Luminant

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CP-201001635
Log # TXNB-10087

Ref. # 10 CFR 52

December 16, 2010

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555
ATTN: David B. Matthews, Director
Division of New Reactor Licensing

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT, UNITS 3 AND 4
DOCKET NUMBERS 52-034 AND 52-035
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION NO. 5116 (SECTION 8.2), 5117 (SECTION 8.4), 5225 (SECTION 2.4.3), AND 5237 (SECTION 17.5)

Dear Sir:

Luminant Generation Company LLC (Luminant) submits herein the response to Request for Additional Information (RAI) No. 5116, 5117, 5225, and 5237 for the Combined License Application for Comanche Peak Nuclear Power Plant Units 3 and 4. The RAIs involve the offsite power system, station blackout, probable maximum flood, and Quality Assurance Program Description, respectively.

Should you have any questions regarding this response, please contact Don Woodlan (254-897-6887, Donald.Woodlan@luminant.com) or me.

The only commitment in this letter is one regarding confirmation of revision levels and dates of references in FSAR Chapter 17 made in the response to CP RAI #189 Question 17.5-12. This confirmation will be complete during the first quarter of 2011 and is being tracked as regulatory commitment #8242.

I state under penalty of perjury that the foregoing is true and correct.

Executed on December 16, 2010.

Sincerely,

Luminant Generation Company LLC

Donald R. Woodlan for

Rafael Flores

Attachments: 1. Response to Request for Additional Information No. 5116 (CP RAI #182)
2. Response to Request for Additional Information No. 5117 (CP RAI #183)
3. Response to Request for Additional Information No. 5225 (CP RAI #188)
4. Response to Request for Additional Information No. 5237 (CP RAI #189)

Enclosures: DVD and CD with documents for Attachment 3

D090
NRO

cc: Stephen Monarque w/enclosures

Electronic distribution w/o enclosures:

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RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 5116 (CP RAI #182)

SRP SECTION: 08.02 - Offsite Power System

QUESTIONS for Electrical Engineering Branch (EEB)

DATE OF RAI ISSUE: 10/19/2010

QUESTION NO.: 08.02-29

The regulatory basis for this question is discussed in NUREG-0800, Standard Review Plan (SRP), Section 8.2 and 10 CFR 50.65(a)(1).

Chapter 8 of the applicant's Combined License Application did not discuss the cable monitoring program for underground and inaccessible cables within the scope of the maintenance rule. 10 CFR 50.65(a)(1) which states that, "Each holder of a license to operate a nuclear plant ... shall monitor the performance or condition of structures, systems, or components... in a manner sufficient to provide reasonable assurance that such structures, systems, and components... are capable of fulfilling their intended functions." Additionally, Standard Review Plan Section 8.2.III.1.L, states, "Operating experience has shown that undetected degradation of underground electric cables...could result in multiple equipment failures. Underground or inaccessible power and control cable runs that are susceptible to protracted exposure to wetted environments or submergence... should be reviewed." Guidance providing an acceptable means of meeting 10 CFR 50.65(a)(1) requirements with respect to the selection of electric cable condition monitoring can be found in Sections 3 and 4.5 of NUREG/CR-7000.

Also, as stated in COL Information Item 17.6(1):

The COL applicant must provide in its FSAR a description of the maintenance rule program , and its implementation , for monitoring the effectiveness of maintenance necessary to meet the requirements of 10 CFR 50.65.

Since the staff did not find a discussion of a cable monitoring program for underground and inaccessible cables within the scope of the maintenance rule as required by 10 CFR 50.65(a)(1), describe the monitoring program for underground and inaccessible cables (power, control and instrumentation) under the maintenance rule, and revise the FSAR to reflect this information.

ANSWER:

Condition monitoring of underground or inaccessible cables within the scope of the maintenance rule is considered part of the 10 CFR 50.65 maintenance rule program to be implemented just prior to fuel load authorization. Specific information necessary to determine appropriate inspections, tests and monitoring is not available at this time. A review of detailed design and procurement information is needed to

determine the method and frequency for cable inspection or testing. NUREG/CR-7000 provides detailed recommendations on implementing a cable condition monitoring program. This NUREG was released in January 2010 and is under evaluation by the industry. The latest industry experience and other available information will be considered in developing a cable condition monitoring program as part of the maintenance rule program. A description of this aspect of the maintenance rule program has been added to the FSAR.

Impact on R-COLA

See attached marked-up FSAR Revision 1 pages 8.2-13 and 8.3-4.

Impact on DCD

See attached marked-up DCD Revision 2 page 8.3-57 provided in MHI letter UAP-HF-10334.

~~CP~~STD COL 8.2(11) Replace the last sentence of the fourth paragraph in DCD Subsection 8.2.3 with the following. CTS-01140

A transmission system reliability analysis is provided in Subsection 8.2.2.2. CTS-01140

STD COL 8.3(12) Condition monitoring of underground or inaccessible cables within the scope of the maintenance rule (10 CFR50.65) is incorporated into the maintenance rule program. The cable condition monitoring program incorporates lessons learned from industry operating experience, address regulatory guidance, and utilizes information from detailed design and procurement documents to determine the appropriate inspections, tests, and cable monitoring criteria within the scope of the maintenance rule described in Subsection 17.6.2. The program takes into consideration Generic Letter 2001-01. RCOL2_08.02-29

8.2.4 Combined License Information

Replace the content of DCD Subsection 8.2.4 with the following.

CP COL 8.2(1) ***8.2(1)*** *Utility power grid and transmission line*

This Combined License (COL) Item is addressed in Subsections 8.1.2.1, 8.2.1.1, 8.2.1.2.3, Table 8.2-201, Table 8.2-202, and Figure 8.2-201.

8.2(2) *Deleted from the DCD.*

CP COL 8.2(3) ***8.2(3)*** *Switchyard description*

This COL Item is addressed in Subsections 8.1.1, 8.1.5.3.5, 8.2.1.2.1.1, 8.2.1.2.1.2, 8.2.1.2.2, Figure 8.1-1R, Figure 8.2-202, Figure 8.2-203, Figure 8.2-204, Figure 8.2-205, Figure 8.2-206, Figure 8.2-207, Figure 8.2-208, Figure 8.3.1-1R and Figure 8.3.1-2R.

CP COL 8.2(4) ***8.2(4)*** *Normal preferred power*

This COL Item is addressed in Subsection 8.2.1.2, Figure 8.2-202, Figure 8.2-203, Figure 8.2-207 and Figure 8.2-208.

CP COL 8.2(5) ***8.2(5)*** *Alternate preferred power*

This COL Item is addressed in Subsection 8.2.1.2, Figure 8.2-202, Figure 8.2-204, Figure 8.2-207 and Figure 8.2-208.

8.2(6) *Deleted from the DCD.*

CP COL 8.2(7) ***8.2(7)*** *Protective relaying*

8.3(7) *Deleted from the DCD.*

STD COL 8.3(8) ***8.3(8)*** *Short circuit analysis for dc power system*

This COL Item is addressed in Subsections 8.3.2.1.1, 8.3.2.1.2 and 8.3.2.3.2.

8.3(9) *Deleted from the DCD.*

STD COL 8.3(10) ***8.3(10)*** *Equipment Protection and Coordination Studies*

This COL Item is addressed in Subsection 8.3.1.3.4.

CP COL 8.3(11) ***8.3(11)*** *Insulation Coordination (Surge and Lightning Protection)*

This COL Item is addressed in Subsection 8.3.1.3.5.

STD COL 8.3(12) ***8.3(12)*** *Cable monitoring program* RCOL2_08.02-29

This COL item is addressed in subsection 8.2.3 of the FSAR and 8.3.3 of the DCD.

MITSUBISHI HEAVY INDUSTRIES, LTD.
16-5, KONAN 2-CHOME, MINATO-KU
TOKYO, JAPAN

December 15, 2010

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Mr. Jeffrey A. Ciocco

Docket No. 52-021
MHI Ref: UAP-HF-10334

Subject: Update of Chapter 8 of US-APWR DCD

Reference:
1) Letter CP-200901597 logged as TXNB-09074 from M.L. Lucas (Luminant) to U.S. NRC, "COMANCHE PEAK NUCLEAR POWER PLANT, UNITS 3 AND 4, DOCKET NUMBERS 52-034 AND 52-035, REVISION 1 TO THE COMBINED LICENSE APPLICATION," dated November 20, 2009
2) Letter MHI Ref: UAP-HF-09490 from Y. Ogata (MHI) to U.S. NRC, "Submittal of US-APWR Design Control Document Revision 2 in Support of Mitsubishi Heavy Industries, Ltd.'s Application for Design Certification of the US-APWR Standard Plant Design" dated on October 27, 2009.
3) NRC Request for Additional Information (RAI) No. 5116 Revision 1, RAI #182, 10/19/2010, Comanche Peak Units 3 and 4, Luminant Generation Company, LLC. Docket No. 52-034 and 52-035, SRP Section: 08.02 - Offsite Power System, Application Section: FSAR Section 8.2
4) NRC Request for Additional Information (RAI) No. 5117 Revision 1, RAI #183, 10/19/2010, Comanche Peak Units 3 and 4, Luminant Generation Company, LLC. Docket No. 52-034 and 52-035, SRP Section: 08.04 - Station Blackout, Application Section: FSAR Section 8.4

During the review process of the Combined License Application for Comanche Peak Units 3 and 4 (Reference 1, "R-COLA"), which incorporates by reference the Mitsubishi Heavy Industries, Ltd. (MHI) Design Certification Application for the US-APWR Standard Plant Design (Reference 2, "DCD"), the U.S. Nuclear Regulatory Commission ("NRC") Staff has requested additional information about offsite power system and station blackout (Reference 3 and 4).

During development of the Luminant response to these RAIs for the R-COLA, MHI has determined that updates of Chapter 8 of the MHI US-APWR Design Control Document are required.

With this letter, MHI transmits to the NRC Staff the proposed DCD updates necessary to support the Luminant response to these RAIs. These updates will be incorporated in a future DCD revision.

Please contact Dr. C. Keith Paulson, Senior Technical Manager, Mitsubishi Nuclear Energy Systems, Inc. if the NRC has questions concerning any aspect of this letter. His contact information is provided below.

Sincerely,

Y. Ogata

Yoshiki Ogata,
General Manager- APWR Promoting Department
Mitsubishi Heavy Industries, LTD.

Enclosure:

1. Update of Chapter 8 of the US-APWR DCD

CC: J. A. Ciocco
C. K. Paulson

Contact Information
C. Keith Paulson, Senior Technical Manager
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Telephone: (412) 373-6466

8.3.3 Tests and Inspections

All active components of the electrical system are accessible for inspection during plant power generation. The electrical system components like transformers, switchgears, circuit breakers, MCCs, GTGs and their controls are tested in accordance with applicable standards and manufacturer recommendations for the Class 1E and non-Class 1E before plant startup.

The Class 1E electrical power systems are provided with four redundant trains and any one train can be taken out for maintenance and testing during normal power operation without impacting the minimum safety requirements.

- The Class 1E GTGs are periodically inspected and tested per the requirements of IEEE Std 387 (Reference 8.1-1).
- The restoration of AAC power supply within 60 minutes to one of the Class 1E buses from the AAC GTG is verified by test.
- The batteries are periodically inspected and tested per IEEE Std 450 (Reference 8.3.2-4) and IEEE Std 484 (Reference 8.3.2-3).

Underground and inaccessible cables within the scope of the maintenance rule (10 CFR 50.65) are monitored by periodical testing in a manner similar to the medium voltage cables in underground duct banks described in Subsection 8.2.1. The COL Applicant is to provide the cable monitoring program for underground and inaccessible cables with the scope of the maintenance rule.

8.3.4 Combined License Information

COL 8.3(1) *The COL applicant is to provide transmission voltages. This includes also MT and RAT voltage ratings.*

COL 8.3(2) *The COL applicant is to provide ground grid and lightning protection.*

COL 8.3(3) *The COL applicant is to provide short circuit analysis for ac power system, since the system contribution is site specific.*

COL 8.3(4) *Deleted*

COL 8.3(5) *Deleted*

COL 8.3(6) *Deleted*

COL 8.3(7) *Deleted*

COL 8.3(8) *The COL applicant is to provide short circuit analysis for dc power system.*

COL 8.3(9) *Deleted*

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 5116 (CP RAI #182)

SRP SECTION: 08.02 - Offsite Power System

QUESTIONS for Electrical Engineering Branch (EEB)

DATE OF RAI ISSUE: 10/19/2010

QUESTION NO.: 08.02-30

The regulatory basis for this question is discussed in NUREG-0800, Standard Review Plan (SRP), Section 8.2.

FSAR Subsection 8.2.2.2 states that:
"The Comanche Peak generation remains stable for reasonably expected contingencies. These study cases include loss of the most heavily loaded transmission circuit connected to the plant switching station, loss of the largest capacity transmission circuit connected to the plant switching station and removal of the largest load from the system. In addition, in case of loss of the largest supply, i.e. CPNPP Units 3 and 4, the transmission system remains stable with slight voltage and frequency variation. The voltage low point is about 0.976 per unit and frequency deviation from 60 Hz is only 0.24 Hz at the lowest point. In addition, the maximum frequency decay rate does not exceed 5 Hz/second that is assumed in the reactor coolant system flow analysis in Chapter 15." (emphasis added)

It is not clear from the applicant's statement that the stability of the grid will be studied to confirm that after a turbine trip, adequate power to the RCPs is maintained for at least three seconds as required in the transient and accident analysis in Chapter 15. Confirm that anti-motoring protective relaying for the main generator will open the generator output breaker after a time delay of at least 15 seconds, during which time the rotating generator will provide voltage support to the grid, and provide an ITAAC to verify the 15 seconds time delay associated with anti-motoring protective relaying to trip generator output breaker. Also, confirm that the analyses in Chapter 15 do not assume (credit) operation of the RCPs following the turbine trip if the initiating event is an electrical system failure.

ANSWER:

The statement from FSAR Subsection 8.2.2.2 emphasized in the question refers to the specialized case of a complete loss of forced reactor coolant flow initiated by decrease of offsite power frequency to all four RCPs during power operation evaluated in DCD Subsection 15.3.1.2. The transient stability study documented in FSAR Subsection 8.2.2.2 confirmed the 5Hz/second frequency decay rate assumption was valid.

Luminant confirms that anti-motoring protective relaying for the main generator will open the generator output breaker after a time delay of at least 15 seconds, during which time the rotating generator will provide voltage support to the grid. However, neither the 3-second delay after a turbine trip to maintain power to the RCP, nor the 15-second time delay in the anti-motoring protective relay scheme is required by the accident analysis for the US-APWR. The 3-second and 15-second delays may be familiar to the reviewer as requirements for PWRs that employ passive safety designs, but neither delay is required for the US-APWR. Therefore, an ITAAC to verify the 15-second time delay is not required.

In DCD Subsection 15.0.0.7, the 3-second delay time between a reactor trip and LOOP is used in the safety analyses to prevent the complete loss of flow transient from being superimposed on the initiating event being evaluated. The 3-second time delay assures that the portion of the transient following a postulated LOOP occurs after the limiting DNBR. Therefore, for the safety analyses, the minimum DNBR at any time during the transient is the same with offsite power available or unavailable. The 3-second delay, although a realistic assumption of actual plant response, is not a requirement for plant design.

The DCD Chapter 15 safety analyses are based on the initiating events defined by SRP Chapter 15, two of which can be considered due to an electrical system failure. The first event is the loss of non-emergency AC power to the station auxiliaries described in DCD Subsection 15.2.6. In this case, the electrical system failure is the complete LOOP, which is assumed to cause a coast-down of all RCPs. The analysis assumes that RCP coast-down begins at the same time as the turbine trip and LOOP. Therefore, the DCD Subsection 15.2.6 analysis does not credit continued operation of the RCPs following turbine trip for this initiating event.

The second event is the complete loss of forced coolant flow described in DCD Subsection 15.3.1. In this case, an electrical system failure is one possible failure that results in a loss of power to all RCPs, causing a coast-down of all of the RCPs. By definition, the continued operation of the RCPs is not credited during this event.

In summary, the accident analysis does not credit a time delay between turbine trip and tripping the main generator breaker. Thus, an ITAAC is not required to verify this time delay.

Impact on R-COLA

None.

Impact on DCD

None.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 5117 (CP RAI #183)

SRP SECTION: 08.04 - Station Blackout

QUESTIONS for Electrical Engineering Branch (EEB)

DATE OF RAI ISSUE: 10/19/2010

QUESTION NO.: 08.04-1

The regulatory basis for this question is discussed in NUREG-0800, Standard Review Plan (SRP), Section 8.4 and Regulatory Guide 1.155.

The US-APWR DCD, Tier 2, Section 8.4.2.2, "Conformance with Regulatory Guidance," states that the applicant's conformance with Position C.3.4 of Regulatory Guide 1.155, "Station Blackout," would be demonstrated by providing procedures and training to cope with Station Blackout (SBO). US-APWR DCD, FSAR Section 13.5, "Plant Procedures," explains that the development of administrative and operating procedures to be used by the operating organization (plant staff) is designated as the responsibility of the COL Applicant. Therefore, a COL applicant referencing the US-APWR design is responsible for SBO procedures, which include (1) Station Blackout Response Guidelines, (2) AC Power restoration Guidelines and (3) Severe Weather Guidelines. Confirm whether these procedures and training are addressed in the COL, Part 2, FSAR with references to the DCD FSAR description. If these procedures are not addressed in the COL FSAR, provide the procedures and revise the FSAR to reflect the addition of these procedures.

ANSWER:

DCD Revision 2 Tier 2 Subsection 8.4.2.2 notes that the procedures to cope with SBO are addressed in Section 13.5 and the training is addressed in Section 13.2. These sections, as incorporated into the CPNPP FSAR, address how plant procedures and training are developed and implemented for CPNPP Units 3 and 4. These sections address the full range of procedures and training, which includes the specific procedures (guidelines) identified in the question. In particular, although not specifically referenced, SBO procedures fall under FSAR Subsection 13.5.2.1. This subsection addresses Operating and Emergency Operating Procedures as well as the Procedure Generation Package. The Station Blackout Response Guideline, the AC Power Restoration Guideline, and a Severe Weather Guideline are covered by the discussions in FSAR 13.5.2.1. The commitment provided in DCD Subsection 8.4.2.2, which is incorporated by reference into the FSAR, in concert with the discussions on procedures in Sections 13.2 and 13.5, fully address these procedures in the FSAR. Additional revision of the FSAR is not required.

Impact on R-COLA

None.

Impact on DCD

None.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 5117 (CP RAI #183)

SRP SECTION: 08.04 - Station Blackout

QUESTIONS for Electrical Engineering Branch (EEB)

DATE OF RAI ISSUE: 10/19/2010

QUESTION NO.: 08.04-2

The regulatory basis for this question is discussed in NUREG-0800, Standard Review Plan (SRP), Section 8.4.

NUMARC 8700, item B10, endorsed by NRC staff in RG 1.155, states that the AAC power source shall be started and brought to operating conditions that are consistent with its functions as an AAC source at intervals not longer than three months, following manufacturer's recommendations. Once every refueling outage, a timed start and rated load capacity test shall be performed. Describe how Luminant would satisfy the above test requirements at Comanche Peak Nuclear Power Plant, Units 3 and 4.

ANSWER:

DCD Subsection 8.4.2.2 has been revised to require that the AAC power system be tested and inspected periodically to demonstrate operability and reliability. Testing and maintenance of the AAC is evaluated under the reliability assurance program and the maintenance rule program as described in DCD and COLA Section 17.4 and COLA Section 17.6. The surveillance test interval does not exceed 3 months. During the quarterly surveillance test, the AAC generator is started and brought to operating conditions. During every refueling outage, the AAC generator is tested by performing a timed start and rated load capacity test. The FSAR incorporates DCD Section 8.4 with no departures or supplements. Luminant will incorporate the stated requirements into the maintenance program.

Impact on R-COLA

None.

Impact on DCD

See attached proposed change to DCD Revision 2 pages 8.4-10 and 8.3-57 provided in MHI letter UAP-HF-10334.

MITSUBISHI HEAVY INDUSTRIES, LTD.
16-5, KONAN 2-CHOME, MINATO-KU
TOKYO, JAPAN

December 15, 2010

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Mr. Jeffrey A. Ciocco

Docket No. 52-021
MHI Ref: UAP-HF-10334

Subject: **Update of Chapter 8 of US-APWR DCD**

Reference:
1) Letter CP-200901597 logged as TXNB-09074 from M.L. Lucas (Luminant) to U.S. NRC, "COMANCHE PEAK NUCLEAR POWER PLANT, UNITS 3 AND 4, DOCKET NUMBERS 52-034 AND 52-035, REVISION 1 TO THE COMBINED LICENSE APPLICATION," dated November 20, 2009
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4) NRC Request for Additional Information (RAI) No. 5117 Revision 1, RAI #183, 10/19/2010, Comanche Peak Units 3 and 4, Luminant Generation Company, LLC. Docket No. 52-034 and 52-035, SRP Section: 08.04 - Station Blackout, Application Section: FSAR Section 8.4

During the review process of the Combined License Application for Comanche Peak Units 3 and 4 (Reference 1, "R-COLA"), which incorporates by reference the Mitsubishi Heavy Industries, Ltd. (MHI) Design Certification Application for the US-APWR Standard Plant Design (Reference 2, "DCD"), the U.S. Nuclear Regulatory Commission ("NRC") Staff has requested additional information about offsite power system and station blackout (Reference 3 and 4).

