COMPONENT DESIGN BASES INSPECTION (CDBI)

BASELINE INSPECTION PLAN

Palisades Nuclear Plant

INSPECTION REPORT NUMBER 05000255/2006009(DRS)

Inspection Objectives

This inspection fulfills the baseline inspection program requirements for biennial Inspection Procedure (IP) 71111.21. The inspection's objective is to verify that design bases have been correctly implemented for the selected risk significant components and that operating procedures and operator actions are consistent with design and licensing bases. This is to ensure that selected components are capable of performing their intended safety functions. This inspection verifies aspects of the Initiating Events, Mitigating Systems, and Barrier Integrity cornerstones for which there are no indicators to measure performance.

Inspection Dates: October 30 through December 15, 2006

Exit: December 15, 2006

Applicable Inspection Procedures

IP 71111.21	"Component Design Bases Inspection," dated June 22, 2006
IP 71152	"Identification and Resolution of Problems" (reference)

Prepared By:	/RA/	10/18/06
	P. Lougheed, Engineering Inspector	Date
Approved By:	/RA/	10/18/06
	A. M. Stone, Branch Chief, DRS	Date
Reviewed By:	/RA/	10/19/06
	C. Lipa, Branch Chief, DRP	Date

INSPECTION PLAN DETAILS

I. INSPECTION TEAM

P. Lougheed	Senior Engineering Inspector (lead)	(630) 829-9760	VPL@nrc.gov
J. Neurauter	Senior Engineering Inspector	(630) 829-9828	JEN@nrc.gov
C. Brown	Engineering Inspector	(630) 829-9605	CEB1@nrc.gov
K. Walton	Operations Inspector	(630) 829-9836	RKW@nrc.gov
J. Ayala[1]	NRR Project Manager (Training)	(301) 415-4063	JXA3@nrc.gov
V. Meghani[2]	Engineering Inspector (Training)	(630) 829-9751	VLM1@nrc.gov
D. Passehl	Senior Reactor Analyst	(630) 829-9872	DXP@nrc.gov
G. Skinner	Electrical Contractor	(412) 963-9889 (cell)	georgebsg@cs.com
M. Yeminy	Mechanical Contractor	(305) 926-120	Matyyeminy@hotmail.com

[1] Juan will be participating the week of November 13 – 17 only
[2] Vijay will be participating the weeks of November 27 – December 1 and December 11 – 15

II. Detailed Inspection Schedule

Lead Inspector Preparation: October 16 - 20, 2006

Preparation at Region III Offices: October 23 - 27, 2006

Information Gathering Visit Onsite: October 30 - November 3, 2006

Preparation at Region III Offices: November 6 - 9, 2006[3]

Inspection Onsite Weeks: November 13 - 17, 2006
November 27 - December 1, 2006
December 11 - 15, 2006

In-office Weeks: November 20 - 24, 2006[3]
December 4 - 8, 2006

Exit Meeting: December 15, 2006

[3] These weeks contain Federal holidays

Preparation of Inspection Report:

- Inputs Due: December 23, 2006, COB
- Draft Completed: January 12, 2007
- Management Review and Approval Completed (target): January 19, 2007

Inspection Report Must Be Issued Before January 29, 2007 (45 days from exit)

III. Lead Inspector Preparation Activities

a. General

The lead inspector will review the licensee material received and work with the SRA to narrow down the list of risk significant components provided by the licensee. Although the lead inspector and SRA will provide the team with a narrowed down list, this does not mean that other components can not be selected for review. The lead inspector will also complete a detailed inspection plan.

b. Information Requests

As part of the inspection preparation, the lead inspector contacted the licensee, informed them of the scope of the inspection, and requested that the necessary information be provided to the inspection team. The information request letter was sent to the license on September 13, 2006. The requested information was received back from the utility on October 11, 2006.

c. Distribution of Collected Information

On Monday, October 23, 2006, if not prior, the lead inspector will distribute the inspection plan, the information provided by the licensee, as well as information provided by the SRA. The majority of the information should be provided electronically. This information can be used by the team members in order to divide up the components to be reviewed during the information gathering visit.

