pipes. If a COL applicant, during the design finalization process, determines that manual gate valves are a preferable option to the orifices. The reactor designer agrees with the change but a departure from the certified design is created. Since the Chapter 19 discussion on severe accidents (p. 19.36-1) discusses flooding of the reactor cavity from the refueling water storage tank as the means of assuring the reactor vessel is cooled and the damaged core is retained in the vessel. Since the proposed departure describes a different means of performing a design function related to a severe accident issue, the departure meets the threshold and would not be screened from the requirement to address the two questions in DCR VIII.B.5.c.

An example of a proposed departure that does not meet the threshold would be a change to the expected post-72 hour loads associated with Ancillary Generator Room Lights. Table 8.3.1-4 lists the expected loads for these lights as .5 kW. If during the design finalization, it is determined that the lights actually will require .65 kW during the post 72-hour period, a departure from the certified design is created. However, there would be no impact on a design function related to a severe accident or design basis issue and the change would screen out for VIII.B.5.b and c.