During development of the Luminant response to these RAIs for the R-COLA, MHI has determined that updates of Chapter 8 of the MHI US-APWR Design Control Document are required.

With this letter, MHI transmits to the NRC Staff the proposed DCD updates necessary to support the Luminant response to these RAIs. These updates will be incorporated in a future DCD revision.

Please contact Dr. C. Keith Paulson, Senior Technical Manager, Mitsubishi Nuclear Energy Systems, Inc. if the NRC has questions concerning any aspect of this letter. His contact information is provided below.

Sincerely,

Y. Ogata

Yoshiki Ogata,
General Manager- APWR Promoting Department
Mitsubishi Heavy Industries, LTD.

Enclosure:

1. Update of Chapter 8 of the US-APWR DCD

CC: J. A. Ciocco
C. K. Paulson

Contact Information
C. Keith Paulson, Senior Technical Manager
Mitsubishi Nuclear Energy Systems, Inc.
300 Oxford Drive, Suite 301
Monroeville, PA 15146
E-mail: ck_paulson@mnes-us.com
Telephone: (412) 373-6466

8.3.3 Tests and Inspections

All active components of the electrical system are accessible for inspection during plant power generation. The electrical system components like transformers, switchgears, circuit breakers, MCCs, GTGs and their controls are tested in accordance with applicable standards and manufacturer recommendations for the Class 1E and non-Class 1E before plant startup.

The Class 1E electrical power systems are provided with four redundant trains and any one train can be taken out for maintenance and testing during normal power operation without impacting the minimum safety requirements.

- The Class 1E GTGs are periodically inspected and tested per the requirements of IEEE Std 387 (Reference 8.1-1).
- The restoration of AAC power supply within 60 minutes to one of the Class 1E buses from the AAC GTG is verified by test.
- The batteries are periodically inspected and tested per IEEE Std 450 (Reference 8.3.2-4) and IEEE Std 484 (Reference 8.3.2-3).

Underground and inaccessible cables within the scope of the maintenance rule (10 CFR 50.65) are monitored by periodical testing in a manner similar to the medium voltage cables in underground duct banks described in Subsection 8.2.1. The COL Applicant is to provide the cable monitoring program for underground and inaccessible cables with the scope of the maintenance rule.

8.3.4 Combined License Information

COL 8.3(1) *The COL applicant is to provide transmission voltages. This includes also MT and RAT voltage ratings.*

COL 8.3(2) *The COL applicant is to provide ground grid and lightning protection.*

COL 8.3(3) *The COL applicant is to provide short circuit analysis for ac power system, since the system contribution is site specific.*

COL 8.3(4) *Deleted*

COL 8.3(5) *Deleted*

COL 8.3(6) *Deleted*

COL 8.3(7) *Deleted*

COL 8.3(8) *The COL applicant is to provide short circuit analysis for dc power system.*

COL 8.3(9) *Deleted*

The AAC power system will be inspected and tested periodically based on manufactures' recommendations and Reg 1.155 to demonstrate operability and reliability. The surveillance test interval does not exceed 3 months (Quarterly). During the quarterly test the AAC is started and brought to operating conditions. Additionally, during every refueling outage, the AAC generator is tested by performing a timed start and rated load capacity test. The reliability of the AAC power system will meet or exceed 95% as determined in accordance with NSAC-108 (Reference 8.4-2) or equivalent methodology to meet ~~the~~ Criterion 5 of Section C.3.3.5, RG 1.155 (Reference 8.3.1-21). Testing and maintenance of the AAC is evaluated under the reliability assurance program and the maintenance rule program as described in DCD and COLA Section 17.4 and COLA 17.6.

Procedures to cope with SBO are addressed in Section 13.5 and the training is addressed in Section 13.2. These include all operator actions necessary to cope with SBO for at least the duration in accordance with Subsection 8.4.2.1.1 and to restore normal long-term core cooling/decay heat removal once ac power is restored. This meets the requirement of Regulatory Position C.3.4 of RG 1.155.

The quality assurance of AAC GTG is controlled in accordance with DCD Chapter 17 and related topical report PQD-HD-19005 Revision 2 (Reference 8.4-3). This meets the requirements of Regulatory Position C.3.5 of RG 1.155.

8.4.3 Combined License Information

No additional information is required to be provided by a COL applicant in connection with this section.

8.4.4 References

8.4-1 Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors, NUMARC 87-00, Revision. 1, August 1991.

8.4-2 Reliability of Emergency Diesel Generators at U.S Nuclear Power Plants, NSAC-108, September 1986.

8.4-3 Quality Assurance Program (QAP) Description For Design Certification of the US-APWR, PQD-HD-19005 Revision 3, September 2009.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 5117 (CP RAI #183)

SRP SECTION: 08.04 - Station Blackout

QUESTIONS for Electrical Engineering Branch (EEB)

DATE OF RAI ISSUE: 10/19/2010

QUESTION NO.: 08.04-3

The regulatory basis for this question is discussed in NUREG-0800, Standard Review Plan (SRP), Section 8.4.

NUMARC 8700, item B11, endorsed by RG 1.155, states that surveillance and maintenance procedures for the AAC system shall be implemented considering manufacturer's recommendations or in accordance with plant developed procedures. Describe how Luminant would satisfy the above procedures at Comanche Peak Nuclear Power Plant, Units 3 and 4.

ANSWER:

Please see the response to Question 08.04-2 above.

Impact on R-COLA

None.

Impact on DCD

None.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 5225 (CP RAI #188)

SRP SECTION: 02.04.03 - Probable Maximum Flood (PMF) on Streams and Rivers

QUESTIONS for Hydrologic Engineering Branch (RHEB)

DATE OF RAI ISSUE: 11/15/2010

QUESTION NO.: 02.04.03-12

NUREG-0800, Standard Review Plan (SRP), Section 2.4.3, 'Probable Maximum Flood (PMF) on Streams and Rivers,' establishes criteria that the NRC staff intends to use to evaluate whether an applicant meets the NRC's regulations. In response to supplemental RAIs 4308, 4309, 4310, and 4311 the Applicant provided responses dated July 16, 2010 which discussed estimation of watershed flooding as a result of flood causing hydrological mechanisms, including calculation package TXUT-00-FSAR 2.4.3-CALC-012 REV. 2. While performing the review and comparing the HEC-HMS basin layout of Figure 7-12 of Revision 2 to the original HEC-HMS basin layout of Figure 7-4 of TXUT-00-FSAR 2.4.3-CALC-012 Revision 1 provided by the Applicant in August 2009, it became clear that the Applicant revised the sub-basins network topology used in the HEC-HMS modeling to determine runoff to Squaw Creek Reservoir and routing to Brazos-Paluxy confluence. The NRC staff needs to confirm that the actual HEC-HMS and HEC-RAS computer modeling input/setup files are consistent with the results cited in TXUT-001-FSAR-2.4.3-CALC-012 Rev 2.

As such, the applicant is requested to submit the files for review. The NRC staff also requests clarification of why, as referenced in Section 2.0 of TXUT-00-FSAR 2.4.3-CALC-012 REV. 2, different flow rates are used in HEC-HMS and HEC-RAS analysis and determination of the backwater elevation at Squaw Creek Dam tailwater. The HEC-HMS outflow from SCR is 206,000 cfs, whereas the HEC-RAS input is specified as a "backwater flow" of 100.440 cfs. Clarify the physical significance of these two flow rates and their relationship.

ANSWER:

The HEC-RAS steady state and unsteady state models used in Calculation TXUT-001-FSAR 2.4.3-CALC-012, Rev.3 (Calc 012) are provided on the attached DVD. The HEC-HMS model used in Calc 012 is also provided on the DVD, as well as the calculation packages.

The referenced flows of 206,000 cfs and 100,400 cfs represent outflow from Squaw Creek Reservoir (SCR) for two different probable maximum precipitation (PMP) scenarios. Various scenarios were evaluated to determine the maximum backwater elevation at the toe of the Squaw Creek Dam. Because of large coincidental downstream flow on the Paluxy River, the scenario resulting in the smaller outflow

from the SCR results in the highest backwater elevation at the toe of the Squaw Creek Dam. Details of the PMP scenarios and the results are provided in the following discussion.

Calculation TXUT-001-FSAR 2.4.3-CALC-011 (Calc 011) has been revised to include the correct HEC-HMS model, the one used in Calc 012. The revised HEC-HMS model layout indicates the runoff from the SCR is routed along Reach 2 to Junction 1. The runoff from Basin 4 is routed using Reach 4 to Junction 1. The routed runoff from the SCR and Basin 4 are combined with runoff from Basin 2 and Basin 3 at Junction 1. Due to the revised routing; the critical temporal distribution for the Paluxy River changed from the center distribution to the two-thirds distribution.

Calc-012 has been revised to include the two-thirds temporal distribution for the Paluxy River. The results of revised Calc 012 indicate that the probable maximum flood (PMF) water surface elevation of 793.66 ft NAVD 88, corresponding to an outflow of 206,000 cfs from the SCR, remains unchanged. Due to the revised Paluxy River temporal distribution, the sensitivity analysis provides the maximum backwater elevation of 761.11 ft NAVD 88 at the toe of Squaw Creek Dam, with a corresponding flow of 181,880 cfs.

Two PMP scenarios were considered to determine the PMF at Comanche Peak Nuclear Power Plant (CPNPP). These scenarios were chosen based on an iterative process of computing the PMP and rainfall runoff for several storm centers as described in Calc 011. The two PMP scenarios analyzed in Calc 012 are:

- Scenario A - PMP in the sub-basin above Squaw Creek Dam (Basin 1) with the storm center at SC X and a two-thirds peaking temporal distribution.
- Scenario B - PMP in the overall watershed (Squaw Creek and Paluxy River watershed) with the storm center at PR Y and a two-thirds peaking temporal distribution.

Scenario A provides the most conservative PMF elevation at CPNPP using HEC-HMS software. The Squaw Creek Dam discharge rating curves used in the PMF analysis assume a submerged spillway condition with a tailwater elevation of 776 ft NGVD 29. The crest of the service spillway is at an elevation of 775 ft. Submerged spillway conditions are expected to reduce the runoff from the SCR resulting in higher PMF water surface elevation at CPNPP. Scenario A and submerged spillway conditions, combined with other inputs such as baseflow, non-linear basin response, watershed characteristics, channel characteristics, etc., as explained in Calc 012, result in a peak outflow of 206,000 cfs from the SCR and a PMF water surface elevation of 793.66 ft NAVD 88 at CPNPP using the HEC-HMS model.

Scenario B provides the most conservative PMF estimates at the confluence of Squaw Creek and the Paluxy River using HEC-HMS software. Scenario A and Scenario B were combined in the HEC-RAS steady state analysis to determine the water surface elevation at the confluence. This is a conservative approach because multiple PMF events were assumed to occur coincidentally and their peak flows were combined. The transposed Brazos River dam failure flow obtained from TXUT-001-FSAR 2.4.3-CALC-015, Rev.1 in combination with peak flows from each basin (Basins 1 to 4) results in a water surface elevation of 760.02 ft at the confluence.

Calc 012 includes a backwater analysis using the HEC-RAS unsteady state approach to estimate the PMF water surface elevation downstream of Squaw Creek Dam coincident with downstream conditions at the confluence. As indicated in Calc 012, Scenario A results in higher flows from Basins 1 and 2. However, Scenario B results in higher flows from Basins 3 and 4, and at the confluence of the Squaw Creek and the Paluxy River watersheds. The higher flow at the confluence of the Paluxy River and Squaw Creek in combination with Brazos River dam failure flow is expected to result in higher backwater flow at the toe of Squaw Creek Dam. Therefore, outflow hydrographs from each basin for Scenario B were used in the HEC-RAS unsteady state analysis. The water surface elevation of 760.02 ft was used as the downstream boundary condition in the HEC-RAS unsteady state analysis. The results of the HEC-RAS unsteady state analysis indicate a maximum water surface elevation of 760.36 ft, corresponding to the Scenario B peak outflow of 101,350 cfs from the SCR at the toe of the dam, based on the downstream boundary conditions.

A sensitivity analysis was performed using a HEC-RAS unsteady state analysis to check that the water surface elevation at the toe of Squaw Creek Dam does not exceed 760.36 ft. The sensitivity analysis combines the outflow hydrographs from Scenario A (Basin 1 and 2) and Scenario B (Basin 3 and 4) in order to maximize flows from each sub-basin. The results of the sensitivity analysis indicate a maximum water surface elevation of 760.45 ft, corresponding to a backwater flow of 181,880 cfs at the toe of the dam, based on the downstream boundary conditions. Scenario A indicates a peak outflow of approximately 206,000 cfs from the SCR. However, due to downstream conditions, the flow of 181,880 cfs provides highest water surface elevation at the toe of the Squaw Creek Dam.

The elevation obtained from the sensitivity analysis is higher than the backwater elevation of 760.36 ft estimated above. Therefore, as a result of the sensitivity analysis, the maximum backwater elevation with adjustment due to different datum at the toe of Squaw Creek Dam will be 761.11 ft NAVD 88 (760.45 ft + 0.66 ft). The backwater flow resulting from the unsteady state analysis described above increased from 100,440 cfs (Calc 012 Rev. 2) to 101,350 cfs (Calc 012, Rev. 3) due to the change in the Paluxy River temporal distribution and no longer provides the maximum backwater elevation at the toe of Squaw Creek Dam.

Thus, the outflow of 206,000 cfs from the SCR results in the higher water surface elevation of 793.66 ft NAVD 88 at CPNPP. Sensitivity analysis peak outflow of 206,000 cfs from the SCR, in combination with Brazos River Dam failure flow, results in the higher water surface elevation of 761.11 ft NAVD 88 at the toe of Squaw Creek Dam. The backwater analysis does not provide the controlling PMF water surface elevation. Scenario A provides the controlling PMF water surface elevation of 793.66 ft NAVD 88 for the CPNPP.

Attachments

HEC-RAS Models (on DVD)

HEC-HMS Model (on DVD)

Calculation TXUT-001-FSAR 2.4.3-CALC-011, Rev.3 (on CD)

Calculation TXUT-001-FSAR 2.4.3-CALC-012, Rev.3 (on CD)

Impact on R-COLA

See attached marked-up FSAR Revision 1 pages 2.4-25, 2.4-26, 2.4-27, 2.4-31, 2.4-32, 2.4-146, 2.4-147, 2.4-148, and Figures 2.4.3-204, 2.4.3-205, and 2.4.3-212.

Impact on DCD

None.

2.4.3 Probable Maximum Flood

CP COL 2.4(1) ~~Replace the content~~Add the following at the end of DCD Subsection 2.4.3 ~~with the following~~. RCOL2_02.04-1

The guidance in Appendix A of the U.S. Nuclear Regulatory Commission (NRC) Regulatory Guide 1.59 was followed in determining the PMF by applying the guidance of ANSI/ANS-2.8-1992 (Reference 2.4-229). ANSI/ANS-2.8-1992 was issued to supersede ANSI N170-1976, which is referred to by Regulatory Guide 1.59. ANSI/ANS-2.8-1992 is the latest available standard.

The PMF was determined for the Squaw Creek watershed and routed through the SCR to determine a water surface elevation of ~~790.9~~793.66 ft msl. The PMF for the Paluxy River watershed at the confluence with the Brazos River was also examined. The PMF for the Paluxy River and the Squaw Creek watersheds was combined with the Brazos River dam failure flood flow to determine any backwater effects that may affect the site. The Brazos River dam failure flood flow is described in Subsection 2.4.4 and includes the PMF for the Brazos River. The resulting water surface elevation downstream of the Squaw Creek Dam is ~~755.21~~761.11 ft msl. RCOL2_02.04-3 RCOL2_02.04-5

The CPNPP Units 3 and 4 safety-related facilities are located at elevation 822 ft msl. Therefore, PMF on rivers and streams does not present any potential hazards for CPNPP Units 3 and 4 safety-related facilities. RCOL2_02.04-12

2.4.3.1 Probable Maximum Precipitation

The PMP is defined by HMR 51 (Reference 2.4-218) and HMR 52 (Reference 2.4-219). HMR 53 (Reference 2.4-230) may be used to derive seasonal estimates of the PMP. The PMP was determined for the Squaw Creek ~~and the~~watershed and the combined Squaw Creek and Paluxy River watersheds to maximize the effects of flooding downstream of the SCR. Using the location of the watersheds, HMR 51 PMP charts are used to determine generalized estimates of the all-season PMP for drainage areas from 10 to 20,000 sq mi for durations from 6 to 72 hr. The resulting depth-area-duration (DAD) values are shown in Table 2.4.3-201. RCOL2_02.04-5

HMR 52 is used to determine the aerial distribution of PMP estimates derived from HMR 51. The recommended elliptical isohyetal pattern from HMR 52, shown in Figure 2.4.3-201, is used for the watersheds. The watershed model, combining both watersheds, contains 4 subbasins and is shown in Figure 2.4.3-202. The watershed model is discussed in detail in Subsection 2.4.3.3.

HMR 52 computer software (Reference 2.4-231), developed by USACE, is used to determine the optimum storm size and orientation to produce the greatest PMP over the watersheds using the HMR 51 derived DAD table. Several storm centers were examined for each watershed to determine the critical storm center.

In accordance with Appendix A of Regulatory Guide 1.59, the 72-hr PMP storm is combined with an antecedent storm equal to 40 percent of the PMP. Therefore, the complete sequential storm considered includes a 3-day, 40 percent PMP event followed by a 3-day dry period, which is followed by the 3-day full PMP event. Critical temporal distribution was determined by runoff analysis. Multiple temporal distributions were examined, including one-third, center, two-thirds, and end peaking arrangements.

RCOL2_02.0 4.03-5

Considering only the SCR watershed, Basin 1, the critical storm center for the SCR watershed was found to be near the Squaw Creek watershed centroid, identified as point SC X in Figure 2.4.3-202. A storm center at SC2 results in the maximum PMP for the SCR watershed. However, the storm center SC X results in a higher runoff and hence SC X is considered to be the critical storm center for the SCR watershed. The critical storm area was found to be 100 sq mi, corresponding to isohyet D in Figure 2.4.3-201. The critical storm orientation was found to be 181 degrees.

The critical 72-hr storm PMP rainfall total is 42.53 in for the SCR watershed. The standard HMR 52 temporal arrangement of 6-hr precipitation increments is provided in Table 2.4.3-208. The critical temporal distribution was determined by the runoff analyses to be a two-thirds peaking arrangement for the SCR watershed. The hourly temporal distribution of the 72-hr PMP rainfall for the SCR watershed, Basin 1, is provided in Table 2.4.3-209. The corresponding hyetograph is shown in Figure 2.4.3-211.

For the remaining portion of the Squaw Creek watershed and the Paluxy River watershed, the critical PMP for each basin was determined considering the combined areas for both watersheds.

For the remaining portion of the Squaw Creek watershed, Basin 2, the critical storm center was found to be near the watershed centroid, identified as point SC X in Figure 2.4.3-202. A storm center at SC2 results in the maximum PMP for the Squaw Creek watershed. The storm center SC X results in a higher runoff and hence SC X is considered to be the critical storm center for the Squaw Creek watershed. The critical storm area was found to be 700 sq mi, corresponding to isohyet H in Figure 2.4.3-201. The critical storm orientation was found to be 145 degrees.

The critical 72-hr storm PMP rainfall total is 38.46 in for the Squaw Creek watershed. The standard HMR 52 temporal arrangement of 6-hr precipitation increments is provided in Table 2.4.3-202. The critical temporal distribution was determined by runoff analysis to be an two-thirds peaking arrangement for the Squaw Creek watershed. The hourly ~~end~~two-thirds temporal distribution of the 72-hr PMP rainfall for ~~each of the 4 subbasins~~Basin 2 is provided in Table 2.4.3-203. The corresponding hyetograph is shown in Figure 2.4.3-203.

RCOL2_02.0 4.03-12
RCOL2_02.0 4.03-5

For the Paluxy River watershed, Basins 3 and 4 are the critical storm center was found to be near the watershed centroid, identified as point PR Y in Figure 2.4.3-

RCOL2_02.0 4.03-5

202. The critical storm area was found to be 450 sq mi, corresponding to isohyet G in Figure 2.4.3-201. The critical storm orientation was found to be 172 degrees.

The critical 72-hr storm PMP rainfall total is 35.08 in for the Paluxy River watershed. The standard HMR 52 temporal arrangement of 6-hr precipitation increments is provided in Table 2.4.3-204. The critical temporal distribution was determined by runoff analysis to be a ~~one-third~~two-thirds peaking arrangement for the Paluxy River watershed. The hourly temporal distributions of the 72-hr PMP rainfall for ~~each of the 4 subbasins is~~Basins 3 and 4 are provided in Table 2.4.3-205. The corresponding hyetographs are ~~is~~ shown in Figure 2.4.3-204 and 2.4.3-212. RCOL2_02.04.03-5 RCOL2_02.04.03-12

The watersheds do not occur in the orographic regions identified by HMR 51 and HMR 52. Additionally, the area does not contain significant changes in elevation that would require modification to the PMP. Therefore, orographic effects are not considered.

According to HMR 53, the all-season PMP estimates are associated with the warmer summer months. HMR 53 winter precipitation estimates are greatly reduced compared to the all-season PMP estimates. Additionally, snowmelt does not contribute significantly to river floods anywhere in the state (Reference 2.4-214). Therefore, snowmelt is not considered to be a factor in modeling the PMF event.