IV. Team Preparation Activities

1. First In-office Preparation Week

The intent of the first preparation week is to begin narrowing down the components and operational experience to be reviewed during the inspection. The components identified by the lead and SRA will be divided between the team for further review determined during the information gathering visit. Working with the SRA, the senior inspectors will identify a preliminary list of risk-significant components.

Based on previous experience, plant walkdowns, discussions with the resident staff, and reviews of procedures and other documents, inspectors may identify other components that should be reviewed. The team will select 16-19 components for in-depth review during the inspection. These selections should be complete during the information gathering week or at the latest, the second in-office preparation week.

Dependent upon other assigned duties, inspectors should review the revised inspection procedure to familiarize themselves with the process for selection of components, operator actions, and operating experience; and conducting the inspection. Previous

CDBI inspection reports, such as Kewaunee (IR 05000305/2005002, ML050950237), Perry (IR 05000440/2006009, ML061250451), Duane Arnold (IR 05000331/206007, ML061580073) and Monticello (IR 05000263/2006009, ML062190468) should also be reviewed.

Inspectors should begin identifying some operating experience issues, either component specific, common cause, or generic issues that they may want to evaluate during the inspection. The operations inspector should begin identifying operator actions to be evaluated during the inspection.

Since most preparation activities will be during the next two weeks, inspectors should not spend a significant amount of time this week on preparation activities. Recommendation is under eight hours time charged.

2. Onsite Information Gathering Visit Week and Second In-office Preparation Week

a. General

During the information gathering week, the team will commence their review to determine which components, operator actions, and operating experience will be selected for review. Final selections of items for review will hopefully be completed by the end of this week, but some selection may go into the next week. A matrix will be developed to identify what each inspector is assigned to verify during the inspection. All inspectors and contractors will need to complete the site specific training to obtain unescorted access to the plant. The contractors are authorized to work a total of 40 hours for the information gathering visit and the second in-office preparation week.

b. Component Selection

The sample selection of 15-20 components should be based on risk significance and the least available margin. The team will initially select more than the minimum required to ensure the minimum number of samples are met. If it is determined that either the team does not have the time or resources to complete all of the selected components, they will not be included as part of the number of completed samples.

Margin is defined by the inspection procedure to be a combination of design margin, corrective action insights, maintenance history, design changes, complex design schemes, and maintenance rule insights. Design margin is typically defined as the difference between the actual (or predicted) and required performance of a system, component, or operator action. Low margin can be a function of the original design, caused by design modifications, power uprates, or can be due to degraded material conditions.

Inspection samples (safety or non-safety risk significant components) should be identified at the major component (e.g. pump, motor operated valve, etc.) or procedural step level to assist in inspection planning. Included within the selected sample should be passive components such as sump screens, strainers, piping, cables, etc., whose

failure could impact system functionality, component design functions that involve a lot of operation and human actions, availability/reliability issues, and components design attributes which are not fully demonstrated through testing. To the extent practical, the sample should include a diverse range of equipment. The team in their selection of samples should attempt to limit the number of systems involved (i.e. select pump, valve, strainer, etc, in same system, if possible), which will limit the amount of preparation time required to understand design and system requirements necessary to conduct a successful inspection.

In order to identify low margin areas, the inspectors should review detailed calculation conclusions associated with the identified risk-significant components to identify areas of low margin. For the initial component selection, the inspector need not review the details of the calculation, but rather should identify calculations showing little margin between predicted results and calculation and/or regulatory acceptance criteria. Once this identification is complete, no further review of the calculation is necessary until the component is selected.

In addition, the margin review should include corrective action program insights and repetitive maintenance summaries associated with the identified risk-significant components as poor performing components may be indicative of inadequate design. Component review should also include evaluation of the impact of plant modifications or licensing basis changes on available margin. In particular, licensing changes that can reduce safety analysis margins, such as extended power uprates, should be considered.