The potential dam failures consider coincident PMF flows for the Brazos River watershed. The PMP for the Brazos River was not determined. The approach detailed in Appendix B of Regulatory Guide 1.59 was used to derive the peak PMF flow directly. Potential dam failures are discussed in Subsection 2.4.4.

2.4.3.2 Precipitation Losses

~~Precipitation losses are based on the existing evaluation for CPNPP Units 1 and 2. According to CPNPP Units 1 and 2 FSAR, an initial loss of 0.5 in and a conservative infiltration rate of 0.1 in/hr were determined from USACE records of the Paluxy River watershed (Reference 2.4-214). The recorded Paluxy watershed losses are provided in Table 2.4.3-206.~~ RCOL2_02.04.03-5

For evaluation of CPNPP Units 3 and 4, no initial losses were assumed, indicating saturated antecedent moisture conditions at the onset of the antecedent storm. This assumption is more conservative than the guidance provided in ANSI/ANS-2.8-1992. ~~A constant loss rate of 0.1 in/hr was used in the runoff model.~~Additionally, no loss rate was assumed for the duration of the modeled events. All rainfall is transformed to runoff. The runoff model is described in Subsection 2.4.3.3. RCOL2_02.04.03-5 CTS-01167

conservative assumptions that multiple PMF scenarios occur coincidentally and that the peak domino-type dam failure effects are maintained at the confluence throughout the duration of the PMF. A computation interval of 5 min was used in the HEC-RAS model.

2.4.3.4 Probable Maximum Flood Flow

Applying the precipitation, described in Subsection 2.4.3.1, with the precipitation losses, described in Subsection 2.4.3.2, to the runoff model, described in Subsection 2.4.3.3, the SCR peak PMF inflow was determined to be ~~221,000~~319,000 cfs. The routed peak discharge from the SCR is ~~148,000~~206,000 cfs. The resulting inflow and outflow hydrographs are shown in Figure 2.4.3-207. Position of the storm and temporal distribution of the PMP is discussed in Subsection 2.4.3.1. Discussion of dam failure is provided in Subsection 2.4.4. There are no significant current or planned upstream structures. No credit is taken for the lowering of flood levels at the site due to downstream dam failure. RCOL2_02.0 4.03-5

Based on the individual basin controlling PMP, the peak flow for Squaw Creek Basin 2 was determined to be 31,300 cfs, using the two-thirds temporal distribution at the storm center SC X. The peak flow for Paluxy River Basin 3 was determined to be 85,000 cfs, using the two-thirds temporal distribution at the storm center PR Y. The peak flow for Paluxy River Basin 4 was determined to be 945,000 cfs, using the two-thirds temporal distribution at the storm center PR Y. RCOL2_02.0 4.03-5 RCOL2_02.0 4.03-12

The individual basin PMP distributions provide maximum peak flows and the temporal distributions are aligned for all basins. Therefore, the maximum backwater flow is determined using the two-thirds temporal distribution at the storm center SC X for Basin 1 and 2, and PR Y for Basin 3 and 4. The maximum backwater flow on the downstream end of the Squaw Creek Dam is ~~88,130~~181,880 cfs. The associated backwater analysis does not provide the controlling PMF water surface elevation at the site. RCOL2_02.0 4.03-12

2.4.3.5 Water Level Determinations

The PMF runoff, routed through the SCR, results in a peak water surface elevation of ~~790.9~~793.0 ft msl at CPNPP Units 3 and 4. The water surface elevation is determined using the HEC-HMS runoff and routing model as described in Subsection 2.4.3.3. The hydrograph for the SCR is provided in Figure 2.4.3-208. RCOL2_02.0 4.03-5

Elevations are provided with reference to the National Geodetic Vertical Datum of 1929 (NGVD 29). The plant site elevation is referenced to the North American Vertical Datum of 1988 (NAVD 88). According to the National Geodetic Survey (Reference 2.4-290), the datum shift of NAVD 88 minus NGVD 29 is equal to between 0 and +0.66 ft for the site. Therefore, it is conservative to account for a maximum conversion of +0.66 ft when comparing water surface elevations determined using NGVD 29 to elevations at the site in NAVD 88. Considering RCOL2_02.0 4.03-5

conversion, the SCR maximum water surface elevation of 793.66 ft NAVD 88 is well below the CPNPP Units 3 and 4 safety-related structures elevation of 822 ft NAVD 88. RCOL2_02.0 4.03-5

The standard step, unsteady-flow analysis for the Squaw Creek and the Paluxy River watersheds, resulted in a water surface elevation of ~~775.21~~760.45 ft msl on the downstream side of the SCR. The HEC-RAS model described in Subsection 2.4.3.3 was used to translate runoff to the water surface elevation. ~~The~~Considering datum conversion, the resulting elevation of ~~775.21~~761.11 ft msl is below the elevation of CPNPP Units 3 and 4 safety-related facilities and presents no hazard. In an unlikely event of achieving the water surface elevation described above, possible headcutting on the downstream slope of Squaw Creek could result in failure of the Squaw Creek Dam. However, failure would lower the water surface elevation of the SCR. RCOL2_02.0 4.03-5 RCOL2_02.0 4.03-12 RCOL2_02.0 4.03-5 RCOL2_02.0 4.03-11 RCOL2_02.0 4.03-12

2.4.3.6 Coincident Wind Wave Activity

Fetch length was estimated based on USGS Quadrangles and the PMF maximum water surface elevation of SCR. The critical fetch length was found to be ~~2.67~~2.7 mi originating from the east ~~for Fetch 3~~ as shown in Figure 2.4.3-209. CPNPP is protected from wind wave activity from the west and south by the local topography. Wave height, setup, and runup are estimated using USACE "Coastal Engineering Manual, EM 1110-2-1100" guidance (Reference 2.4-235). RCOL2_02.0 4.03-11

A two-year annual extreme mile wind speed of 50 mph was estimated based on ANSI/ANS-2.8-1992 as shown in Figure 2.4.3-210. The two-year annual extreme mile wind speed was adjusted for duration, based on the fetch length, level, over land or over water, and stability.The critical duration was found to be about 53 min. This corresponds to an adjusted wind speed of 49.91 mph.

Significant wave height (average height of the maximum 33-1/3 percent of waves) is estimated to be 2.76 ft, crest to trough. The maximum wave height (average height of the maximum 1 percent of waves) is estimated to be 4.59 ft., crest to trough. The corresponding wave period is 2.6 sec.

Slopes of 10:1 and 3:1, horizontal to vertical, in the vicinity of the CPNPP were used to determine the wave setup and runup. Additionally, wind wave activity at the vertical retaining wall was also examined. The runup includes wave setup. Runup for the 10:1 slopes was estimated to be 2.85 ft. Runup for the 3:1 slopes was estimated to be ~~6.98~~6.99 ft. Runup at the vertical retaining wall on the north side of CPNPP Units 3 and 4 was estimated to be 16.90 ft. RCOL2_02.0 4.03-11

Wind setup was estimated using additional USACE Hydrologic Engineering Requirements for Reservoirs, EM 1110-2-1420 guidance (Reference 2.4-236). The maximum wind setup was estimated to be ~~0.07~~0.08 ft. The maximum total wind wave activity is estimated to be ~~16.97~~16.98 ft and occurs at the vertical retaining wall. The PMF and maximum coincident wind wave activity results in a flood elevation of ~~807.87~~810.64 ft msl. Elevations are provided with reference to RCOL2_02.0 4.03-11 RCOL2_02.0 4.03-11

CP COL 2.4(1)

Table 2.4.3-205 (Sheet 1 of 3)
Paluxy River Watershed Subbasin Hourly ~~Cumulative~~Incremental PMP Estimates

RCOL2_02.0 4.03-5
RCOL2_02.0 4.03-12

	Hourly ~~Cumulative~~Incremental PMP (in)			
Time (hr)	~~Basin 1~~	~~Basin 2~~	Basin 3	Basin 4
0100	~~0.10~~	~~0.10~~	0.10	0.10
0200	~~0.19~~	~~0.19~~	~~0.20~~0.10	~~0.20~~0.10
0300	~~0.29~~	~~0.29~~	~~0.30~~0.10	~~0.30~~0.10
0400	~~0.38~~	~~0.38~~	~~0.40~~0.10	~~0.40~~0.10
0500	~~0.48~~	~~0.48~~	~~0.51~~0.10	~~0.50~~0.10
0600	~~0.57~~	~~0.58~~	~~0.61~~0.10	~~0.60~~0.10
0700	~~0.69~~	~~0.69~~	~~0.73~~0.11	~~0.72~~0.11
0800	~~0.80~~	~~0.81~~	~~0.85~~0.11	~~0.84~~0.11
0900	~~0.92~~	~~0.92~~	~~0.98~~0.11	~~0.96~~0.11
1000	~~1.03~~	~~1.04~~	~~1.10~~0.11	~~1.08~~0.11
1100	~~1.15~~	~~1.16~~	~~1.22~~0.11	~~1.21~~0.11
1200	~~1.26~~	~~1.27~~	~~1.34~~0.11	~~1.33~~0.11
1300	~~1.41~~	~~1.42~~	~~1.50~~0.12	~~1.48~~0.12
1400	~~1.55~~	~~1.57~~	~~1.65~~0.12	~~1.63~~0.12
1500	~~1.70~~	~~1.71~~	~~1.81~~0.12	~~1.79~~0.12
1600	~~1.84~~	~~1.86~~	~~1.96~~0.12	~~1.94~~0.12
1700	~~1.99~~	~~2.01~~	~~2.12~~0.12	~~2.10~~0.12
1800	~~2.13~~	~~2.15~~	~~2.27~~0.12	~~2.25~~0.12
1900	~~2.33~~	~~2.36~~	~~2.49~~0.14	~~2.46~~0.14
2000	~~2.53~~	~~2.56~~	~~2.70~~0.14	~~2.67~~0.14
2100	~~2.72~~	~~2.76~~	~~2.91~~0.16	~~2.88~~0.15
2200	~~2.92~~	~~2.96~~	~~3.12~~0.16	~~3.09~~0.15
2300	~~3.12~~	~~3.16~~	~~3.33~~0.16	~~3.30~~0.15
2400	~~3.32~~	~~3.36~~	~~3.55~~0.16	~~3.51~~0.15
2500	~~3.60~~	~~3.64~~	~~3.84~~0.16	~~3.80~~0.15
2600	~~3.89~~	~~3.93~~	~~4.15~~0.16	~~4.11~~0.15
2700	~~4.19~~	~~4.24~~	~~4.47~~0.21	~~4.43~~0.21
2800	~~4.50~~	~~4.56~~	~~4.81~~0.21	~~4.76~~0.21
2900	~~4.84~~	~~4.90~~	~~5.17~~0.21	~~5.12~~0.21
3000	~~5.19~~	~~5.26~~	~~5.55~~0.21	~~5.49~~0.21
3100	~~5.75~~	~~5.82~~	~~6.15~~0.21	~~6.09~~0.21

CP COL 2.4(1)

Table 2.4.3-205 (Sheet 2 of 3)
Paluxy River Watershed Subbasin Hourly ~~Cumulative~~Incremental PMP Estimates

RCOL2_02.04.03-5
RCOL2_02.04.03-12

	Hourly ~~Cumulative~~Incremental PMP (in)			
Time (hr)	~~Basin 1~~	~~Basin 2~~	Basin 3	Basin 4
3200	~~6.34~~	~~6.41~~	~~6.79~~0.21	~~6.74~~0.21
3300	~~6.98~~	~~7.07~~	~~7.50~~0.30	~~7.46~~0.29
3400	~~7.70~~	~~7.79~~	~~8.29~~0.31	~~8.27~~0.31
3500	~~8.52~~	~~8.61~~	~~9.18~~0.32	~~9.18~~0.32
3600	~~9.44~~	~~9.54~~	~~10.17~~0.34	~~10.21~~0.34
3700	~~10.71~~	~~10.81~~	~~11.52~~0.36	~~11.63~~0.35
3800	~~12.60~~	~~12.69~~	~~13.51~~0.38	~~13.79~~0.38
3900	~~15.31~~	~~15.39~~	~~16.51~~0.60	~~17.04~~0.60
4000	~~20.47~~	~~20.56~~	~~23.37~~0.65	~~24.31~~0.65
4100	~~22.82~~	~~22.90~~	~~25.99~~0.71	~~27.07~~0.72
4200	~~24.51~~	~~24.58~~	~~27.67~~0.79	~~28.99~~0.80
4300	~~25.03~~	~~25.11~~	~~28.23~~0.89	~~29.54~~0.91
4400	~~25.51~~	~~25.59~~	~~28.74~~1.00	~~30.06~~1.03
4500	~~25.95~~	~~26.04~~	~~29.21~~1.34	~~30.53~~1.43
4600	~~26.37~~	~~26.46~~	~~29.66~~1.99	~~30.97~~2.16
4700	~~26.76~~	~~26.86~~	~~30.07~~3.01	~~31.38~~3.25
4800	~~27.13~~	~~27.24~~	~~30.47~~6.85	~~31.77~~7.27
4900	~~27.37~~	~~27.48~~	~~30.73~~2.54	~~32.03~~2.76
5000	~~27.61~~	~~27.73~~	~~30.99~~1.77	~~32.28~~1.92
5100	~~27.86~~	~~27.97~~	~~31.24~~0.56	~~32.54~~0.56
5200	~~28.10~~	~~28.22~~	~~31.50~~0.51	~~32.80~~0.51
5300	~~28.34~~	~~28.46~~	~~31.76~~0.47	~~33.05~~0.47
5400	~~28.58~~	~~28.71~~	~~32.02~~0.44	~~33.31~~0.44
5500	~~28.75~~	~~28.88~~	~~32.20~~0.42	~~33.49~~0.41
5600	~~28.92~~	~~29.05~~	~~32.38~~0.40	~~33.66~~0.39
5700	~~29.09~~	~~29.22~~	~~32.56~~0.26	~~33.84~~0.26
5800	~~29.25~~	~~29.39~~	~~32.74~~0.26	~~34.02~~0.26
5900	~~29.42~~	~~29.56~~	~~32.92~~0.26	~~34.19~~0.26
6000	~~29.59~~	~~29.73~~	~~33.10~~0.26	~~34.37~~0.26
6100	~~29.72~~	~~29.86~~	~~33.23~~0.26	~~34.51~~0.26
6200	~~29.85~~	~~29.99~~	~~33.37~~0.26	~~34.64~~0.26

CP COL 2.4(1)

Table 2.4.3-205 (Sheet 3 of 3)
Paluxy River Watershed Subbasin Hourly ~~Cumulative~~Incremental PMP Estimates

RCOL2_02.04.03-5
RCOL2_02.04.03-12

	Hourly ~~Cumulative~~Incremental PMP (in)			
Time (hr)	~~Basin 1~~	~~Basin 2~~	Basin 3	Basin 4
6300	~~29.97~~	~~30.12~~	~~33.51~~0.18	~~34.78~~0.18
6400	~~30.10~~	~~30.25~~	~~33.64~~0.18	~~34.91~~0.18
6500	~~30.23~~	~~30.38~~	~~33.78~~0.18	~~35.05~~0.18
6600	~~30.36~~	~~30.51~~	~~33.92~~0.18	~~35.19~~0.18
6700	~~30.46~~	~~30.61~~	~~34.03~~0.18	~~35.30~~0.18
6800	~~30.57~~	~~30.72~~	~~34.14~~0.18	~~35.41~~0.18
6900	~~30.67~~	~~30.82~~	~~34.25~~0.14	~~35.52~~0.14
7000	~~30.77~~	~~30.93~~	~~34.36~~0.14	~~35.63~~0.14
7100	~~30.88~~	~~31.03~~	~~34.47~~0.14	~~35.74~~0.14
7200	~~30.98~~	~~31.14~~	~~34.58~~0.14	~~35.85~~0.14

RCOL2_02.0
4.03-5
RCOL2_02.0
4.03-12

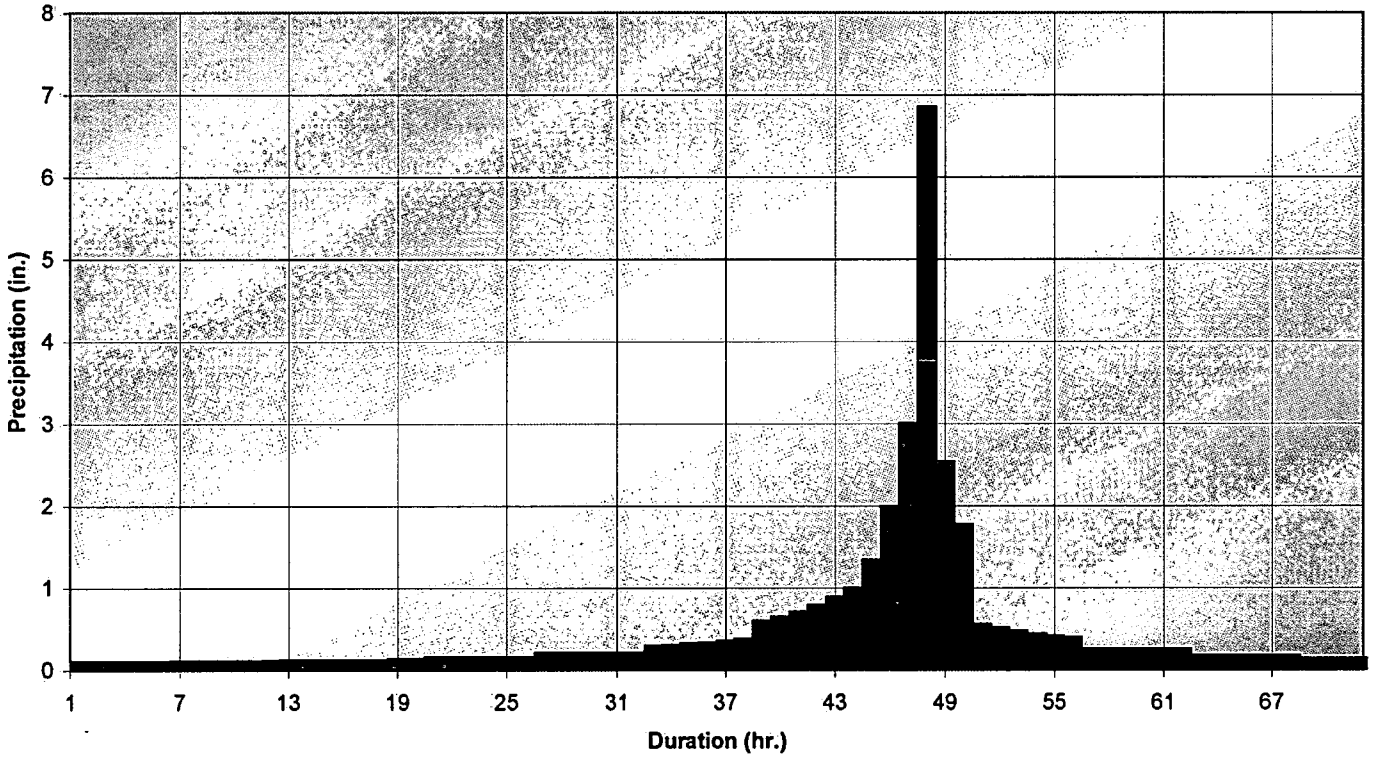

Figure 2.4.3-204 Paluxy River Basin 3 ~~Probable Maximum Precipitation~~Two-Thirds Temporal Distribution Hyetograph (Storm Center at PR Y)

RCOL2_02.0
4.03-12

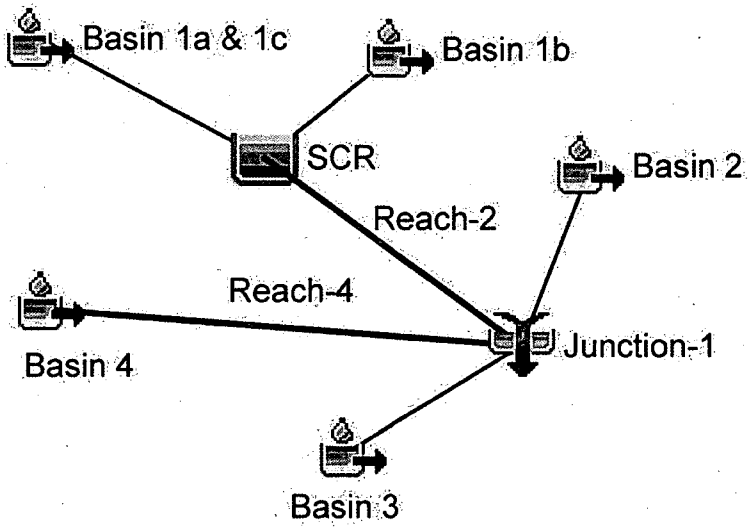

Figure 2.4.3-205 HEC-HMS Watershed Sub-basin Schematic

RCOL2_02.04.03-5

RCOL2_02.04.03-12

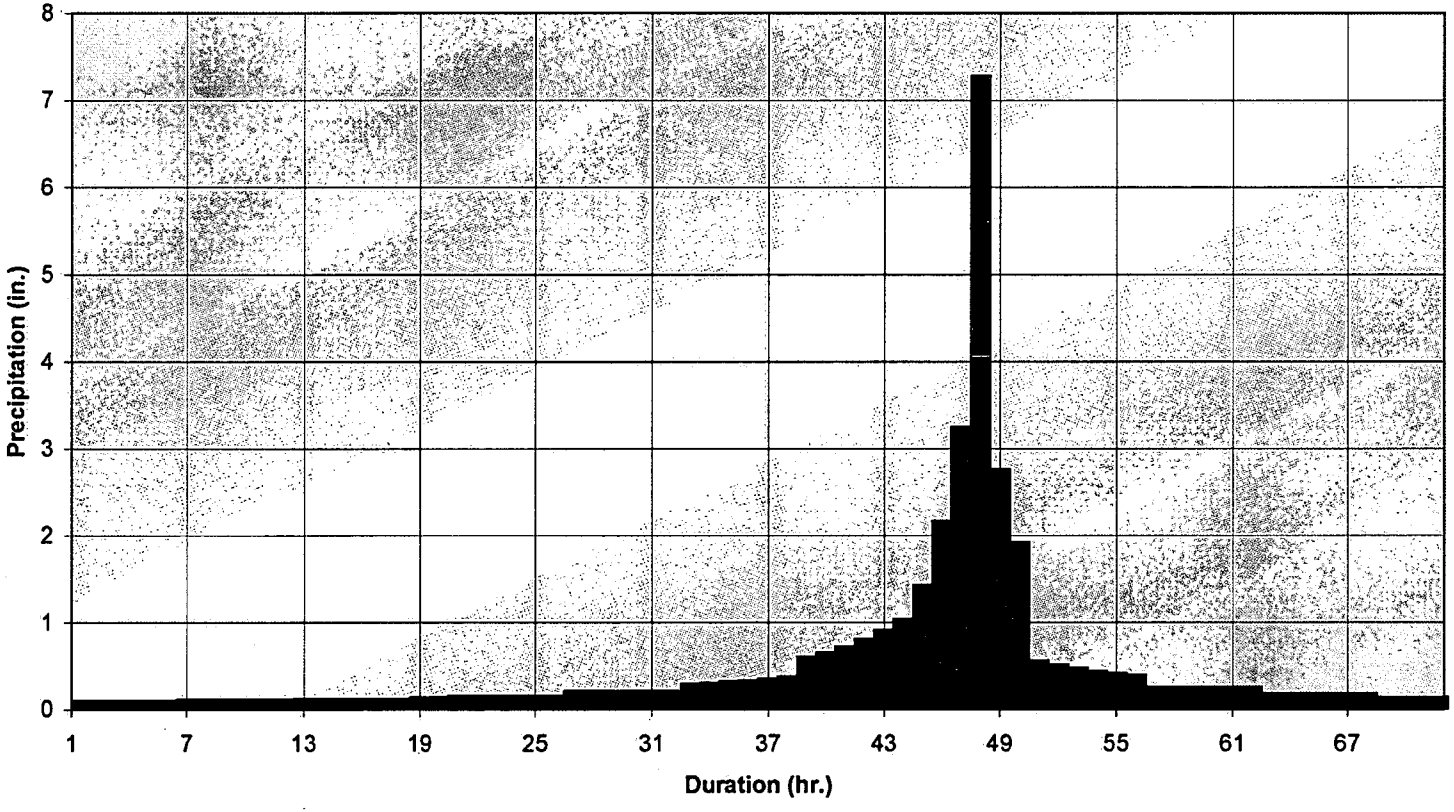

Figure 2.4.3-212 Paluxy River Basin 4 Two-Thirds Temporal Distribution Hyetograph (Storm Center at PR Y)

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 5237 (CP RAI #189)

SRP SECTION: 17.5 - Quality Assurance Program Description - Design Certification, Early Site Permit and New License Applicants

QUESTIONS for Quality and Vendor Branch 1 (AP1000/EPR Projects) (CQVP)

DATE OF RAI ISSUE: 11/16/2010

QUESTION NO.: 17.5-11

The regulatory basis for this question is discussed in NUREG-0800, Standard Review Plan, (SRP) Section: 17.5 - Quality Assurance Program Description - Design Certification, Early Site Permit and New License Applicants.

The Comanche Peak Nuclear Power Plant, Unit 3 and 4 (CPNPP 3 and 4) Quality Assurance Program Description (QAPD), dated June 23, 2010, discussed in Sections 17.3 and 17.5 of the CPNPP 3 and 4 FSAR, is based on NEI 06-14, Rev 9 (NEI 06-14A Rev 7). Consistent with the NRC staff's safety evaluation on NEI 06-14, Rev. 9, applicants that do not wish to include a commitment to Regulatory Guide (RG) 1.33, Rev. 2, in their QAPDs, must explicitly address the provisions in Attachment 4 to NEI 06-14, Revision 9, while also including Part V, "Additional Quality Assurance and Administrative Controls for the Plant Operational Phase," in their QAPDs. Accordingly, Luminant is requested to submit (on the docket), the information in Attachment 4 to NEI 06-14 as it pertains to the Comanche Peak ,Units 3 and 4 application, or otherwise include an explicit commitment to RG 1.33, Rev 2, in Part IV, "Regulatory Commitments" of the CPNPP 3 and 4 QAPD.

ANSWER:

The attachment to this response submits the requested information from Attachment 4 to NEI 06-14 Rev 9 as it pertains to the Comanche Peak Units 3 and 4 application. Attachment 4 was not intended to be part of the QAPD template, but was added to NEI 06-14 Rev 9 to provide a roadmap for identifying how Regulatory Guide 1.33, Rev. 2, and ANSI N18.7-1976 requirements are addressed by NQA-1-1994 and/or the NEI 06-14 QAPD.

Attachment

Table of Where Regulatory Guide 1.33, Rev. 2 and ANSI N18.7-1976 Requirements are Addressed by NQA-1-1994 Standards and/or the NEI 06-14 QAPD

Impact on R-COLA

None.

Impact on DCD

None.

ATTACHMENT

Table of Where Regulatory Guide 1.33, Rev. 2 and ANSI N18.7-1976 Requirements are Addressed by NQA-1-1994 Standards and/or the CPNPP Units 3 and 4 QAPD

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
1. Scope		
This Standard provides requirements and recommendations for an administrative controls and quality assurance program necessary to provide assurance that operational phase activities at nuclear power plants are carried out without undue risk to the health and safety of the public. The requirements of this Standard apply to all activities affecting the safety-related functions of nuclear power plant structures, systems, and components. It is not intended to apply to test mobile and experimental reactors nor reactors not subject to U.S. Nuclear Regulatory Commission licensing. However, applicable sections of this Standard should be used as they apply to related activities. Activities included are: design changes, purchasing, fabricating, handling, shipping, storing, cleaning, erecting, installing, inspecting, testing, operating, maintaining, repairing, refueling and modifying.	NQA-1 Introduction to Parts I and II QAPD Part I, Introduction; Part II, Section 2	
It is recommended that the administrative controls and quality assurance provisions of this Standard be applied to other important plant equipment at a level commensurate with the importance of the equipment to reliable and efficient plant operation. However, it is emphasized that this Standard is directed primarily toward administrative controls and quality assurance associated with safety-related activities, equipment and procedures.	NQA-1 Introduction to Parts I and II QAPD Part I, Introduction; Part II, Section 2	

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
This Standard incorporates criteria that permit a degree of flexibility, since administrative practices vary among organizations operating nuclear power plants.		NQA-1 and the NEI 06-14 are similar in allowing some flexibility based on importance to safety.
The Nuclear Regulatory Commission (NRC) promulgates regulations applicable to many aspects of the design, construction and operation of nuclear power reactors. This Standard contains criteria for administrative controls and quality assurance for nuclear power plants during the operational phase of plant life. This phase is generally considered to commence with initial fuel loading, except for certain preoperational activities. Certain operating activities may commence prior to fuel loading and certain initial construction activities may extend past fuel loading. Owner organizations should identify clearly those activities that fall in these overlapping time periods and should specify whether the activities are to be considered as operational or as construction activities.	NQA-1 Introduction to Parts I and II QAPD Part I, Introduction; Part II, Section 2	
This Standard is intended to be consistent with applicable criteria for quality assurance, including those given in Title 10, Code of Federal Regulations, Part 50, "Licensing of Production and Utilization Facilities," Appendix B. [1][1] This Standard fully and completely describes the general requirements and guidelines of American National Standard Quality Assurance Program Requirements for Nuclear Power Plants, N45.2-1971, [2] as those requirements and guidelines apply during the operational phase of plant life.	QAPD Part I, Introduction; Part II, Section 2; Part IV, Commitments.	10 CFR 50, Appendix B, for the operational phase is met through a combination of NQA-1 and the QAPD in lieu of a commitment to implement the requirements of ANSI N18.7-1976/ANS-3.2. (Commitment to industry standards is addressed in the

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
		nuclear facility's FSAR, [usually chapter 1, and the QAPD referenced in chapter 17]. Most of the listed standards are updated and incorporated into NQA-1.

[1] Footnote from N18.7 - "Numbers in brackets refer to corresponding numbers in Section 6, References."

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
Reg. Guide 1.33 - C. Regulatory Position, paragraph 1: The overall quality assurance program requirements for the operation phase that are included in ANSI N18.7-1976/ANS-3.2 are acceptable to the NRC staff and provide an adequate basis for complying with the quality assurance program requirements of Appendix B to 10 CFR Part 50, subject to the following. **Reg. Guide 1.33 -** C. Regulatory Position 2. Throughout ANSI N18.7-1976/ANS-3.2, other documents required to be included as a part of this standard are identified at the point of reference. The specific acceptability of these standards listed in ANSI N18.7-1976/ANS-3.2 has been addressed in the latest revision of the following regulatory guides: ANSI Standard — Regulatory Guide N45.2 — 1.28 N45.2.1 — 1.37 N45.2.2 — 1.38 N45.2.3 — 1.39 N45.2.4 — 1.30 N45.2.5 — 1.94 N45.2.6 — 1.58 N45.2.8 — 1.116 N45.2.9 — 1.88 N45.2.10 — 1.74 N45.2.11 — 1.64 N45.2.13 — 1.123 N18.1 — 1.8		For the QAPD the following cross-reference is provided: • N45.2 is replaced by NQA-1-1983 as indicated in Reg. Guide 1.28, Rev. 3 and by the 1994 edition through the NRC approved alternative described in a safety evaluation for Exelon (ref. ADAMS accession no. ML023440300) • N45.2.1 is now NQA-1-1994, Part II, Subpart 2.1 • N45.2.2 is now NQA-1-1994, Part II, Subpart 2.2; NQA-1-1994, Part I, Supplement 8S-1 and Part II, Subpart 2.15 also address certain

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
N18.17 1.17 N101.4 1.54 ***Note:*** N45.2.12 is discussed in NRC documents WASH-1283, "Guidance on Quality Assurance Requirements During Design and Procurement Phase of Nuclear Power Plants," (Grey Book) and WASH-1309, "Guidance on Quality Assurance Requirements During the Construction Phase of Nuclear Power Plants," (Green Book) and will be endorsed by a regulatory guide upon its approval as an ANSI standard.		requirements previously in N45.2.2 • N45.2.3 is now NQA-1-1994, Part II, Subpart 2.3 • N45.2.4 is now NQA-1-1994, Part II, Subpart 2.4 • N45.2.5 is now NQA-1-1994, Part II, Subpart 2.5 • N45.2.6 is now NQA-1-1994, Part I, Supplements 2S-1, 2S-2, and Part III, Nonmandatory Appendix 2A-1; Reg. Guide 1.58 has been withdrawn • N45.2.8 is now NQA-1-1994, Part II, Subpart 2.8 • N45.2.9 is now NQA-1-1994, Part I, Supplement 17S-1 and the list of record types and

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
		retention periods is included in Table 1 of Reg. Guide 1.28, Rev. 3; Reg. Guide 1.88 has been withdrawn • N45.2.10 is now NQA-1-1994, Part I, Introduction; Reg. Guide 1.74 has been withdrawn • N45.2.11 is now NQA-1-1994, Part I, Supplement 3S-1; Reg. Guide 1.64 has been withdrawn • N45.2.12 is now NQA-1-1994, Supplement 18S-1; Reg. Guide 1.144 has been withdrawn • N45.2.13 is now NQA-1-1994, Part I, Supplements 4S-1 and 7S-1; Reg.

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
		Guide 1.123 has been withdrawn • N18.1 is now ANS-3.1 • N18.17 and Reg. Guide 1.17 have been withdrawn and the applicable requirements included in 10 CFR Part 73 • N101.4 has been withdrawn and replaced with several other standards as discussed in RG 1.54, Rev. 1)
2. Definitions		
2.1 Limitations		
The definitions given below are applicable specifically to this Standard. Other terms and their definitions are contained in American National Standard, Quality Assurance Terms and Definitions, N45.2.10 [3].	NQA-1, Introduction to Part I	NQA-1 replaces N45.2 and daughters, including N45.2.10
2.2 Glossary of Terms		
administrative controls. Rules, orders, instructions, procedures, policies, practices and designations of authority and responsibility.	QAPD, Part V, Section 1	

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
audit. A formal, independent examination with intent to verify conformance with established requirements.	NQA-1, Introduction to Part I	NQA-1 provides more clarity
emergency procedures. Written procedures which specify actions, including manipulation of plant controls, to reduce the consequence of an accident or potentially hazardous condition which has already occurred, to implement the emergency plan, or to prepare for possible hazardous natural occurrences.	QAPD, Part V, Section 3	The intent of the definition is met by the description of the Emergency Operating Procedures and Emergency Plan Implementing Procedures in the QAPD.
experiments. Performance of those plant operations carried out under controlled conditions in order to establish characteristics or values not previously known.	QAPD, Part V, Section 1	
independent review. Review completed by personnel not having direct responsibility for the work function under review regardless of whether they operate as a part of an organizational unit or as individual staff members (see review).	QAPD, Part V, Section 1	
inspection. Examination, observation, or measurement to determine the conformance of materials, supplies, components, parts, appurtenances, systems, personnel performance, procedures, processes or structures to predetermined requirements.	NQA-1, Introduction to Part I	
maintenance and modification procedures. Written procedures defining the policies and practices by which structures; mechanical, electrical and instrumentation and control systems; and components thereof of a nuclear power plant are kept in a condition of good repair or efficiency so that they are capable of performing their intended functions. As used in this Standard, these procedures apply to those activities performed by maintenance or contractor personnel to maintain, repair or modify safety-related equipment.	NQA-1, Subpart 2.18, Sections 2.2 and 4.4.1 QAPD, Part V, Section 4	

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
Related activities are those actions taken by operating personnel to determine that a planned maintenance activity can be safely performed under the existing plant operating conditions, to authorize the release of equipment to be maintained in accordance with equipment control procedures, and to assure that the equipment has been returned to normal operating status at the completion of the maintenance work including verification of functional acceptability. Procedures for these related activities by operating personnel are considered to be operating procedures, but may be included in maintenance procedures.		
nuclear power plant. Any plant using a nuclear reactor to produce electric power, process steam or space heating.	QAPD, Part V, Section 1	
off-normal condition procedures. Written procedures which specify operator actions for restoring an operating variable to its normal controlled value when it departs from its range or to restore normal operating conditions following a perturbation. Such actions are invoked following an operator observation or an annunciator alarm indicating a condition which, if not corrected, could degenerate into a condition requiring action under an emergency procedure.	QAPD, Part V, Section 3	
onsite operating organization. Onsite personnel concerned with operation, maintenance and certain technical services.	QAPD, Part V, Section 1	
operating activities. Work functions associated with normal operation and maintenance of the plant, and technical services routinely assigned to the onsite operating organization.	QAPD, Part V, Section 1	
operating procedures. Written procedures defining the normal method, means and limits of operation of a nuclear power plant, a plant system or systems, or processes, including actions to be taken by operating personnel for removal from and return to service equipment on which maintenance is to be or has been performed (see also maintenance and modification	QAPD, Part V, Section 4	

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
procedures).		
operational phase. That period of time during which the principal activity is associated with normal operation of the plant. This phase of plant life is considered to begin formally with commencement of fuel loading, and ends with plant decommissioning.	QAPD, Part V, Section 1	
owner organization. The organization, including the onsite operating organization, which has overall legal, financial and technical responsibility for the operation of one or more nuclear power plants.	NQA-1, Basic Requirement 2 QAPD, Part II, Section 1	This term is also defined in ANS-3.1.
quality assurance. All those planned and systematic actions necessary to provide assurance that a structure, system or component will perform satisfactorily in service. It applies to all activities associated with doing a job correctly as well as verifying and documenting the satisfactory completion of the work.	NQA-1, Introduction to Part I	
review. A deliberately critical examination, including observation of plant operation, evaluation of audit results, procedures, certain contemplated actions, and after-the-fact investigations of abnormal conditions (see independent review).	QAPD, Part V	
shall, should and may. The word "shall" is used to denote a requirement; the word, "should" to denote a recommendation; and the word "may" to denote permission, neither a requirement nor a recommendation.	NQA-1, Introduction to Part I (as part of the definition of guideline)	The word may is not recognized in NQA-1 or Regulatory Guide 1.33. These words are also defined in ANS-3.1.
supervision. Direction of personnel activities or monitoring of plant functions by an individual responsible and accountable for the activities he directs or monitors.	QAPD, Part V	
surveillance testing. Periodic testing to verify that safety-related structures, systems and components continue to function or are in a state of	QAPD, Part V	

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
readiness to perform their functions.		
system. An integral part of a nuclear power plant comprising components which may be operated or used as a separate entity to perform a specific function.	QAPD, Part V	
testing. Performance of those steps necessary to determine that systems or components function in accordance with predetermined specifications.	NQA-1, Introduction to Part I	NQA-1 expounds on the definition.
3. Owner Organization		
3.1 General		
The owner organization shall establish an administrative controls and quality assurance program which complies with this Standard. The program shall be in effect at all times during the operational phase to assure that operational phase activities are carried out without undue risk to the health and safety of the public. The program shall require that decisions affecting safety are made at the proper level of responsibility and with the necessary technical advice and review. The owner organization may delegate to other organizations the work of establishing and executing the administrative controls and quality assurance program or any part thereof, in accordance with this Standard, but shall retain responsibility there for.	NQA-1, Basic Requirement 2 QAPD Policy Statement; QAPD Part II, Sections 1 and 2	
3.2 Assignment of Authority and Responsibility		
It is essential that all members of the organization involved in operation of nuclear power plants, including those at the highest management levels, recognize the necessity that the plants be operated under a well formulated and detailed administrative controls and quality assurance program to assure safety and efficiency. Lines of authority, responsibility and communication shall be established from the highest management level through intermediate levels to and including the onsite operating organization (including those offsite organizational units assigned responsibility for procurement, design and construction, quality assurance,	NQA-1, Basic Requirement 1 and Supplement 1S-1 QAPD, Part I, Section 1	

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
and technical support activities). These relationships shall be documented and updated, as appropriate, in the form of organizational charts, functional descriptions of departmental responsibilities and relationships and job descriptions for key personnel positions or in equivalent forms of documentation. The owner organization shall specify in writing the authority and responsibility assigned to individuals and organizations involved in establishing, executing and measuring the overall effectiveness of the administrative controls and quality assurance program required by this Standard.		
The persons or organizations responsible for defining and measuring the overall effectiveness of the program shall be designated, shall be sufficiently independent from cost and scheduling considerations when opposed to safety considerations, shall have direct access to responsible management at a level where appropriate action can be accomplished, and shall report regularly on the effectiveness of the program to the plant manager and the cognizant offsite management.	NQA-1, Basic Requirement 1	
Persons or organizations performing functions of assuring that the administrative controls and quality assurance program is established and implemented or of assuring that an activity has been correctly performed shall have sufficient authority and organizational freedom to: identify quality problems; initiate, recommend or provide solutions, through designated channels; and verify implementation of solutions.	NQA-1, Basic Requirement 1	
The organizational structure and the functional responsibility assignments shall be such that: (1) Attainment of program objectives is accomplished by those who have been assigned responsibility for performing work. This may include interim examinations, checks, and inspections of the work by the individual	NQA-1, 1S-1, Section 2.1	

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
performing the work. (2) Verification of conformance to established program requirements is accomplished by a qualified person who does not have responsibility for performing or directly supervising the work. The method and extent of such verification shall be commensurate with the importance of the activity to plant safety and reliability.		
In structuring the organization and assigning responsibility, quality assurance should be recognized as an interdisciplinary function involving many organizational components and, therefore, should not be regarded as the sole domain of a single quality assurance group. For example, it may be more appropriate for nuclear engineers to perform reviews of plant nuclear engineering activities rather than quality assurance engineers because of the special competence required to perform these reviews. Quality assurance encompasses many functions and activities and extends to various levels in all participating organizations, from the top executive to all workers whose activities may influence quality.	NQA-1, Supplement 1S-1.	
3.3 Indoctrination and Training		
Provisions shall be made for indoctrination and training of those personnel in the owner organization performing activities affecting quality to assure that suitable proficiency is achieved and maintained. Such personnel also shall be provided training concerning the administrative controls and quality assurance program which, as a minimum, shall include the following areas: overall company policies, procedures, or instructions which establish the program; procedures or instructions which implement the program related to the specific job-related activity.	NQA-1, Basic Requirement 2 NQA-1, Supplement 2S-4 QAPD, Part II, Section 2	
3.4 Onsite Operating Organization		