The SRA and resident inspector may be able to provide additional insights that would be useful in the selection of samples for review.

c. Operator Action Selection

The operations inspector should review the list of risk significant operator actions provided by the licensee, and with insights provided by the SRA and the resident inspector, select 3-5 for review during the inspection. A review of operating procedures, and operator task analysis validation studies should be performed to identify critical operator actions with little margin between the time required and the time available to complete an action. Based on the operator actions selected, the inspector should request from the licensee the procedures necessary to conduct the operations.

d. Operating Experience Selection

Based on the components selected, inspectors need to review the list of recent operating experience provided by the licensee and select potential issues that can be reviewed by the team. Other operating experience that the inspectors are aware of that may be relevant to the components selected can also be selected for review. In addition, the team should identify for review one or two generic or common cause issues that are not related to the selected samples (e.g., station blackout, ATWS, GL 89-13, etc.), some of which may relate back to selected components. Some of the operating experience selected should cover initiating events and barrier integrity cornerstones.

Based on those issues identified, the team will narrow down the samples to 4-6, which will be divided between team members.

e. Specific Component Assignments

Once it is determined which components, operator actions, and operating experience samples will be reviewed, and in consultation with the inspectors, the lead inspector will make specific assignments to individual inspectors. Once the components have been assigned, each inspector should obtain sufficient familiarity with the chosen components, operator actions, and operating experience samples and their associated systems to understand the design and safety requirement for the samples selected and their associated system. The inspectors should also review the flow paths in which the selected mechanical components are located and other components in those flow paths that could potentially affect their function.

For each component or inspection area assigned, the inspector needs to develop a list of attributes (see IP 71111.21, section 02.02 for examples) that will be reviewed during the inspection.

The inspectors' review should also identify potential areas where the interface between engineering and operations procedures can be reviewed by the operations inspector to ensure design requirements are adequately implemented into procedures.

The inspectors should review the list of modifications performed on their assigned components to determine whether any are either complex, reduce margin, required for power uprate, etc., to determine whether that modification should be considered for review during the inspection. Although the inspection procedure does not identify a specific number of modifications that need to be reviewed, the team will select approximately five modifications for review. These modifications will be selected by the team from those identified by individual team members.

f. Trainees

Dependent upon other assigned duties, the two trainees may not be participating during the preparation weeks. However, in order to maximize their participation during their onsite weeks, they will be assigned some components for review. Therefore, the trainees should make a good faith effort to complete the above "Specific Components Assignment" activities prior to their first week on site.

g. Requests for Additional Information

During the course of the inspection, team members should request their licensee contact to provide any specific information and/or documents they want to have readily available when they return to the site. This might include any specific modification packages, calculations, drawings, condition reports, procedures, schedule walkdowns, etc. Licensee computers will be available in the conference room with access to at least condition reports and procedures.

V Onsite Inspection Activities

a. Plant Walkdowns

The team will perform a general walkdown of the plant during the information gathering week. This will allow inspectors to become familiar with the plant, observe components assigned, and identify other potential areas for inspection.

During the inspection weeks, each inspector is expected to conduct a detailed walkdown of their assigned components and their associated systems. The intent of the component/system walkdowns is for the inspectors to obtain basic familiarity with the systems, material condition of equipment, where components are located, etc. in order to accomplish inspection objectives. During the walkdowns, the inspectors are also asked to be aware of general plant material conditions. Any abnormal or questionable conditions should be brought to the lead inspector to discuss with the resident staff and the licensee.

The operations inspector is expected to conduct walkdowns with plant operations personnel as needed to determine the feasibility of performing required in-plant operator actions.

b. Inspection

Successful completion of the CDBI inspection procedure requires a full understanding of how the components and their associated system operates, and is supposed to operate. Inspection of some broad-based attributes, such as those described in the inspection procedure, cannot be accomplished by a single inspector working independently of the rest of the team. However, to avoid duplication of work, each individual will be assigned primary responsibility for the attributes being inspected. For example, if a mechanical inspector is assigned to review a motor-operated valve, they may need an electrical inspector to review the degraded voltage calculation. The lead inspector will facilitate these types of reviews and will attempt to assign them at the start of the inspection to equalize the work load between inspectors.