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
3.4.1 General		
A number of factors influence management in its decision regarding the establishment of an onsite operating organization. These include the owner organization's established staffing policies, the physical size and complexity of the nuclear power plant, the number of units, the extent of assistance provided by offsite technical support organizations, the extent of reliance on consultants and the availability of qualified personnel from other sources to assist in activities, such as initial start-up, refueling, maintenance or modification work. A nuclear power plant onsite operating organization may change with time. For example, the number and qualifications of personnel making up the onsite technical support staff can generally be reduced as a plant progresses through initial operation to operational maturity. Management shall give careful consideration to the timing and extent of such changes.	NQA-1, Supplement 1S-1 QAPD, Part II, Section 1	
3.4.2 Requirements for the Onsite Operating Organization		
The onsite operating organization shall include one or more individuals knowledgeable in the following fields: nuclear power plant operation; nuclear power plant mechanical, electrical and electronic systems; nuclear engineering; chemistry and radiochemistry; radiation protection; and quality assurance.	QAPD, Part II, Section 1	
Initial incumbents or replacements for members of the onsite operating organization and offsite technical support organizations shall have appropriate experience, training and retraining to assure that necessary competence is maintained in accordance with the provisions of American National Standard for Selection and Training of Nuclear Power Plant Personnel, N18.1-1971. [4] Personnel whose qualifications do not meet those specified in N18.1 and who are performing inspection, examination, and testing activities during the operations phase of the plant, including preoperational and start-up testing, shall be qualified to American National	NQA-1, Supplements 2S-1 and 2S-2 QAPD, Part II, Section 2;Part IV, (by commitment to ANS-3.1)	The facility technical specifications also address commitments for training and qualification of the operating staff. Between NQA-1-1994 and the QAPD content, alternative

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
Standard Qualifications of Inspection, Examination, and Testing Personnel for the Construction Phase of Nuclear Power Plants, N45.2.6-1973 [5], except that the QA experience cited for Levels I, II, and III should be interpreted to mean actual experience in carrying out the types of inspection, examination, or testing activity, being performed.		requirements that meet the intent of ANSI N45.2.6 are established.
The owner organization shall designate those positions in the onsite operating organization which shall be filled by personnel holding NRC reactor operator and senior reactor operator licenses. Requirements for the minimum number of personnel holding such licenses who shall be present at the plant under various operating conditions and situations shall also be specified.	QAPD, Part II, Section 1; Part IV (by the commitment to ANS-3.1 where it describes functional positions that require an NRC operator license)	The facility technical specifications establish specific requirements for numbers of personnel requiring NRC licenses based on operating conditions/ situations.
The Plant Manager shall have overall responsibility for the execution of the administrative controls and quality assurance program at the plant to assure safety. An individual or organizational unit knowledgeable and experienced in nuclear power plant operational phase activities and quality assurance practices shall be designated and assigned the responsibility to verify that the program is being effectively implemented. Depending on the organizational structure, the individual or organizational unit may report functionally to onsite plant management or an offsite organization (see also 3.2). Reporting to onsite plant management is preferable since such an arrangement usually results in improved communications in identifying problems and initiating corrective action. The individual or organizational unit in this case may receive technical guidance from offsite support groups. This individual's or organizational unit's duties and responsibilities shall be such that the required attention can be devoted, as required, to verifying that the program is being effectively executed. The individual or organizational unit shall report on the effectiveness of the program to the Plant Manager and to other cognizant management as may be designated.	NQA-1, Basic Requirement 1 and Supplement 1S-1; Basic Requirement 2 and Supplement 2S-3 QAPD, Part II, Section 1 QAPD, Part II, Section 18 for assessing and reporting on the effectiveness of the QA program implementation	

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
Their activities shall be periodically audited by designated offsite personnel.		
4. Reviews and Audits		
4.1 General		
Programs for reviews and for audits of activities affecting plant safety during the operational phase shall be established by the owner organization to:	NQA-1, Basic Requirement 18 and Supplement 18S-1 QAPD, Part II, Sections 1, 2, 3, 5, 18, and Part V	
(1) Verify that these activities are performed in conformance with this Standard and with company policy and rules, approved operating procedures and license provisions.	NQA-1, Basic Requirement 18 and Supplement 18S-1 QAPD, Part II, Sections 1, 2, 3, 5, 18, and Part V	
(2) Review significant proposed plant changes, tests and procedures.	QAPD, Part II, Sections 5, and 18, and Part V, Section 2	
(3) Verify that reportable events, which require reporting to NRC in writing within 24 hours, are promptly investigated and corrected in a manner which reduces the probability of recurrence of such events.	QAPD, Part V, Section 2	
(4) Detect trends which may not be apparent to a day- to-day observer.	QAPD, Part II, Section 18, and Part V, Section 2	
These programs for reviews and audits shall, themselves, be periodically reviewed for effectiveness by management of the owner organization.	QAPD, Part II, Section 18.2	
The programs provided for reviews and for audits may take different forms. For example, the owner organization may assign these functions to separate established organizational units independent of the onsite operating organization, or may appoint a standing committee comprised of individuals from within or outside the owner organization to perform reviews and to exercise overview of audits. Historically, a committee approach was used to provide both review and audit capability for early commercial nuclear power plants. This approach was employed to make the most		This paragraph contains general guidance and historical information, no requirements are specified.

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
efficient use of personnel with pertinent experience and qualifications. In the ensuing period, the availability of competent personnel has significantly increased as the nuclear power industry has expanded and the sources of trained manpower have responded to the resulting demand. This growing pool of talent in the aggregate, is sufficient to encourage alternative approaches to the review and audit committees commonly used in the past.		
In general, the time required of individuals serving as members of independent review groups is a function of the number of nuclear power plants an owner organization has in operation. For this reason, owner organizations contemplating rapid growth and an expanding commitment to nuclear power should regard the use of committees to meet the independent review functions as an interim approach for effective utilization of available technical expertise. In addition, such owner organizations should include in their expansion planning, provisions for early establishment of organizational units to provide independent review, for recruitment of staff, and for an orderly transition to such an organizational structure in the event a committee approach has been used previously to meet the independent review function.		This paragraph provides general guidance information, no requirements are specified.
An independent offsite organizational unit may be assigned review responsibilities including responsibility for reviewing audit reports provided by onsite staff members, or both functions may be assigned to an organizational unit that is independent of line responsibility for operating activities. This Standard does not specify an organizational structure for meeting the review and audit functions, but in lieu thereof delineates essential elements of satisfactorily comprehensive programs for review and for audit in the manner best suited to the owner organization involved.		This paragraph provides general guidance information, no requirements are specified.
4.2 Program Description		
Written programs for both audits and independent reviews shall be prepared that contain:	NQA-1, Basic Requirement 18 and Supplement 18S-1	

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
(1) Subjects to be audited and independently reviewed. (2) Responsibility and authority of those supervising audits and conducting independent reviews. These responsibilities shall include the identification of problems and the verification of corrective action. Additional responsibilities may include recommendations to appropriate management of solutions to problems and the approval or disapproval of contemplated actions. (3) Mechanisms for initiating audit and independent review activities. (4) Provisions for use of specialists or subgroups. (5) Authority to obtain access to the nuclear power plant operating records and operating personnel to perform audits and independent reviews. (6) Requirements, for distribution of reports and other records to appropriate staff members and managers in the owner organization. (7) Identification of the management position (or positions, if auditors and reviewers have different reporting chains) to which auditors and independent reviewers report. (8) Provisions for assuring that personnel responsible for audit and independent review are kept informed on a timely basis of matters within their scope of responsibility. (9) Provisions for follow-up action, including reaudit of deficient areas where indicated. (10) Other provisions required for effective audits and independent reviews.	QAPD, Part II, Section 18 and Part V, Section 2	
4.3 Independent Review Program		
Activities occurring during the operational phase shall be independently reviewed on a periodic basis. The independent review program shall be functional prior to initial core loading.	QAPD, Part V, Section 2.2	

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4.3.1 Personnel		
Personnel assigned responsibility for independent reviews shall be specified, in both number and technical disciplines, and shall collectively have the experience and competence required to review problems in the following areas: (1) Nuclear power plant operations (2) Nuclear engineering (3) Chemistry and radiochemistry (4) Metallurgy (5) Nondestructive testing (6) Instrumentation and control (7) Radiological safety (8) Mechanical and electrical engineering (9) Administrative controls and quality assurance practices (10) Other appropriate fields associated with the unique characteristics of the nuclear power plant involved. An individual may possess competence in more than one specialty area. If sufficient expertise is not available from within the owner organization, independent reviews shall be supplemented through outside consultants or organizations. Provisions shall be made to assure that appropriate expertise is brought to bear in review of operational phase activities.	QAPD, Part V, Section 2.2	
4.3.2 Standing Committees Functioning as Independent Review Bodies		

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
4.3.2.1 Committee Composition		
When a standing committee is responsible for the independent review program, it shall be composed of no less than five persons, of whom no more than a minority are members of the onsite operating organization. Competent alternates are permitted if designated in advance. The use of alternates shall be restricted to legitimate absences of principals.	QAPD, Part V, Section 2.2	
4.3.2.2 Meeting Frequency		
Formal meetings of personnel assigned to a standing committee functioning as an independent review group shall be scheduled as needed. During the period of initial operation such meetings should be held no less frequently than once per calendar quarter. Subsequently, the meeting frequency shall not be less than twice a year.	QAPD, Part V, Section 2.2	
4.3.2.3 Quorum		
A quorum for formal meetings of the committee held under the provisions of 4.3.2.2 shall consist of not less than a majority of the principals, or duly appointed alternates, and shall be subject to the following constraints: the chairman (or his duly appointed alternate) shall be present for all formal meetings; and no more than a minority of the quorum shall have line responsibility for operation of the plant.	QAPD, Part V, Section 2.2	
4.3.2.4 Meeting Records		
Minutes of all meetings of the committee shall be prepared and retained. All documentary material reviewed should be identified. Decisions and recommendations made by the committee shall be documented. Meeting minutes shall be disseminated promptly to appropriate members of management having responsibility in the area reviewed. (See also Section	QAPD, Part V, Section 2.2	

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5.2.12.)		
4.3.3 Organizational Units Functioning as Independent Review Bodies		
An organizational unit assigned primary responsibility for review of operational phase activities shall report to a designated management representative who is assigned authority and responsibility for effective functioning of the unit and who is not immediately responsible for the performance of the activities to be reviewed. The supervisor of such an organizational unit should schedule periodic formal meetings of his staff, or of appropriate subparts thereof, for the purpose of fostering interaction in reviews of specific operational phase activities.	QAPD, Part V, Section 2.2	
4.3.3.1 Documentation of Reviews		
Written records of reviews shall be prepared and retained. All documentary material reviewed should be identified. Results of reviews conducted by the unit including recommendations and proposed actions shall be subject to approval of the supervisor of the unit, and shall be disseminated promptly to appropriate members of management having responsibility in the area reviewed. (See also Section 5.2.12.)	QAPD, Part V, Section 2.2	
4.3.4 Subjects Requiring Independent Review		
The following subjects shall be reviewed by the independent review body:	QAPD, Part V, Section 2.2	
(1) Written safety evaluations of changes in the facility as described in the Safety Analysis Report, changes in procedures as described in the Safety Analysis Report and tests or experiments not described in the Safety Analysis Report which are completed without prior NRC approval under the provisions of 10 CFR 50.59(a)(1). [1] This review is to verify that such changes, tests or experiments did not involve a change in the technical specifications or an unreviewed safety question as defined in 10 CFR 50.59(a)(2). [1]	QAPD, Part V, Section 2.2	

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
(2) Proposed changes in procedures, proposed changes in the facility, or proposed tests or experiments, any of which involves a change in the technical specifications or an unreviewed safety question as defined in 10 CFR 50.59(c). [1] Matters of this kind shall be referred to the independent review body by the onsite operating organization (see 4.4) following its review, or by other functional organizational units within the owner organization, prior to implementation.	QAPD, Part V, Section 2.2	Note - change in 50.59 language ("unreviewed safety question" no longer used) - but otherwise covered in QAPD, Part V, Section 2.2
(3) Changes in the technical specifications or license amendments relating to nuclear safety prior to implementation, except in those cases where the change is identical to a previously reviewed proposed change. **Reg. Guide 1.33** - C. Regulatory Position 3. Section 4.3.4, " Subjects Requiring Independent Review, Item (3) states, in part, that changes to the technical specifications or license amendments related to nuclear safety are required to be reviewed by the independent review body prior to implementation. It should be noted that proposed changes to technical specifications or license amendments should be reviewed by the independent review body prior to their submittal to the Commission for approval.	QAPD, Part V, Section 2.2	
(4) Violations, deviations and reportable events, which require reporting to the NRC in writing within 24 hours, such as:	QAPD, Part V, Section 2.2	Regulations for reporting have changed, but the intent of this is addressed in QAPD, Part V, Section 2.2
(a) Violations of applicable codes, regulations, orders, technical specifications, license requirements or internal procedures or instructions having safety significance	QAPD, Part V, Section 2.2	
(b) Significant operating abnormalities or deviations from normal or expected performance of plant safety- related structures, systems, or	QAPD, Part V, Section 2.2	

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components		
(c) Reportable events, which require reporting to the NRC in writing within 24 hours, as defined in the plant technical specifications Review of events covered under this Section shall include the results of any investigations made and the recommendations resulting from such investigations to prevent or reduce the probability of recurrence of the event.	QAPD, Part V, Section 2.2	Regulations for reporting have changed, but the intent of this is addressed in QAPD, Part V, Section 2.2
(5) Any other matter involving safe operation of the nuclear power plant which an independent reviewer deems appropriate for consideration, or which is referred to the independent reviewers by the onsite operating organization or by other functional organizational units within the owner organization.	QAPD, Part V, Section 2.2	
4.4 Review Activities of the Onsite Operating Organization		
The onsite operating organization shall provide, as part of the normal duties of plant supervisory personnel, timely and continuing monitoring of operating activities to assist the Plant Manager in keeping abreast of general plant conditions and to verify that the day-to-day operating activities are conducted safely and in accordance with applicable administrative controls. These continuing monitoring activities are considered to be an integral part of the routine supervisory function and are important to the safety of plant operation.	QAPD, Part V, Section 2.1	

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The onsite operating organization should perform reviews periodically and as situations demand, to evaluate plant operations and to plan future activities. The important elements of the reviews should be documented. Such reviews serve a useful purpose but shall not take the place of the reviews and audits described in Sections 4.3 and 4.5, respectively. The onsite operating organization should screen subjects of potential concern to independent reviewers and perform preliminary investigations (see 4.3.4). The Plant Manager, in carrying out his responsibility for overall safety of plant operations, shall be responsible for timely referral of appropriate matters to management and independent reviewers. **Reg. Guide 1.33**-C. Regulatory Position 5.a. The guidelines (indicated by the verb "should") of ANSI N18.7-1976/ANS-3.2 contained in the following sections have sufficient safety importance to be treated the same as the requirements (indicated by the verb "shall") of the standard: a. Section 4.4-The guidelines concerning review activities of the onsite operating organization, except the guideline that refers to screening subjects of potential concern.	QAPD, Part V, Section 2.1	
4.5 Audit Program		
A comprehensive system of planned and documented audits shall be carried out to verify compliance with all aspects of the administrative controls and quality assurance program.	NQA-1, Basic Requirement 18 and Supplement 18S-1 QAPD, Part II, Sections 7 and 18	
Audits of selected aspects of operational phase activities shall be performed with a frequency commensurate with their safety significance and in such a manner as to assure that an audit of all safety- related functions is completed within a period of two years. Audits shall include as a minimum verification of compliance and	QAPD, Part II, Section 18	The utilities' have modified their audit programs over the years to include risk-informed scheduling

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effectiveness of implementation of internal rules, procedures (for example, operating, design, procurement, maintenance, modification, refueling, surveillance, test, security and radiation control procedures and the emergency plan), regulations and license provisions; programs for training, retraining, qualification and performance of operating staff; corrective actions taken following abnormal occurrences; and observation of performance of operating, refueling, maintenance and modification activities, including associated record keeping. **Reg. Guide 1.33** - C. Regulatory Position 4. Section 4.5, "Audit Program," of ANSI N18.7- 1976/ANS-3.2 states that audits of selected aspects of operational phase activities shall be performed with a frequency commensurate with their safety significance and in such a manner as to ensure that an audit of all safety-related functions is completed within a period of 2 years. In amplification of this requirement, the following program elements should be audited at the indicated frequencies: a. The results of actions taken to correct deficiencies that affect nuclear safety and occur in facility equipment, structures, systems, or method of operation-at least once per 6 months. b. The conformance of facility operation to provisions contained within the technical specifications and applicable license conditions-at least once per 12 months. c. The performance, training, and qualifications of the facility staff-at least once per 12 months.		and controlling the scope of the audits as alternate methods of satisfying the amplified requirements stated in RG 1.33 for specific elements to be audited more frequently than every two years.
Written reports of such audits shall be reviewed by the independent review body and by appropriate members of management including those having responsibility in the area audited.	NQA-1, Basic Requirement 18. QAPD, Part II, Section 18, and Part V, Section 2.2	
Those performing the audits may be members of the audited organization; however, they shall not audit activities for which they have immediate	NQA-1, Basic Requirement 18	

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responsibility. While performing the audit, they shall not report to a management representative who has immediate responsibility for the activity being audited.		
Appropriate and timely follow-up action, including reaudit of deficient areas, shall be taken.	NQA-1, Basic Requirement 18	
Periodic review of the audit program shall be performed by the independent review body or by a management representative at least semiannually to assure that audits are being accomplished in accordance with requirements of technical specifications and of this Standard. Further guidance on requirements for auditing of quality assurance programs for nuclear power plants exists in draft form.[2]	QAPD, Part V, Section 2.2	Audits are no longer addressed in the technical specifications. Based on SRP 17.5, the period for evaluating the audit program is two years rather than every six months.

[2] Footnote from N18.7 "Requirements for auditing of Quality Assurance Programs for Nuclear Power Plants," Proposed American National Standard N45.2.12, trial use (Draft *4,* Revision 2) January 1 1976; correspondence should be sent to: Secretary, American National Standards Committee N45, The American Society of Mechanical Engineers, United Engineering Center, 345 East 47 street, New York, NY 10017. The provisions of this draft standard shall be used for audits performed under this section except the audit frequency specified herein shall be used."

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5. Program, Policies and Procedures		
5.1 Program Description		
The total program for providing administrative controls and quality assurance during the operational phase may be described in many diverse documents. For example, operating procedures may be compiled in one manual, maintenance procedures in a second manual and Quality Assurance procedures in a third. It is not intended that all source documents be compiled in one master document. However, a summary document shall be compiled by each owner organization to identify the sources, to index such source documents to the requirements of this Standard and to provide a consolidated base for description of the program.	QAPD, Part I, Introduction; Part II, Section 6	
The owner organization shall identify in the program description those structures, systems and components to be covered by the program and the major organizational units and their responsibilities. The program shall provide control over activities affecting the quality of the structures, systems and components to an extent consistent with their importance to safety. The program shall take into account the need for special controls, processes, tests, equipment, tools, and skills to attain the required quality and the need for verification of quality by inspections, evaluation or test.	NQA-1, Basic Requirement 2 QAPD, Part II, Section 2	The applicable licensee's SAR provides more detail on the SSCs and their importance to safety. In most cases this will refer back to the list in the referenced DCD.

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5.2 Rules of Practice		
The owner organization shall establish rules and instructions pertaining to personnel conduct and control, including consideration of job-related factors which influence the effectiveness of operating and maintenance personnel, including such factors as number of hours at duty station, availability on call of professional and supervisory personnel, method of conducting operations, and preparing and retaining plant documents. These rules and instructions should provide a clear understanding of operating philosophy and management policies.	QAPD, Policy and Part V	
5.2.1 Responsibilities and Authorities of Operating Personnel		
The responsibilities and authorities of the plant operating personnel shall be delineated. These shall include, as a minimum: (1) The reactor operator's authority and responsibility for shutting the reactor down when he determines that the safety of the reactor is in jeopardy or when operating parameters exceed any of the reactor protection system setpoints and automatic shutdown does not occur. (2) The responsibility to determine the circumstances, analyze the cause, and determine that operations can proceed safely before the reactor is returned to power after a trip or an unscheduled or unexplained power reduction. (3) The senior reactor operator's responsibility to be present at the plant and to provide direction for returning the reactor to power following a trip or an unscheduled or unexplained power reduction. (4) The responsibility to believe and respond conservatively to instrument indications unless they are proved to be incorrect. (5) The responsibility to adhere to the plant's Technical Specifications. (6) The responsibility to review routine operating data to assure safe operation.	QAPD, Part I Section 1, and Part V	QAPD provides overall responsibilities in general terms. The specific responsibilities described here are located in the organizational standards and administrative controls, Technical Specifications and reinforced through the systematic training programs.

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5.2.2 Procedure Adherence		
Procedures shall be followed, and the requirements for use of procedures shall be prescribed in writing. Rules shall be established which provide methods by which temporary changes to approved procedures can be made, including the designation of a person or persons authorized to approve such changes.	NQA-1-1994, Basic Requirements 5 and 6, and Supplement 6S-1 QAPD, Part II, Sections 5 and 6	
Temporary changes which clearly do not change the intent of the approved procedure, shall as a minimum be approved by two members of the plant staff knowledgeable in the areas affected by the procedures. At least one of these individuals shall be the supervisor in charge of the shift and hold a senior operator's license on the unit affected. Such changes shall be documented and, if appropriate, incorporated in the next revision of the affected procedure. In the event of an emergency not covered by an approved procedure, operations personnel shall be instructed to take action so as to minimize personnel injury and damage to the facility and to protect health and safety.	QAPD, Part II, Sections 5.1 and 6.2	The QAPD requirements only allow temporary changes that do not change the intent of the procedure. All other changes must be done in accordance with the document control program.
Guidance should be provided to identify the manner in which procedures are to be implemented. Examples of such guidance include identification of those tasks that require: (1) The written procedure to be present and followed step by step while the task is being performed. (2) The operator to have committed the procedural steps to memory. (3) Verification of completion of significant steps, by initials or signatures of check-off lists.	QAPD, Part II, Section 5.1	
The types of procedures that shall be present and referred to directly are those developed for extensive or complex jobs where reliance on memory cannot be trusted, e.g., reactor start-up, tasks which are infrequently	QAPD, Part II, Section 5.1	

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performed, and tasks in which operations must be performed in a specified sequence. Procedural steps for which actions should be committed to memory include, for example, immediate actions in emergency procedures. Routine procedural actions that are frequently repeated may not require the procedure to be present. Copies of all procedures shall be available to appropriate members of the plant staff. If documentation of an action is required, the necessary data shall be recorded as the task is performed. Examples of procedures requiring verification are furnished in 5.3.4.1 and 5.3.4.2.		
5.2.3 Operating Orders		
A mechanism shall be provided for dissemination to the plant staff of instructions of general and continuing applicability to the conduct of business. Such instructions, sometimes also referred to as standing orders or standard operating procedures, should deal with job turnover and relief, designation of confines of control room, definition of duties of operators and others, transmittal of operating data to management, filing of charts, limitations on access to certain areas and equipment, shipping and receiving instructions, or other such matters. Provisions should be made for periodic review and updating of standing orders. **Reg. Guide 1.33** - C. Regulatory Position 5.b. The guidelines (indicated by the verb "should") of ANSI N18.7-1976/ANS-3.2 contained in the following sections have sufficient safety importance to be treated the same as the requirements (indicated by the verb "shall") of the standard: b. Section 5.2.3-The guideline concerning review and updating of standing orders.	QAPD, Part V, Section 3.2	
5.2.4 Special Orders		
A mechanism shall be provided for issuing management instructions which have short-term applicability and which require dissemination. Such	QAPD, Part V, Section 3.2	

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
instructions, sometimes referred to as a special orders, should encompass special operations, housekeeping, data taking, publications and their distribution, plotting process parameters, personnel actions, or other similar matters. Provisions should be made for periodic review, updating and cancellation of special orders. **Reg. Guide** 1.33 - C. Regulatory Position 5.c. The guidelines (indicated by the verb "should") of ANSI N18.7-1976/ANS-3.2 contained in the following sections have sufficient safety importance to be treated the same as the requirements (indicated by the verb "shall") of the standard: c. Section 5.2.4-The guideline concerning review, updating, and cancellation of special orders.		
5.2.5 Temporary Procedures		
Temporary procedures may be issued during the operational phase: to direct operations during testing, refueling, maintenance and modifications; to provide guidance in unusual situations not within the scope of the normal procedures; and to insure orderly and uniform operations for short periods when the plant, a system, or a component of a system is performing in a manner not covered by existing detailed procedures or has been modified or extended in such a manner that portions of existing procedures do not apply. Temporary procedures shall include designation of the period of time during which they may be used and shall be subject to the review process prescribed in 4.3 and 5.2.15 as applicable.	QAPD, Part V, Section 3.2 Also, temporary procedures for Maintenance activities are covered under NQA-1-1994, Subpart 2.18, Section 2.2	
Temporary procedures shall be approved by the management representative assigned approval authority.	QAPD, Part V, Section 3.2	
5.2.6 Equipment Control		
Permission to release equipment or systems for maintenance shall be granted by designated operating personnel. Prior to granting permission,	NQA-1, Basic Requirement 14 and Subpart 2.18, Section 2.5	

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such operating personnel shall verify that the equipment or system can be released, and determine how long it may be out of service. Granting of such permission shall be documented. Attention shall be given to the potentially degraded degree of protection when one subsystem of a redundant safety system has been removed for maintenance.	QAPD, Part V, Section 4	
After permission has been granted to remove the equipment from service, it shall be made safe to work on. Measures shall provide for protection of equipment and workers. Equipment and systems in a controlled status shall be clearly identified. Strict control measures for such equipment shall be enforced.	NQA-1, Basic Requirement 14 QAPD, Part V, Section 4	
Conditions to be considered in preparing equipment for maintenance include, for example: shutdown margin; method of emergency core cooling; establishment of a path for decay heat removal; temperature and pressure of the system; valves between work and hazardous material; venting, draining and flushing; entry into closed vessels; hazardous atmospheres; handling hazardous materials; and electrical hazards.	NQA-1 Subpart 2.18, Section 2.5 QAPD, Part V, Section 4	
When entry into a closed system is required, control measures shall be established to prevent entry of extraneous material and to assure that foreign material is removed before the system is reclosed.	NQA-1, Subpart 2.3 QAPD, Part II, Section 13.1 and Part V, Section 4	
Procedures shall be provided for control of equipment, as necessary, to maintain personnel and reactor safety and to avoid unauthorized operation of equipment. These procedures shall require control measures such as locking or tagging to secure and identify equipment in a controlled status. The procedures shall require independent verifications, where appropriate, to ensure that necessary measures, such as tagging equipment, have been implemented correctly.	NQA-1, Basic Requirement 14 QAPD, Part V, Section 4	
Temporary modifications, such as temporary bypass lines, electrical jumpers, lifted electrical leads, and temporary trip point settings, shall be controlled by approved procedures which shall include a requirement for	QAPD, Part II, Sections 3 and 14	

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independent verification. A log shall be maintained of the current status of such temporary modifications.		
The procedures shall also require that the status of inspections and tests performed upon individual items on the nuclear power plant be indicated by the use of markings such as stamps, tags, labels, routing cards, or other suitable means. Suitable means include identification numbers which are traceable to records of the status of inspections and tests.	NQA-1, Basic Requirement 14	
Procedures shall also provide for the identification of items which have satisfactorily passed required inspections and tests, where necessary to preclude inadvertent bypassing of such inspections and tests. In cases where required documentary evidence is not available, the associated equipment or materials must be considered nonconforming in accordance with Section 5.2.14. Until suitable documentary evidence is available to show the equipment or material is in conformance, affected systems shall be considered to be inoperable and reliance shall not be placed on such systems to fulfill their intended safety functions.	NQA-1, Basic Requirement 14 QAPD, Part II, Section 14	
When equipment is ready to be returned to service, operating personnel shall place the equipment in operation and verify and document its functional acceptability. Attention shall be given to restoration of normal conditions, such as removal of jumpers or signals used in maintenance or testing or such as returning valves, breakers or switches to proper startup or operating positions from "test" or "manual" positions. When placed into service, the equipment should receive additional surveillance during the run-in period.	NQA-1, Basic Requirement 14, and Subpart 2.18, Section 2.2 QAPD, Part V, Section 4	
5.2.7 Maintenance and Modifications		
Maintenance or modifications which may affect functioning of safety-related structures, systems, or components shall be performed in a manner to ensure quality at least equivalent to that specified in original design bases and requirements, materials specifications and inspection requirements. A	NQA-1, Introduction to Part II, and Subpart 2.18 QAPD, Part V, Section 5	

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suitable level of confidence in structures, systems, or components on which maintenance or modifications have been performed shall be attained by appropriate inspection and performance testing (see also 5.2.17 and 5.3.5).		
Maintenance or modification of equipment shall be preplanned and performed in accordance with written procedures, documented instructions or drawings appropriate to the circumstances which conform to applicable codes, standards, specifications, and criteria. Skills normally possessed by qualified maintenance personnel may not require detailed step- by-step delineations in a written procedure.	NQA-1, Basic Requirement 5, and Subpart 2.18, Section 2.2 QAPD, Part II, Section 5	
Means for assuring quality of maintenance and modification activities (for example, inspections, measurements, tests, welding, heat treatment, cleaning, nondestructive examination and worker qualifications in accordance with applicable codes and standards) and measures to document the performance thereof shall be established. This documentation shall be retained as specified in Section 5.2.12.	NQA-1, Basic Requirement 2, 3, 9, 10, 11, 17 and associated Supplements, and Subpart 2.1 and 2.3 QAPD, Part II, Section 2, 3, 9, 10, 11, and 17	
Measures shall be established and documented to identify the inspection and test status of items to be used in maintenance and modification activities. Normally, the point of control for such items should be the plant storage area.	NQA-1, Basic Requirement 14 QAPD, Part II, Section 14	
The following standards contain useful guidance concerning design and construction-related activities associated with modifications and shall be applied to those activities occurring during the operational phase that are comparable in nature and extent to related activities occurring during initial plant design and construction: American National Standard Installation, Inspection and Testing of Instrumentation and Electric Equipment During the Construction of Nuclear Power Generation Station, N45.2.4-1972 (IEEE 336-1972) [6]; American National Standard Supplementary Quality Assurance Requirements for Installation, Inspection and Testing of Structural Concrete and Structural Steel During the Construction Phase of	QAPD, Part IV	ANSI N101.4 has been withdrawn and RG 1.54 revised in July 2000 to address the acceptability of the replacement ANSI Standards.

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
Nuclear Power Plants, N45.2.5-1974 [7]; American National Standard Qualifications of Inspection, Examination and Testing Personnel for the Construction Phase of Nuclear Power Plants N45.2.6- 1973 [5]; American National Standard Supplementary Quality Assurance Requirements for Installation, Inspection and Testing of Mechanical Equipment and Systems for Construction Phase of Nuclear Power Plants, N45.2.8-1975 [8] American National Standard Quality Assurance Requirements for the Design of Nuclear Power Plants, N45.2.11-1974 [9]; and American National Standard Quality Assurance for Protective Coating Applied to Nuclear Facilities N101.4-1972 [10]. Considerable care is required in assessing which operational phase activities are comparable in nature and extent to activities normally associated with design and construction.		
5.2.7.1 Maintenance Programs		
A maintenance program shall be developed to maintain safety-related structures, systems and components at the quality required for them to perform their intended functions.	NQA-1, Subpart 2.18, Section 1	
Maintenance shall be scheduled and planned so as not to compromise the safety of the plant. Planning shall consider the possible safety consequences of concurrent or sequential maintenance, testing or operating activities. Equipment required to be operable for the prevailing mode shall be available, and maintenance shall be performed in a manner such that license limits are not violated. Planning for maintenance shall include evaluation of the use of special processes, equipment and materials in performance of the task, including assessment of potential hazards to personnel and equipment.	NQA-1, Introduction to Part II, and Subpart 2.18, Section 2.1	
General rules for the development of procedures under a maintenance program which is consistent with the provisions of 5.2.7 shall be written before start-up. These general rules shall form the basis for developing the repair or replacement procedures at the time of failure. Procedures required	NQA-1, Subpart 2.18 QAPD, Part V, Section 3	

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for maintenance of equipment expected to require recurring maintenance should be written prior to plant operation. As experience is gained in operation of the plant, routine maintenance should be altered to improve equipment performance, and procedures for repair of equipment shall be improved as appropriate. Approved procedures shall be available for repair of safety- related equipment prior to the performance of such repairs (see also Sections 5.2.2 and 5.2.7).		
A preventive maintenance program including procedures as appropriate for safety-related structures, systems and components shall be established and maintained which prescribes the frequency and type of maintenance to be performed. A preliminary program based on service conditions and experience with comparable equipment should be developed prior to fuel loading. The program should be revised and updated as experience is gained with the equipment.	NQA-1, Subpart 2.18, Section 3	
The causes of malfunctions shall be promptly determined, evaluated and recorded (see also Sections 4.3 and 4.4). Experience with the malfunctioning equipment and similar components shall be reviewed and evaluated to determine whether a replacement component of the same type can be expected to perform its function reliably. If evidence indicates that common components in safety-related systems have performed unsatisfactorily, corrective measures shall be planned prior to replacement or repair of all such components. Replacement components should have received adequate testing or should be of a design for which experience indicates a high probability of satisfactory performance. Consideration shall be given to phased replacement to permit inservice performance of the new component to be evaluated and thereby minimize the possibility of a hidden deficiency producing a systematic failure. An augmented testing and inspection program should be implemented following a large scale component replacement (or repair) until such time as a suitable level of performance has been demonstrated.	NQA-1, Basic Requirement 16 and Subpart 2.18, Section 4	

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Reg. Guide 1.33 - C. Regulatory Position 5.d. The guidelines (indicated by the verb "should") of ANSI N18.7-1976/ANS-3.2 contained in the following sections have sufficient safety importance to be treated the same as the requirements (indicated by the verb "shall") of the standard: d. Section 5.2.7.1-The guidelines that address adequate design and testing of replacement parts.		
5.2.7.2 Modifications		
Design activities associated with modifications of safety-related structures, systems, and components shall be accomplished in accordance with N45.2.11.1974. [9]	NQA-1, Basic Requirement 3 and Supplement 3S-1 QAPD, Part II, Section 3	
5.2.8 Surveillance Testing and Inspection Schedule		
A surveillance testing and inspection program shall be prescribed to insure that safety-related structures, systems, and components will continue to operate, keeping parameters within normal bounds, or will act to put the plant in a safe condition if they exceed normal bounds.	NQA-1, Basic Requirements 10 and 11, and Supplements 10S-1 and 11S-1 QAPD, Part II, Section 11	
Provisions shall be made for performing required surveillance testing and inspections, including inservice inspections. Such provisions shall include the establishment of a master surveillance schedule reflecting the status of all planned in plant surveillance tests and inspections. Frequency of surveillance tests and inspections may be related to the results of reliability analyses, the frequency and type of service, or age of the item or system, as appropriate.	NQA-1, Supplement 10S-1, Section 8, and Basic Requirement 11 QAPD, Part II, Section 11	
Additional control procedures shall be instituted, as necessary, to assure timely conduct of surveillance tests and inspections and appropriate documentation, reporting, and evaluation of the results. Surveillance testing which may increase the probability of plant trips or major transients with accompanying safety concerns should be deferred to periods when such	NQA-1, Basic Requirement 11 and Supplement 11S-1	

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plant trips or transients have a minimum impact on safety and reliability.		
5.2.9 Plant Security and Visitor Control		
Procedures shall be developed to supplement features and physical barriers designed to control access to the plant and, as appropriate, to vital areas within the plant. Information concerning specific design features and administrative provisions of the plant security program shall be confidential and thus accorded limited distribution. The security and visitor control procedures should consider, for example, physical provisions, such as: fences and lighting; lock controls for doors, gates and compartments containing sensitive equipment; and provisions for traffic and access control. Also to be considered are administrative provisions, such as: visitor sign-in and sign-out procedures; escorts and badges for visitors; emphasis on inspection, observation and challenging of strangers by operating crews; and a program of pre- employment screening for potential employees. See American National Standard Industrial Security for Nuclear Power Plants, N18.17-1973, for guidance and provisions for security measures adequate to protect nuclear power plants. [11]		Administrative controls are established through the security measures required by regulation (10 CFR 73) and NRC orders. These regulatory requirements have superseded the requirements of ANSI N18.7.
5.2.10 Housekeeping and Cleanliness Control		
Housekeeping practices shall be utilized recognizing requirements for the control of radiation zones and the control of work activities, conditions and environments that can affect the quality of important parts of the nuclear plant. Housekeeping encompasses all activities related to the control of cleanness of facilities, materials, equipment fire prevention and protection including disposal of combustible material and debris and control of access to areas, protection of equipment, radioactive contamination control and storage of solid radioactive waste. Housekeeping practices shall assure that only proper materials, equipment, processes and procedures are utilized and that the quality of items is not degraded as a result of housekeeping practices or techniques.	NQA-1, Part II, Subpart 2.3 QAPD, Part IV	

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Where necessary, procedures and work instructions needed to assure compliance with specific requirements shall be available; e.g., inspection and cleaning of electrical bus and control centers, cleaning of control consoles, radioactive decontamination. Particular attention should be given to housekeeping in work and storage areas where important items are handled and stored to preclude damage or contamination. American National Standard Housekeeping During the Construction Phase of Nuclear Power Plants, N-45.2.3-1973 [12] shall be applied to those activities occurring during the operational phase that are comparable in nature and extent to related activities occurring during construction.	NQA-1, Part I, Basic Requirements 2 and 5; and Part II, Subparts 2.3 and 2.18 QAPD, Part II, Sections 2 and 5	NQA-1, Subpart 2.3 replaces ANSI N45.2.3
During maintenance or modification activities, certain portions of safety-related systems may be subject to potential contamination with foreign materials. To prevent such contamination, control measures, including measures for access control, shall be established. Immediately prior to closure an inspection shall be conducted to assure cleanness and the result of such inspection shall be documented. American National Standard Cleaning of Fluid Systems and Associated Components during Construction Phase of Nuclear Power Plant, N45.2.1-1973 [13] shall be applied to activities occurring during the operational phase that are comparable in nature and extent to related activities occurring during construction. Measures for minimizing the introduction of foreign materials during maintenance or modification, or cleaning following maintenance or modification of radioactively contaminated systems or of equipment of high radiation fields require special consideration.	NQA-1-1994, Part II, Subpart 2.1 and Subpart 2.18, Section 2.3	NQA-1, Subpart 2.1 replaces N45.2.1
5.2.11 Corrective Actions		
The program shall provide measures to ensure that conditions adverse to plant safety, such as failure, malfunctions, deficiencies, deviations, defective material and equipment, abnormal occurrences, and nonconformances are	NQA-1, Basic Requirement 16, and Subpart 2.18 QAPD, Section 16	

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promptly identified and corrected.		
In the case of significant conditions adverse to safety, the measures shall assure that the cause of the condition is determined and corrective action taken shall be documented and reported to appropriate levels of management and for independent review in accordance with Section 4.3.	NQA-1, Basic Requirement 16, Subpart 2.18, Section 4.3.2 QAPD, Part II, Section 16 and Part V, Section 2	
5.2.12. Plants Records Management		
Provisions shall be made for preparation and retention of plant records as appropriate.	NQA-1, Basic Requirement 17 and Supplement 17S-1 QAPD, QAPD Part II, Section 17.1	
The responsibility for maintaining records and storing them at a specified location or locations shall be assigned.	NQA-1, Basic Requirement 17	
Retention periods of sufficient duration to assure the ability to reconstruct significant events and satisfy any statutory requirements which apply shall be specified.	NQA-1, Supplement 17S-1, Section 2.8 QAPD, Part II, Section 17.1	NQA-1, Supplement 17S-1 with the information in Reg. Guide 1.28, Rev. 3, or NQA-1 -1994, Nonmandatory Appendix 17A-1, is equivalent to ANSI N45.2.9.
American National Standard Requirements for Collection, Storage and Maintenance of Quality Assurance Records for Nuclear Power Plants, N45.2.9-1974, shall be used for management of plant records during the operational phase. [14]	NQA-1 Basic Requirement 17, Supplement 17S-1 QAPD, Part II, Section 17.1	NQA-1, Supplement 17S-1 with the information in Reg. Guide 1.28, Rev. 3, or NQA-1 -1994, Nonmandatory

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		Appendix 17A-1, is equivalent to ANSI N45.2.9.
5.2.13 Procurement and Materials Control		
Measures shall be provided for procurement, documentation and control of those materials and components including spare and replacement parts necessary for plant operation, refueling, maintenance and modification. These measures shall utilize American National Standard Quality Assurance Requirements for the Control of Procurement of Items and Services for Nuclear Power Plants, N45.2.13- 1976. The Appendix to N45.2.13 is particularly useful in determining the quality assurance requirements depending on the complexity or safety of the item. [15]. Procedures shall be established and implemented to ensure that purchased materials and components associated with safety-related structures or systems are: (1) Purchased to specifications and codes equivalent to those specified for the original equipment, or those specified by a properly reviewed and approved revision. (In those cases where the original item or part is found to be commercially "off the shelf," or without specifically identified quality assurance requirements spare and replacement parts may be similarly procured but care shall be exercised to assure at least equivalent performance. In those cases where the QA requirements of the original item cannot be determined, an engineering evaluation shall be conducted by qualified individuals to establish the requirements and controls. This evaluation shall assure that interfaces, interchangeability, safety, fit and function are not adversely affected or contrary to applicable regulatory or code requirements. The results of this evaluation shall be documented). (2) Produced or fabricated under requirements at least equivalent to that of the original equipment, or those specified by a properly reviewed and approved revision. (3) Packaged and transported in a manner that will ensure that the quality is	NQA-1, Basic Requirements 4, 8, and 15; Supplements 4S-1, 8S-1, and 15S-1; and Subpart 2.2 QAPD, Part II, Sections 4, 8, and 15	NQA-1 Basic and Supplemental requirements associated with sections 4 and 7 are equivalent to the requirements of N45.2.13 and replace that standard.