Inspectors should plan their workload so that all major areas are preliminarily reviewed prior to the end of the first two onsite weeks of the inspection. The last onsite week should primarily be spent reviewing responses to questions previously asked, resolving issues, and developing any findings. This does not mean that new inspection can't be done; just that doing so leaves little time to develop issues before the end of the inspection.

c. Mentoring

During each of the onsite inspection weeks, the team will be accompanied by an inspector in training. Both Juan Ayala (electrical) and Vijay Meghani (structural) are experienced engineers so the focus of their participation will be on inspection techniques. Both trainees will be assigned a limited number of components to inspect.

The team leader is proposing to pair Juan with Carey Brown and George Skinner. Vijay will be paired with Jim Neurauter and Maty Yeminy. Keith Walton is also requested to provide operational mentoring. Finally Patricia Lougheed will provide oversight and will ensure that requested on the job training activities are occurring.

d. Inspection Objectives (IP 71111.21, Sections 02.02a, 02.02b, 02.02c, 02.02d and 02.03)

For the inspection attributes and inspection activities identified during the preparation weeks, conduct a detailed design review of the selected components' calculations, surveillances, and other associated system documentation to confirm each of the specified attributes for your assigned areas (02.02a). Perform plant walkdowns of selected components to verify as-built condition is consistent to design requirements and inspect component for material condition; and review components corrective action and maintenance history that could affect the components to function (02.02b). The operations inspector should verify performance of risk significant operator actions, along with a walk-through of a sample operations procedures for the selected components (02.02c). Review modifications to ensure design bases, licensing bases, and performance capability have not been degraded (02.02d). Review the licensee's evaluation and disposition of selected operating experience to ensure it has been adequately addressed (02.03).

e. Identification and Resolution of Problems

Identifying Design Issues - threshold and corrective action program
Sample of Problems - verify appropriateness of corrective actions

f. In-office Inspection

Inspectors should be aware of the direct inspection hour limits for this inspection. Since the inspection is conducted over an 8-week schedule with six inspectors versus the inspection procedure 7-week schedule and five inspectors, the number of hours used during the in-office weeks should be carefully monitored as to not exceed the total hours allotted for this inspection. If significant issues arise that require use of more hours, the lead inspector and branch chief should be informed prior to expending the resources. Contractors are also not scheduled to work the in office week between the 3rd and 4th onsite weeks.

VI Issues and Findings

Any issues arising from the inspection are to be preliminarily evaluated using MC 0612, MC 0609 and the Palisadesy specific Phase 2 worksheets **prior** to more than 4 hours inspection time being spent on them. The lead inspector will have copies of the worksheets available on site. Doing a preliminary evaluation will ensure that inspection

effort is focused on risk significant activities and will provide direction for areas needing exploration in order to confirm a finding.

Unless an issue can be shown to be greater than minor, additional inspection time (over the 4 hours) should not be spent. If an issue appears greater than minor, then sufficient questions need to be asked of the licensee to enable the inspectors to confirm any assumptions and complete the Phase 1 and 2 worksheets. Green findings will be documented in the inspection report. Findings that appear to be "other than green" or a potential operability issue shall be **immediately** brought to the lead inspector's attention so that it can be discussed with the licensee and the senior reactor analyst. If a color cannot be determined by the end of the inspection, the issue will be described as an "unresolved item," pending final determination of the appropriate risk significance. Enforcement action will be handled in accordance with the Enforcement Policy.

VII Documentation

a. Inspection Questions

Detailed design inspections normally result in a number of questions being raised. These questions are to be given to the licensee verbally — or, if written, the licensee must copy the information and the inspector must retain the written document. No written information is to be provided to the licensee.

Questions should not be "stored up" to the end of the day, but given to the licensee reasonably soon after being generated. As part of the daily interfaces with the licensee, the lead inspector will go over the status of outstanding questions. Therefore, the team members need to keep the lead inspector apprized of any concerns regarding the timeliness or quality of responses to questions.

Lack of response to questions will not be accepted as a reason for any delay in providing an input unless the licensee did not respond in a reasonable time frame (usually 24 hours), the lead inspector has been informed of the delay and has discussed it with the licensee prior to the exit, and the issue is one that has been determined to be potentially "greater than minor." Any document requests generated on the day of the debrief or afterwards **must** be approved by the lead inspector, must pertain to areas already inspected and must be only for the purpose of finalizing a finding or ensuring an accurate document list entry.

b. Report Preparation

The report will be prepared in accordance with the guidance in MC 0612, MC 0620, Region III model inspection report, and regional procedure 1220. It's recognized that RP 1220 does not strictly apply; however, it provides the best guidance available for formatting of the report and document lists. Input will primarily consist of a list of the

documents reviewed and a scope section for each component reviewed, unless a finding meets the guidance for documentation. The team **will** prepare the report inputs in WordPerfect, following the format of the Perry inspection report, which includes a document list in a table format. Issues which an inspector considers as meeting the criteria for inclusion in the report shall be discussed with the lead inspector prior to preparing an input. Finding input shall consist of both the detailed write-up for the body of the inspection report and the associated paragraphs for the summary of finding section of the inspection report. Inputs are to be e-mailed to the lead inspector within 5 working days (10 calendar days) of the exit.

In keeping with the requirements of MC 0620, only those documents which were reviewed as part of meeting an inspection attribute are to be included. The document list does not include procedures reviewed as part of preparation for the inspection. Corrective action documents generated as a result of the inspector's questions shall be called out separately from corrective action documents that were in the licensee's system prior to the inspection. It is strongly recommended that inspectors keep a list of documents up-to-date to ensure that no documents are missed.

XIII HRMS Information

a. Overall Time Management

The baseline inspection hours primarily encompasses only those hours spent starting with the first on-site inspection week and prior to the exit meeting. Time spent during the two in-office preparation weeks and the information gathering week are to be charged to prep. Baseline inspection hours do not include time spent in travel, entrance or exit meetings, major licensee debriefs, checking on e-mail, or keeping track of hours to correctly credit them. However, they do include time spent in team meetings and in preparing for team meetings. Between 10 to 15% of the baseline hours are to be spent in evaluating problem identification and resolution efforts.

b. Baseline Inspection Charges

The hours given for the this procedure is as follows:

Procedure	Minimum	Nominal	Maximum
71111.21	347	408	470

As a result, each inspector should be able to charge approximately between 102 and 117 hours over the 3-week inspection period. Contractors are allotted 272 hours of direct inspection effort (136 each).

c. Preparation Charges

The lead inspector has estimated that each inspector should charge approximately 60 hours to BIP for this inspection over the three week preparation period. The information gathering week and the two in-office preparation weeks (completion of selection process). If an inspector is unable to prepare due to other work demands, please discuss this with the lead inspector (who will then work with management to ensure proper inspection preparation occurs.) This should not be a problem as most preparation is performed onsite. During these three weeks, no time should be assigned to inspection.

d. Documentation Charges

During the inspection, any time spent documenting items which have been reviewed is to be charged to BID. Also the time spent on the exit meeting is to be charged to BID. If the inspector has no findings, documentation time should be between 6 and 15 hours. Documentation of findings should take about 20 hours, depending on their complexity. These hours may be adjusted, dependent upon the number and extent of findings. Please note that this does not change the time period over which the input is due: It still will be five working days following the exit.

e. Checking E-mail and Other Such Activities

For planning purposes, the lead inspector has assumed that each inspector will spend a maximum of 2 hours each on-site week of the inspection, maximum of 8 hours, checking e-mail, HRMS, or doing other activities not directly related to the inspection. This time, if used, should be charged to general administration.

f. Travel Charges

All travel time is to be charged in HRMS to an IPE code of "AT", including travel during non-regular hours (see below). For planning purposes, a total of approximately 24 hours travel is allotted to each inspector (6 per week). This is based on nominal driving travel time to the site.