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not degraded during transit. (4) Properly documented to show compliance with applicable specifications, codes and standards. (5) Properly inspected, identified and stored to protect against damage, deterioration or misuse. (6) Properly controlled to ensure the identification, segregation and disposition of nonconforming material. Special nuclear material and sources shall be shipped and stored as specified in the U.S. Nuclear Regulatory Commission (NRC) fuel license and other applicable regulatory documents.		
5.2.13.1 Procurement Document Control		
Measures shall be provided to assure that applicable regulatory requirements, design bases and other requirements which are necessary to assure adequate quality are included or referenced in the procedures for procurement of items and services.	NQA-1, Basic Requirement 4 and Supplement 4S-1, Section 2.2	
To the extent necessary, procurement documents shall require suppliers to provide a quality assurance program consistent with the pertinent requirements of American National Standard Quality Assurance Program Requirements for Nuclear Power Plants, N45.2-1971. [2]	NQA-1, Basic Requirement 4 and Supplement 4S-1, Section 2.3	The QA requirements of NQA-1- 1994 are equivalent to those of ANSI N45.2-1971.
Where changes are made to procurement documents, they shall be subject to the same degree of control as was used in the preparation of the original documents.	NQA-1, Supplement 4S-1, Section 4	
Procurement documents shall include provisions for the following, as applicable: (1) Supplier Quality Assurance Program. Identification of quality assurance requirements applicable to the items or services procured.	NQA-1, Supplement 4S-1, Section 2.3	
(2) Basic Technical Requirements. Where specific technical requirements apply, such as drawings, specifications, and industrial codes and standards,	NQA-1, Supplement 4S-1, Section 2.2	

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they shall be identified by titles and dates of issue in such a way as to clearly set forth the applicable documents. Where procedural requirement apply, in such areas as test and inspection needs, fabrication, cleaning, erecting, packaging, handling, shipping and storage, they too, shall be identified clearly and in such a way as to avoid uncertainty as to source and need.		
(3) Source Inspection and Audit. Provisions for access to the supplier's facilities and records for source inspection and audit when the need for such inspection or audit has been determined.	NQA-1, Supplement 4S-1, Section 2.4	
(4) Documentation Requirements. Records to be prepared, maintained, submitted or made available for review, such as drawings, specifications, procedures, procurement documents, inspection and test records, personnel and procedure qualifications, and material, chemical, and physical test results. Instruction on record retention and disposition shall be provided.	NQA-1, Supplement 4S-1, Section 2.5	
(5) Lower Tier Procurement. Provisions for extending applicable requirements to lower tier subcontractors and suppliers, including purchaser's access to facilities and records.	NQA-1, Supplement 4S-1, Sections 2.3 and 2.4	
5.2.13.2 Control of Purchased Material, Equipment and Services		
Measures shall be provided to assure that purchased items and services, whether purchased directly or through contractors, conform to the procurement documents.	NQA-1, Basic Requirement 7	
These measures shall include provisions, as appropriate, for source evaluation and selection, objective evidence of quality furnished by the contractor, inspection and audit at the source and examination of items upon delivery.	NQA-1, Basic Requirement 7	
Measures for evaluation and selection of procurement sources include the use of historical quality performance data, source surveys or audits, or source qualification programs.	NQA-1, Supplement 7S-1, Section 3.1	

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Source inspection or audit shall be performed as necessary to assure the required quality of an item. Source inspection or audit may not be necessary when the quality of the item can be verified by review of test reports, inspection upon receipt, or other means.	NQA-1, Supplement 7S-1, Section 3.1 and Section 8 QAPD, Part II, Section 7.1	
Where required by code, regulation, or contract requirements documentary evidence that items conform to procurement requirements shall be available at the nuclear power plant site prior to installation or use of such items.	NQA-1, Supplement 7S-1, Section 8.1	
This documentary evidence shall be retrievable and shall be sufficient to identify the specific requirements such as codes, standards and specifications met by the purchased item.	NQA-1, Supplement 7S-1, Section 5.2 and Section 6.	
Where not precluded by other requirements, such documentary evidence may take the form of written certifications of conformance which identify the requirements met by the items, provided means are available to verify the validity of such certifications.	NQA-1, Supplement 7S-1, Section 8.2.	
The effectiveness of the control of quality shall be assessed by the purchaser at intervals consistent with the importance, complexity and quality of the item or service.	NQA-1, Supplement 7S-1, Section 5 QAPD, Part II, Section 7.1	
5.2.13.3 Identification and Control of Materials, Parts and Components		
Measures shall be provided for the identification and control of materials, parts, and components including partially fabricated subassemblies.	NQA-1, Basic Requirement 8 and Supplement 8S-1	
These procedures shall be implemented to provide insurance that only correct and accepted items are used and installed, and relating an item of production (batch, lot, component, part) at any stage, from initial receipt through fabrication, installation, repair or modification, to an applicable drawing, specification, or other pertinent technical document.	NQA-1, Supplement 8S-1, Section 2.1	
Physical identification shall be used to the maximum extent possible. Where physical identification is either impractical or insufficient, physical separation, procedural control or other appropriate means shall be	NQA-1, Supplement 8S-1, Section 2.2	

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employed		
Identification may be either on the item or on records traceable to the item, as appropriate.	NQA-1, Basic Requirement 8	
Where identification marking is employed, the marking shall be clear, unambiguous and indelible, and shall be applied in such a manner as not to affect the function of the item	NQA-1, Supplement 8S-1, Section 2.3	
Markings shall be transferred to each part of an item when subdivided and shall not be obliterated or hidden by surface treatment or coatings unless other means of identification are substituted.	NQA-1, Supplement 8S-1, Section 2.3	
When codes, standards or specifications require traceability of materials, parts or components to specific inspection or test records, the program shall be designed to provide such traceability.	NQA-1, Supplement 8S-1, Section 3.1	
5.2.13.4 Handling, Storage and Shipping		
Measures shall be provided to control handling, storage and shipping, including cleaning, packaging and preservation of material and equipment in accordance with established instructions, procedures or drawings, to prevent damage, deterioration and loss.	NQA-1, Basic Requirement 13, Supplement 13S-1, Section 2	
When necessary for particular items, special coverings, special equipment and special protective environments, such as inert gas atmosphere, specific moisture content levels and temperature levels shall be specified, provided, and their existence verified.	NQA-1, Supplement 13S-1, Section 3.1	
For critical, sensitive, perishable or high value articles, specific written procedures for handling, storage, packaging, shipping and preservation should be used.	NQA-1, Supplement 13S-1, Section 3.2	
Special handling tools and equipment should be provided and controlled as necessary to ensure safe and adequate handling. **Reg. Guide 1.33** - C. Regulatory Position 5.e. The guidelines (indicated by the verb "should") of ANSI N18.7-1976/ANS-3.2 contained in the	NQA-1, Supplement3S-l, Section 3.3	

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
following sections have sufficient safety importance to be treated the same as the requirements (indicated by the verb "shall") of the standard: e. Section 5.2.13.4-The guideline concerning special handling tools and equipment.		
Special handling tools and equipment shall be inspected and tested in accordance with written procedures and at specified times, to verify that the tools and equipment are adequately maintained.	NQA-1, Supplement3S-I, Section 3.3	
Attention shall be given to providing adequate instructions for marking and labeling of items for packaging, shipment and storage. Marking shall be adequate to identify, maintain and preserve the shipment, including indication of the presence of special environments or the need for special control.	NQA-1, Supplement 13S-1, Section 4	
American National Standard for Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants (During the Construction Phase), N45.2.2-1972, shall be applied to those activities occurring during the operational phase that are comparable in nature and extent to related activities occurring during construction. [16]	NQA-1, Part II, Subpart 2.2	NQA-1, Subpart 2.2 is equivalent to the cited ANSI N45.2.2 standard.
5.2.14 Nonconforming Items		
Measures shall be provided to control items, services or activities which do not conform to requirements (see also Section 5.2.6).	NQA-1, Basic Requirement 15	
These procedures shall include as appropriate, instructions for identification, documentation, segregation, disposition and notification to affected organizations.	NQA-1, Basic Requirement 15 QAPD, Part II, Section 15	
Nonconforming items shall be reviewed and accepted, rejected, repaired or reworked in accordance with documented procedures.	NQA-1, Supplement 15S-1, Section 4.1	
The responsibility and authority for the disposition of nonconforming items shall be defined.	NQA-1, Supplement 15S-1, Section 4.2	
Repaired and reworked items shall be reinspected in accordance with	NQA-1, Supplement 15S-1,	

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applicable procedures.	Section 4.5	
Measures which control further processing, delivery or installation of a nonconforming or defective item pending a decision on its disposition shall be established and maintained. Nonconforming items may be disposed of by acceptance "as is," by scrapping or repairing the defective item, or by rework to complete or correct to a drawing or specification. Such measures shall provide assurance that the item is identified as nonconforming and controlled. The measures shall require documentation verifying the acceptability of nonconforming items which have the disposition of "repair" or "use as is." A description of the change, waiver or deviation that has been accepted shall be documented to record the change and denote the as-built condition.	NQA-1, Supplement 15S-1, Sections 2 and 4	
As a guideline, control of nonconforming items by tagging, marking or other means of identification is acceptable where physical segregation is not practical, although physical segregation and marking are preferred.	NQA-1, Supplement 15S-1, Section 3	
5.2.15 Review, Approval and Control of Procedures		
The administrative controls and quality assurance program shall provide measures to control and coordinate the approval and issuance of documents, including changes thereto, which prescribe all activities affecting quality. Such documents include those which describe organizational interfaces, or which prescribe activities affecting safety-related structures, systems, or components. These documents also include operating and special orders, operating procedures, test procedures, equipment control procedures, maintenance or modification procedures, refueling, and material control procedures.	NQA-1, Basic Requirement 6 and Supplement 6S-1 QAPD, Part II, Section 6	
These measures shall assure that documents, including revisions or changes, are reviewed for adequacy by appropriately qualified personnel and approved for release by authorized personnel; and are distributed in accordance with current distribution lists and used by the personnel	NQA-1, Basic Requirement 6 and Supplement 6S-1 QAPD, Part II, Section 6	

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performing the prescribed activity, and that procedures are provided to avoid the misuse of outdated or inappropriate documents. Procedures for operational phase activities of a nuclear power plant reflect the conditions that exist at the time the procedures are written. These conditions include the technical information available, industry experience, and in the case of the initial procedures for a new plant, assumptions made regarding the detailed behavior of the plant that may not be fully known prior to operation. In order to ensure that the procedures in current use provide the best possible instructions for performance of the work involved, systematic review and feedback of information based on use is required. Each procedure shall be reviewed and approved prior to initial use. The frequency of subsequent reviews shall be specified and may vary depending on the type and complexity of the activity involved, and may vary with time as a given plant reaches operational maturity. Applicable procedures shall be reviewed following an unusual incident, such as an accident, an unexpected transient, significant operator error, or equipment malfunction. Applicable procedures shall be reviewed following any modification to a system. Plant procedures shall be reviewed by an individual knowledgeable in the area affected by the procedure no less frequently than every two years to determine if changes are necessary or desirable. A revision of a procedure constitutes a procedure review. Procedures shall be approved as designated by the owner organization before initial use. Rules shall be established which clearly delineate the review of procedures by knowledgeable personnel other than the originator and the approval of procedures and procedure changes by authorized individuals.		
Changes to documents shall be reviewed and approved by the same organizations that perform the original review and approval unless the owner organization designates another qualified organization.	NQA-1, Supplement 6S-1, Section 3.1	

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The reviewing organizations shall have access to pertinent background information upon which to base its approval and shall have adequate understanding of requirements and intent of the original document.	NQA-1, Supplement 6S-1, Section 3.1	
Those participating in any activity shall be made aware of, and use, proper and current instructions, procedures, drawings, and engineering requirements for performing the activity. Participating organizations shall have procedures for control of the document and changes thereto to preclude the possibility or use of outdated or inappropriate documents.	QAPD, Part II, Section 6.1	
Document control measures shall provide for: (1) Identification of individuals or organizations responsible for preparing, reviewing, approving, and issuing documents and revisions there to. (2) Identifying the proper documents to be used in performing the activity. (3) Coordination and control of interface documents. (4) Ascertaining that proper documents are being used. (5) Establishing current and updated distribution lists.	NQA-1, Supplement 6S-1, Section 2 QAPD, Part II, Section 6	
5.2.16 Measuring and Test Equipment		
The method and interval of calibration for each installed instrument and control device shall be defined and shall be based on the type of equipment, stability and reliability characteristics, required accuracies and other conditions affecting calibration.	NQA-1, Basic Requirement 12, Supplement 12S-1	
Tools, instruments, testing equipment and measuring devices used for measurements, tests and calibration shall be of the proper range and type and shall be controlled, calibrated and adjusted and maintained at specified intervals or prior to use to assure the necessary accuracy of calibrated devices.	NQA-1, Basic Requirement 12, Supplement 12S-1, Sections 2 and 3	
When calibration, testing, or other measuring devices are found to be out of calibration, an evaluation shall be made and documented concerning the validity of previous test and the acceptability of devices previously tested	NQA-1, Supplement 12S-1, Section 3.2	

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from the time of the previous calibration.		
If any calibration, testing or measuring device is consistently found to be out of calibration, it shall be repaired or replaced.	NQA-1, Supplement 12S-1, Section 3.2	
It is not the intent of this Standard to imply a need for special calibration and control measures on rulers, tape measures, levels and other such devices if normal commercial practices provide adequate accuracy.	NQA-1, Supplement 12S-1, Section 3.3	
Special calibration shall be performed when the accuracy of either installed or calibrating equipment is questionable.	NQA-1, Supplement 12S-1, Section 3.2	
Records shall be made and equipment suitably marked to indicate calibration status.	NQA-1, Supplement 12S-1, Section 5	
American National Standard N45.2.4-1972 shall be applied to those activities occurring during the operational phase that are comparable in nature and extent to related activities occurring during construction. [6]	NQA-1, Subpart 2.4	NQA-1-1994, Subpart 2.4 (ANSI/IEEE Std. 336-1985 IEEE) is equivalent to ANSI N45.2.4. NQA-1-1994, Subpart 2.16 consists of IEEE Std. 498-1985; however, IEEE has withdrawn this standard. The primary requirements from this standard are included in NQA-1- 1994, Basic Requirement 12 and Supplement 12S-1.
5.2.17 Inspections		
A program for inspection of activities affecting safety shall be established and executed by or for the organization performing the activity to verify conformance with applicable documented instructions, procedures, and	NQA-1, Basic Requirement 10 and Supplement 10S-1 establish program requirements	

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drawings.	QAPD, Part II, Section 10	
Inspections, examinations, measurements, or tests of material, products, or activities shall be performed for each work operation where necessary to assure quality.	NQA-1, Subparts 2.1, 2.2, 2.3, 2.4, 2.5, 2.8, and 2.15 establish specific inspections to be performed	
Such inspections shall be performed by qualified individuals other than those who performed or directly supervised the activity being inspected. Inspection of operating activities (work functions associated with normal operation of the plant, routine maintenance, and certain technical services routinely assigned to the onsite operating organization) may be conducted by second-line supervisory personnel or by other qualified personnel not assigned first-line supervisory responsibility for conduct of the work. These independent inspections, i.e., those performed by individuals not assigned first-line supervisory responsibility for the conduct of the work, are not intended to dilute or replace the clear responsibility of first-line supervisors for the quality of work performed under their supervision.	NQA-1 Basic Requirement 10, and Supplement 10S-1 QAPD, Part II, Section 10 (Note exemption in the QAPD.)	
For modifications and nonroutine maintenance, inspections shall be conducted in a manner similar (frequency, type, and personnel performing such inspections) to that associated with construction phase activities (see also Section 5.2.7).	NQA-1, Supplement 10S-1, Section 7.4	
Inspections of safety-related activities shall be performed in accordance with approved written procedures, which set forth the requirements and acceptance limits and specify the inspection responsibilities.	NQA-1, Basic Requirement 10, and Supplement 10S-1, Section 2	
If mandatory inspection hold points are required, the specific hold points shall be indicated in appropriate documents.	NQA-1, Supplement 10S-1, Section 4	
Information concerning inspection shall be obtained from the related design drawings, specifications and/or other controlled documents.	NQA-1, Supplement 10S-1, Section 2	
When inspection techniques require specialized qualifications or skills, personnel performing the inspection shall meet applicable licensing	NQA-1, Supplement 10S-1, Section 3.2; Supplements 2S-1	

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requirements, codes, and standards appropriate to the discipline involved (see also Sections 5.2.7, 5.2.6 and 5.3.10).	and 2S-2	
If inspection is impossible or disadvantageous, indirect control by monitoring processing methods, equipment and personnel shall be provided.	NQA-1, Supplement 10S-1, Section 6.1	
Both inspection and process monitoring shall be provided when control is inadequate without both. In cases where documented verification of quality implied by the above requirements is not possible or feasible, the extent of inspection or performance testing to verify adequacy of structures, systems, or components for service should be, in general, greater than otherwise required.	NQA-1, Supplement 10S-1, Section 6.1	
The owner organization shall evaluate inspection results along with test results (see Section 5.2.19) to determine whether the individual inspection and test programs demonstrate that the plant can be operated safely and as designed.	NQA-1, Supplement 10S-1, Basic Requirement 11 and Supplement 11S-1, and Subpart 2.18, Section 2.2	
Records shall be kept in sufficient detail to permit adequate confirmation of the inspection program. The person recording the data as well as the person approving the inspection results shall be identified. Deviations, their cause, and any corrective action completed or planned as a result of the deviations shall be documented. Inspection records shall be identified as such and shall be retrievable (see also Section 5.2.12).	NQA-1, Supplement 10S-1, Section 9 and Supplement 11S-1 Section 5	Inspection records under NQA-1, may be a part of the work documents.
5.2.18 Control of Special Processes		
Measures shall be established and documented to assure that special processes, accomplished under controlled conditions in accordance with applicable codes, standards, specifications, criteria, and other special requirements, use qualified personnel and procedures.	NQA-1, Basic Requirement 9 and Supplement 9S-1, Section 2	
Qualification of personnel, procedures, and equipment shall comply with the requirements of applicable codes and standards.	NQA-1, Supplement 9S-1, Section 3.1.1	
Special processes are those that require interim in process controls in addition to final inspection to assure quality including such processes as	NQA-1, Basic Requirement 9 QAPD, Part II, Section 9	

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welding, heat treating, chemical cleaning, and nondestructive examination.		
For special processes not covered by existing codes or standards, or where item quality requirements exceed the requirements of established codes or standards, the necessary qualifications of personnel, procedures, or equipment shall be defined.	NQA-1, Supplement 9S-1, Section 3.4	
5.2.19 Test Control		
A test program shall be established to assure that testing required to demonstrate that the item will perform satisfactorily in service is identified and documented, and that the testing is performed in accordance with written test procedures which incorporate or reference the requirements and acceptance limits contained in applicable design documents.	NQA-1, Basic Requirement 11, Supplements 11S-1 and 11S-2, and Subpart 2.18 establish programmatic controls for testing. NQA-1, Subparts 2.1, 2.4, 2.5, and 2.8 establish specific testing requirements that apply to the operational phase.	
The test program shall cover all required tests including: (1) Tests during the preoperational period to demonstrate that performance of plant systems is in accordance with design intent and that the coordinated operation of the plant as a whole is satisfactory, to the extent feasible. (2) Tests during the initial operational phase to demonstrate the performance of systems that could not be tested prior to operation and to confirm those physical parameters, hydraulic or mechanical characteristics that need to be known, but which could not be predicted with the required accuracy, and to confirm that plant behavior conforms to design criteria. The initial start-up test program shall be planned to permit safe fuel loading and start-up; to increase power in safe increments; and to perform major testing at specified power plateaus. If tests require the variation of operating parameters outside of their normal range, the limits within which such	NQA-1, Supplement 10S-1, Section 8; Supplement 11S-1, Section 2; Subpart 2.4, Section 7; Subpart 2.8, Section 5; and Subpart 2.18, Section 2.7 QAPD, Part II, Section 11	

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variation is permitted shall be prescribed. Prerequisites and record keeping shall be given attention and the scope of the testing shall demonstrate insofar as practicable that the plant is capable of withstanding the design transients and accidents. The suitability of plant operating procedures should be checked to the maximum extent possible during the preoperational and initial start-up test programs. **Reg. Guide 1.33** - C. Regulatory Position 5.f. The guidelines (indicated by the verb "should") of ANSI N18.7-1976/ANS-3.2 contained in the following sections have sufficient safety importance to be treated the same as the requirements (indicated by the verb "shall") of the standard: f. Section 5.2.19(2)-The guideline for checking plant operating procedures during the testing program. (3) Surveillance tests during the operational phase to provide assurance that failures or substandard performance do not remain undetected and that the required reliability of safety-related systems is maintained (see Section 5.2.8). (4) Tests during design, fabrication and construction activities associated with plant maintenance and modifications during the operational phase and the demonstration of satisfactory performance following plant maintenance and modifications or procedural changes (see Section 5.2.7).		
5.2.19.1 Preoperational Tests		
Preoperational tests are generally performed sequentially in accordance with written procedures. Procedures should ensure that prerequisite steps for equipment testing, such as completion of necessary construction, prior testing, safety precautions, and measures to preserve equipment status	NQA-1, Supplement 11S-1, Section 3; Subpart 2.4, Section 7; Subpart 2.8, Section 5 QAPD, Part II, Section 11	NQA-1, Subpart 2.8 is equivalent to the requirements of ANSI N45.2.8.