g. Overtime

Based on the number of inspectors and the allowed direct inspection hours, overtime for each regional inspector should be minimal and normally not exceed 3 hours per onsite week. The overtime is to only be used to meet the inspection requirements or if an issue comes up at the end of the day that requires resolution. Inspectors need to inform the team leader if overtime will be used. Overtime must be claimed in HRMS if used. Any overtime spent traveling (although there shouldn't be any) also **must** be claimed in HRMS using the overtime code of "CPETV".

h. Trainees and Mentoring

Trainee time should be charged to ZT0007, "Qualification Training". Time spent mentoring, that is above and beyond normal inspection type assistance, should be charged to W90156, "Safety Professional/Entry Level Development and Coordination." This would include explaining inspection techniques, discussing how to assess the significance of an issue, or accompanying a trainee on a plant tour purely for the purpose of on-the-job training. Qualified inspectors should use their best judgement when charging to this code.

i. In-Office Week

In order to ensure that the maximum inspection hours are not exceeded, it is likely that inspectors will be asked to perform other tasks during the in-office weeks. As noted in item j. below, inspectors should keep close track of total inspection hours, if working on the inspection during an in-office week. This does not mean that inspection cannot be done, just that the inspector needs to be aware of the time spent and be able to justify the work product.

j. Tracking of Time

Because of this inspection could come close to the maximum allotted hours, it is imperative that each inspector keep close tabs on their hours and not exceed the number of hours listed in Item b., above. If it appears that the inspection cannot be completed within the time limitations described above, the lead inspector should be notified as soon as possible. The lead inspector will then consult with the branch chief as to available options, which might include reassignment of tasks.

IX Interface and Coordination Meetings

a. Entrance Meeting

The team will conduct the entrance meeting on Monday, November 13, 2006, tentatively scheduled for 1:00 p.m (est). Team members are expected to arrive onsite to attend the entrance meeting.

b. Licensee Debriefings

Daily debriefings with the licensee will start Wednesday, November 15th at 8:00 a.m. These daily meetings will normally be between the lead inspector, or her designee, and the licensee, with team member attendance on an as-needed basis.

c. Routine Interactions

Throughout the inspection, team members are expected to have routine interactions with licensee employees. It is expected that these interactions will be professional in

nature and will normally be conducted without the lead inspector present. Inspectors should keep track of any questions or requests for further information arising from these meetings.

d. Team Meetings

Team meetings during the information gathering week will be held on Tuesday, Wednesday, and Thursday at 3:00 p.m. The intent of these meetings is to discuss the selection of components, operator actions, and operating experience that will be reviewed during the inspection. An additional team meeting may be held, if necessary during the in-office preparation week on November 9, 2006, to finalize selection of components.

Team meetings during the onsite inspection weeks will be held starting Tuesday, November 14, at 3:00 p.m. The meetings will last approximately 40 minutes. The intent is to allow each inspector, including the lead inspector, to briefly discuss the day's activities/issues, status of inspection activities, and any administrative or logistics items.

An extensive team meeting will be held on Wednesday, December 13, 2006, to discuss the team's findings and determine what issues will be mentioned at the exit. This meeting will probably begin at 2:00 p.m. and will probably run longer than normal team meetings.

e. Final De-brief

The final de-brief with the licensee will be held on Thursday, December 14, 2006, around 2:00 p.m. Inspectors should be ready to discuss in some detail the areas they inspected, observations, and any potential violations/findings.

f. Exit Meeting

The team will conduct the exit meeting on Friday, December 15, 2006, tentatively scheduled for 11:30 a.m. Team members are expected to attend the final exit meeting and to be prepared to present any of their findings to the licensee.

X Logistics

a. Travel

According to the RIII travel web page, Palisades is approximately 150 miles away. The lead inspector has allotted approximately 3 hours driving time for both the first and last days of the onsite weeks for Region III inspectors. Additional travel time needed should be discussed with your branch chief. There is **no** need for Sunday travel. Additionally, the lead inspector requests that everyone use good judgement in all travel

arrangements. If severe weather conditions arise, it is expected that inspectors will take sensible precautions during traveling.

b. Hotels

Per diem for Palisades is 63/39/102. There are a number of hotels in South Haven, with additional hotels in the St. Joseph/Benton Harbor area. Carlson Travel, which should be used by all NRC inspectors, was able to arrange a rate of $59 at the South Haven Holiday Inn Express. When speaking with Carlson (John), remind them that this is a team inspection and that other inspectors are staying in South Haven MI. Contractors should call the hotel and ask to speak to either Jessica or Jenny to get at least the government rate of $63. Let them know you are with the Palisades NRC inspection team.

c. Inspection Location

The inspection team will be located in the main building outside the fence (second floor).

d. Badging and Dosimetry

The licensee is checking on badging for everyone. An e-mail will be sent out to all team members with the Palisades “read and sign” site access information. It is recommended that all team members take this opportunity to refresh their site access.

e. Hours of Work

Inspectors are expected to generally adhere to their normal working hours. Significant changes should be coordinated with the lead inspector but will be accommodated to the extent possible. However, compressed days off should be changed to a non-onsite week. Inspectors desiring to work overtime on their compressed days off need to individually coordinate this with their branch chief prior to the inspection.

f. Work at Home

It is acceptable to the lead inspector for inspectors to have perform work-at-home for any of the in-between weeks, the documentation week, and for parts of the preparation weeks, dependent upon the hours limitations discussed above. The lead inspector is willing to work with other inspectors to develop specific activities and work products to provide to the branch chief for approval. Please note that work-at-home must be approved by the appropriate branch chief.

Attachment A

DESIGN REVIEW QUESTIONS

During the design review, inspectors should consider the following questions:

Valves

1. Are the permissive interlocks appropriate?

2. Will the valve function at the pressures that will exist during transient/accident conditions?

3. Will the control and indication power supply be adequate for system function?

4. Is the control logic consistent with the system functional requirements?

5. What manual actions are required to back up and/or correct a degraded function?

Pumps

1. Is the pump capable of supplying required flow at required pressures under transient/accident conditions?

2. Is adequate net positive suction head (NPSH) available under all operating conditions?

3. Is the permissive interlock and control logic appropriate for the system function?

4. Is the pump control adequately designed for automatic operation?

5. When manual actions are required, do the operating procedures appropriately describe necessary operator actions?

6. What manual actions are required to back up and /or correct a degraded function?

7. Has the motive power required for the pump during transient/accident conditions been correctly estimated and included in the normal and emergency power supplies?

8. Do vendor data and specifications support sustaining operations at low flow rates?

9. Is the design and quality of bearing and seal cooling systems acceptable?

Instrumentation

1. Are the required plant parameters used as inputs to the initiation and control system?

2. If operator intervention is required in certain scenarios, have appropriate alarms and indications been provided?

DESIGN REVIEW QUESTIONS

3. Are the range, accuracy, and setpoint of instrumentation adequate?

4. Are the specified surveillance and calibrations of such instrumentation acceptable?

Circuit Breakers and Fuses

1. Is the breaker control logic adequate to fulfill the functional requirements?

2. Is the short circuit rating in accordance with the short circuit duty?

3. Are the breakers and fuses properly rated for the load current capability?

4. Are breakers and fuses properly rated for DC operation?

Cables

1. Are cables rated to handle full load at the environments temperature expected?

2. Are cables properly rated for short circuit capability?

3. Are cables properly rated for voltage requirements for the loads?

Electrical Loads

1. Have electrical loads been analyzed to function properly under the expected lowest and highest voltage conditions?

2. Have loads been analyzed for their inrush and full load currents?

3. Have loads been analyzed for their electrical protection requirements?

As-built System

1. Are service water flow capacities sufficient with the minimum number of pumps available under accident conditions?

2. Have modified equipment components falling under the scope of 10 CFR 50.49 been thoroughly evaluated for environmental equipment qualifications considerations such as temperature, radiation, and humidity?

3. Are the modifications to the system consistent with the original design and licensing bases?