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have been or will be performed (see also Sections 5.2.17 and 5.3.10). A detailed prescribed physical inspection of equipment components and facilities should be performed to ensure readiness for operation. Typical items to be covered include cleanliness, lubrication, setting of limit switches, calibration of instruments, and presence of safety devices. The test procedure should list the checks to be made and include acceptance criteria and reference sources, such as vendor's literature, engineering drawings or plant specifications. A component test is a functional, operational or performance test of an individual piece of equipment or unit system under prescribed conditions. Typical parameters to be examined are direction of rotation, bearing temperatures, vibration, time delays, and ability to operate with remote and local controls. The procedure should list checks to be made and provide acceptance criteria. Consideration should also be given to providing a run-in period to minimize early failures during operation of the plant. Individual system tests establish the functional adequacy by operation under prescribed conditions. The tests shall be designed to permit evaluation of system performance including, for example, the measurement of flow, temperature, pressure, response time and vibration, transfer of power supply to emergency power and accuracy and response of control devices. The preoperational testing program should demonstrate, as nearly as can be practicably simulated, the overall integrated operation of the plant systems at rated conditions, including simultaneous operation of auxiliary systems. It may be necessary to defer portions of these tests until nuclear heat is available. The procedures used should be similar to those discussed in 5.3.3 and 5.3.4, and they should be modified to require variation in control parameters, such as pump stops and restarts, cycling valves and varying flows so that system performance can be evaluated. For additional		

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requirements in matters relating to preoperational test programs, American National Standard N45.2.8-1975 is generally applicable. [8] **Reg. Guide 1.33** - C. Regulatory Position 5.g. The guidelines (indicated by the verb "should") of ANSI N18.7-1976/ANS-3.2 contained in the following sections have sufficient safety importance to be treated the same as the requirements (indicated by the verb "shall") of the standard: g. Section 5.2.19.1-The guidelines for preoperational tests, except the guideline that refers to a run-in period for equipment. In addition to these guidelines, the prerequisite steps for each equipment test should be completed prior to the commencement of the preoperational test.		
5.2.19.2 Tests Prior to and During initial Plant Operation		
Prior to placing a nuclear power plant into operation, a preoperational test program shall be performed to demonstrate the functional adequacy of plant components, systems and structures. Following fuel loading an initial start-up test program shall be conducted to evaluate plant performance as the startup progresses.	NQA-1, Basic Requirement 11, and Subpart 2.8, Section 5 QAPD, Part II, Section 11	
Responsibilities		
The ultimate responsibility for the preparation and execution of adequate preoperational and initial startup test programs rests with the owner organization. If design or construction is performed by other than the owner organization, design organizations involved should participate in definition of the programs, and the construction organization involved may supply manpower or supervision for execution of part or all of the program, but the owner organization shall determine that the program is adequate and that the results are satisfactory.	QAPD, Part II, Section 1	

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Scheduling		
A schedule shall be provided and maintained to provide assurance that all necessary tests are performed and properly evaluated on a timely basis. Testing shall be scheduled so that the safety of the plant is never dependent on the performance of an untested system (see also Section 5.2.8).	QAPD, Part II, Section 11	
5.2.19.3 Tests Associated with Plant Maintenance, Modifications or Procedure Changes		
Tests shall be performed following plant modifications or significant changes in operating procedures to confirm that the modifications or changes reasonably produce expected results and that the change does not reduce safety of operations.	NQA-1, Supplement 11S-1, Section 2 and Subpart 2.18, Section 2 QAPD, Part II, Section 11	
5.3 Preparation of Instructions and Procedures		
The administrative controls and quality assurance program shall be carried out throughout plant life in accordance with written procedures. Activities affecting safety at nuclear power plants shall be described by written procedures of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions and procedures. **Reg. Guide 1.33** - Regulatory Position C, Item 1 ANSI N18.7-1976/ANS-3.2 requires the preparation of many procedures to carry out an effective quality assurance program. Appendix A, "Typical Procedures for Pressurized Water Reactors and Boiling Water Reactors," to this regulatory guide should be used as guidance to ensure minimum procedural coverage for plant operating activities, including related maintenance activities. Appendix A lists typical safety-related activities that should be covered by written procedures but does not provide a complete listing of needed procedures. Many other activities carried out during the operation phase of a nuclear power plant require written procedures not included in Appendix A. Appendix A may also contain	NQA-1, Basic Requirement 5. QAPD, Part II, Section 5; Part V, Section 3	

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procedures that are not applicable to an applicant because of the configuration of the nuclear power plant. The procedures listed in Appendix A may be combined, separated, or deleted to conform to the applicant's procedures plan.		
These procedures shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. These procedures shall provide an approved preplanned method of conducting operations. Procedures shall be prepared and approved prior to implementation as required by 4.3 and 5.2.15.	NQA-1, Basic Requirement 5	
5.3.1 Procedure Scope		
Each procedure shall be sufficiently detailed for a qualified individual to perform the required function without direct supervision, but need not provide a complete description of the system or plant process.	QAPD, Part V, Section 3	
5.3.2 Procedure Content		
The format of procedures may vary from plant to plant, depending on the policies of the owner organization. However, procedures shall include, as appropriate, the following elements:	QAPD, Part V, Section 3	
(1) Title. Each procedure should contain a title descriptive of the work or system or unit to which it applies, a revision number or date, and an approval status.	QAPD, Part V, Section 3.1	
(2) Statement of Applicability. The purpose for which the procedure is intended should be clearly stated; for example, for use during reactor or plant start-up. If the purpose is not clear from the title, a separate statement of applicability should be provided, which may identify the reasons for particular operations.	QAPD, Part V, Section 3.1	
(3) References. References, including reference to technical specifications, should be included in procedures as applicable. References should be	NQA-1, Introduction to Part II, and Subpart 2.18, Section 2,2	

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identified within the body of procedures when the sequence of steps requires other tasks to be performed prior to or concurrent with a particular step within that task.	QAPD, Part V, Section 3.1	
(4) Prerequisites. Each procedure should identify those independent actions or procedures which shall be completed and plant conditions which shall exist prior to its use. Prerequisites applicable only to certain sections of a procedure should be so identified.	NQA-1, Introduction to Part II, and Subpart 2.18, Section 2,2 QAPD, Part V, Section 3.1	
(5) Precautions. Precautions should be established to alert the individual performing the task to those important measures which should be used to protect equipment and personnel, including the public, or to avoid an abnormal or emergency situation. It may be convenient to specify precautions separately. Cautionary notes applicable to specific steps in the procedure should be included in the main body of the procedure and should be identified as such.	NQA-1, Introduction to Part II, and Subpart 2.18, Section 2,2 QAPD, Part V, Section 3.1	
(6) Limitations and Actions. Limitations on the parameters being controlled and appropriate corrective measures to return the parameter to the normal control band should be specified. It mav be convenient to specify limitations and setpoints in a separate section. Where appropriate, quantitative control guides should be provided; for example, an appropriate step of a procedure should say "Manually adjust the feedwater flow controller to maintain the reactor water level at x feet," rather than "Manually adjust the feedwater flow to maintain water level."	QAPD, Section 5 QAPD, Part V, Section 3.1	
(7) Main Bodv. The main bodv of a procedure should contain step-by-step instructions in the degree of detail necessary for performing a required function or task.	NQA-1, Introduction to Part II, and Subpart 2.18, Section 2,2 QAPD, Part V, Section 3.1	
(8) Acceptance Criteria. Procedures should contain, where applicable, acceptance criteria against which the success or failure of test-type activity	NQA-1, Introduction to Part II, and Subpart 2.18, Section 2,2	

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would be judged. In some cases there would be qualitative criteria, i.e., a given event does or does not occur. In other cases quantitative values would be designated.	QAPD, Part V, Section 3.1	
(9) Checkoff Lists. Complex procedures should have checkoff lists. These lists may be included as part of the procedure or may be appended to the procedure. **Reg. Guide** 1.33 - C. Regulatory Position 5.h. The guidelines (indicated by the verb "should") of ANSI N18.7-1976/ANS-3.2 contained in the following sections have sufficient safety importance to be treated the same as the requirements (indicated by the verb "shall") of the standard: h. Section 5.3.2-The guidelines that describe the content (excluding format) of procedures, except for the guidelines that address (1) a separate statement of applicability in Section 5.3.2(2), (2) inclusion of references in procedures, as applicable, in Section 5.3.2(3), and (3) inclusion of quantitative control guides in Section 5.3.2(6).	NQA-1, Introduction to Part II, and Subpart 2.18, Section 2,2 QAPD, Part V, Section 3.1	
5.3.3 System Procedures		
Instructions for energizing, filling, venting, draining, starting up, shutting down, changing modes of operation and other instructions appropriate for operations of systems related to the safety of the plant shall be delineated in system procedures. Procedures for correcting off-normal conditions shall be developed for those events where system complexity may lead to operator uncertainty. System procedures shall contain checkoff lists where appropriate.	QAPD, Part V, Section 3.2	
5.3.4 General Plant Procedures		
General plant procedures provide instructions for the integrated operations of the plant. In addition to the characteristics of procedures presented in 5.3.1 and 5.3.2, details concerning specific general plant procedures are emphasized in the following sections.	QAPD, Part V, Section 3.2	

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5.3.4.1 Start-up Procedures		
Start-up procedures shall be provided that include starting the reactor from cold or hot conditions and establishing power operation, with the generator synchronized to the line. Recovery from reactor trips shall be in accordance with the start-up procedure and shall be subject to the determinations set forth in 5.2.1. (1) Prerequisites. Start-up procedures shall include provisions for documented determination that prerequisites have been met, including confirmation that necessary instruments are operable and properly set; valves are properly aligned; necessary systems procedures, tests and calibrations have been completed; and required approvals have been obtained. Checkoff lists are normally used for this purpose. (2) Main Body. The main body of the start-up procedures shall include the major steps of the start-up sequence, including reference to appropriate system procedures. Such major steps shall include or reference detailed instructions for their performance, for example, minimum instrumentation requirements coverage of control rod withdrawal sequence or soluble poison dilution, manipulation of controls, establishment of feed and steam flow and turbine startup and synchronization. Checkoff lists should be used for the purpose of confirming completion of major steps in proper sequence.	QAPD, Part V, Section 3.2	
5.3.4.2 Shutdown Procedures		
Shutdown procedures shall be provided to guide operations during and following controlled shutdown or reactor trips and shall include instructions for establishing or maintaining hot standby or cold shutdown conditions, as applicable. The major steps involved in shutting down the plant shall be specified, including detailed instructions for the performance of such actions as monitoring and controlling reactivity, load reduction and cooldown rates, sequence of activating or deactivating equipment, requirements for prompt	QAPD, Part V, Section 3.2	

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analyses of causes of reactor trips or abnormal conditions requiring unplanned controlled shutdowns, and provisions for decay heat removal. Checkoff lists should be used for the purpose of confirming completion of major steps in proper sequence.		
5.3.4.3 Power Operation and Load Changing Procedures		
Procedures for steady-state power operation and load changing shall be provided that include, for example, provisions for use of control rods, chemical shim, coolant flow control or any other system available for long-or-short term control of reactivity, making deliberate load changes, responding to unanticipated load changes and adjusting operating parameters.	QAPD, Part V, Section 3.2	
5.3.4.4 Process Monitoring Procedures		
Procedures for monitoring performance of plant systems shall be required to assure that core thermal margins and coolant quality are maintained at all times, that integrity of fission product barriers is maintained at all times and that engineered safety features and emergency equipment are in a state of readiness to maintain the plant in a safe condition if needed. The limits (maximum and minimum) for significant process parameters shall be identified. The nature and frequency of this monitoring shall be covered by operating procedures, as appropriate.	QAPD, Part V, Section 3.2	
5.3.4.5 Fuel-Handling Procedures		
Fuel-handling operations shall be performed in accordance with written procedures. These procedures shall specify actions for core alterations, accountability of fuel and partial or complete refueling operations that include, for example, continuous monitoring of the neutron flux throughout core loading, periodic recording of data, audible annunciation of abnormal flux increases and evaluation of core neutron multiplication to verify the safety of loading increments. Provisions shall be made for preparing specific	QAPD, Part V, Section 3.2	

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
procedures for each refueling outage and for receipt and shipment of fuel. Plant procedures should, nonetheless, prescribe the general preplanning for the fuel-handling program and its associated safety measures and should identify those aspects of the program for which procedures are to be prepared for each refueling outage. (1) Prerequisites. Prerequisites shall be provided in the fuel-handling procedures that include, for example, the status of plant systems required for refueling; inspection of replacement fuel, control rods, poison curtains and internals; designation of proper tools; proper conditions for spent fuel movement; proper conditions for fuel cask loading and movement; and status of interlocks, reactor trip circuits and mode switches. (2) Main Body. The main body of fuel handling procedures shall include requirements for refueling; for example, the status of the core, instructions for proper sequence, orientation, and seating of fuel and components, rules for minimum operable instrumentation, actions to be followed in the event of fuel damage, rules for periods when re fueling is interrupted, verification of the shutdown margin and the frequency of determination, communications between control room and the fuel loading station, independent verification of fuel and component location, criteria for stopping refueling and for reducing the size of the fuel loading increment, and a containment evacuation plan and its associated safety measures. Documentation of final fuel and component serial numbers and locations shall be maintained.		
5.3.5 Maintenance Procedures		
Maintenance procedures shall contain applicable items listed under 5.3.2 and, in addition, measures to cover the features of maintenance described below. (1) Preparation for Maintenance. Maintenance procedures shall reflect considerations listed under 5.2.6. Adherence to applicable radiation protection measures shall be prescribed. These measures shall specify	NQA-1, Subpart 2.18, Section 2 QAPD, Part V, Section 3.2	

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
protective clothing and radiation monitoring needed to assure safety. (2) Performance of Mainenance. The procedures shall contain enough detail to permit the maintenance work to be performed correctly and safely, and shall include provisions for conducting and recording results or required tests and inspections. References should be made to vendor manuals, plant procedures, drawings and other sources as applicable. (3) Post Maintenance Check Out and Return to Service. Instructions shall be included, or referenced, for returning the equipment to its normal operating status. (4) Supporting Maintenance Documents. Where appropriate sections of related documents, such as vendor manuals, equipment operating and maintenance instructions, or approved drawings with acceptance criteria provide adequate instructions to assure the required quality of work, the applicable sections of the related documents shall be referenced in the procedure, or may, in some cases, constitute adequate procedures in themselves. Such procedures shall receive the same level of review and approval as operating procedures.		
5.3.6 Radiation Control Procedures		
Procedures shall be provided for implementation of a radiation control program to meet applicable program requirements. The radiation control program involves the acquisition of data and provision of equipment to perform necessary radiation surveys, measurements and evaluations for the assessment and control of radiation hazards associated with a nuclear power plant. Procedures shall be developed and implemented for: monitoring both external and internal exposures of employees, utilizing accepted techniques; routine radiation surveys of work areas; environmental monitoring in the vicinity of the plant; radiation monitoring of maintenance and special work activities; and for maintaining records demonstrating the adequacy of measures taken to control radiation exposures of employees	QAPD, Part V, Section 3.2	

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
and others.		
5.3.7 Calibration and Test Procedures		
Procedures shall be provided for periodic calibration and testing of safety-related instrumentation and control systems. Procedures shall also be provided for periodic calibration of measuring and test equipment used in activities affecting the quality of these systems. The procedures shall provide for meeting surveillance schedules and for assuring measurement accuracy adequate to keep safety-related parameters within operational and safety limits.	QAPD, Part V, Section 3.2	
5.3.8 Chemical-Radiochemical Control Procedures		
Procedures shall be provided for chemical and radiochemical control activities. They should include, for example, the nature and frequency of sampling and analyses; instructions for maintaining coolant quality within prescribed limits; and limitations on concentrations of agents that could cause corrosive attack, foul heat transfer surfaces or become sources of radiation hazards due to activation. Procedures shall also be provided for the control, treatment and management of radioactive wastes and control of radioactive calibration sources.	QAPD, Part V, Section 3.2	
5.3.9 Emergency Procedures		
Procedures shall be provided to guide operations during potential emergencies. They shall be written so that a trained operator will know in advance the expected course of events that will identify an emergency and the immediate action he should take. Since emergencies may not follow anticipated patterns, the procedures should provide sufficient flexibility to accommodate variations. Emergency procedures that cover actions for manipulations of controls to prevent accidents or lessen their consequences should be based on a general sequence of observations and actions. Emphasis should be placed on operator responses to	QAPD, Part V, Section 3.2	Requirements for Emergency Procedures have been updated through the years through industry initiatives and lessons learned.

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
observations and indications in the control room; that is, when immediate operator actions are required to prevent or mitigate the consequences of a serious condition, procedures should require that those actions be implemented promptly. The emergency procedure format given in 5.3.9.1 provides a basis for coping with emergencies and is an acceptable format for prescribing operator observations and actions. Emergency procedures may contain supplemental background information to further aid operators in taking proper emergency actions, but this information shall be separated from the procedural actions. It is extremely difficult to distinguish between procedures prepared for the purpose of correcting off-normal conditions which in themselves do not constitute actual emergency situations, but which conceivably can degenerate into trite emergencies in the absence of positive corrective action, and procedures required for coping with trite emergencies that have already occurred. Some owner organizations choose the term "Off-normal Procedures" for the same purpose that others choose "Emergency Procedures." When initially available intelligence provided to operating personnel via instrument readings, physical conditions, and personal observations may not clearly indicate the difference between a simple operational problem and a serious emergency, the actions outlined in the emergency procedures shall be based on a conservative course of action by the operating crew. Considerable judgment on the part of competent personnel is required before departing from the emergency procedure. **Reg. Guide 1.33**-C. Regulatory Position 5.i. The guidelines (indicated by the verb "should") of ANSI N18.7-1976/ANS-3.2 contained in the following sections have sufficient safety importance to be treated the same as the requirements (indicated by the verb "shall") of the standard: i. Section 5.3.9-The guideline concerning emergency procedures requiring prompt implementation of immediate operator actions when required to		

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
prevent or mitigate the consequences of a serious condition.		
5.3.9.1 Emergency Procedure Format and Content		
Emergency procedures shall include, as appropriate, the following elements: (1) Title. The title should be descriptive of the emergency for which the procedure is provided. (2) Symptoms. Symptoms should be included to aid in the identification of the emergency. They should include alarms, operating conditions and probable magnitudes of parameter changes. If a condition is peculiar only to the emergency under consideration, it should be listed first. (3) Automatic Actions. The automatic actions that will probably occur as a result of the emergency should be identified. (4) Immediate Operator Actions. These steps should specify immediate actions for operation of controls or confirmation of automatic actions that are required to stop the degradation of conditions and mitigate their consequences. Examples include the following: (a) The verification of automatic actions. This step is based on equipment operating as designed and the sequence of events following an expected course. Since variations from the expected course may occur, operators should be prepared to manipulate controls as necessary to cope with the problem. However, the procedure should caution the operator not to place systems in "manual" unless misoperation in "automatic" is apparent, and should require him to make frequent checks for proper operation of systems placed in manual control. (b) Assurance that reactor is in a safe condition. This step usually means shutdown of the reactor with sufficient reactivity margin and establishment of required core cooling. (c) Notification to plant personnel of the nature of the emergency.	QAPD, Part V, Section 3.2	Requirements for Emergency Procedures have been updated through the years through industry initiatives and lessons learned.

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
(d) Determination that the reactor coolant system pressure boundary is intact. (e) Confirmation of the availability of adequate power sources. (f) Confirmation that containment and exhaust systems are operating properly in order to prevent uncontrolled release of radioactivity. (5) Subsequent Operator Actions. Steps should be included to return the reactor to a normal condition or to provide for a safe extended shutdown period under abnormal or emergency conditions. **Reg. Guide 1.33** - C. Regulatory Position 5.j. The guidelines (indicated by the verb "should") of ANSI N18.7-1976/ANS-3.2 contained in the following sections have sufficient safety importance to be treated the same as the requirements (indicated by the verb "shall") of the standard: j. Section 5.3.9.1-The guidelines that describe the content (excluding format) for: the title in Section 5.3.9.1(1); the inclusion of symptoms to aid in identification in Section 5.3.9.1(2); automatic actions in Section 5.3.9.1(3); immediate operator action, excluding those guidelines contained in the examples, in Section 5.3.9.1(4); and subsequent operator actions in Section 5.3.9.1(5).		
5.3.9.2 Events of Potential Emergency		
Potential emergency conditions shall be identified and procedures for coping with them shall be prepared. The following categories of events may, depending upon the design of the plant, be considered as examples of potential emergencies for which procedures are written and for which immediate action is indicated: (1) Loss of coolant from identified and unidentified sources, from small loss to design-basis-accident loss (2) Reactor transients and excursions (3) Failure of vital equipment	QAPD, Part V, Section 3.2	The list contained in N18.7 is provided as examples and is not stated in the QAPD. NRC regulatory guidance, and the applicable facility SAR and Emergency Plans will provide the basis

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
(4) Loss or degradation of vital power sources (5) Civil disturbances (6) Abnormally high radiation levels (7) Excessive release of radioactive liquid or gaseous effluent (8) Malfunction of reactivity control system (9) Loss of containment integrity (10) Conditions that require use of standby liquid poison systems (11) Possible natural occurrences (12) Fires		for what procedures are necessary.
5.3.9.3 Procedures for Implementing Emergency Plan		
Implementing procedures for emergency plan actions shall contain, as appropriate, the following elements: (1) Individual assignment of authorities and responsibilities for performance of specific tasks to specific individuals or staff positions. (2) Protective action levels and protective measures outlined for the emergency identified. (3) Specific actions to be taken by coordinating support groups. (4) Procedures for medical treatment and handling of contaminated individuals. (5) Special equipment requirements for items such as medical treatment, emergency personnel removal, specific radiation detection, personnel dosimetry and rescue operations, procedures for making this equipment available, plus operating instructions for such equipment, and provisions for its periodic inspection and maintenance. (6) Identification of emergency communications network, including communications required for personnel identification and effective coordination of all support groups. (7) Description of alarm signals in each facility. At sites with multiple units, alarm signals should be consistent from one unit to another. (Signals for	QAPD, Part V, Section 3.2	

American National Standard N18.7-1976/ANS-3.2 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants / Regulatory Guide 1.33, Rev. 2 Regulatory Positions	Applicable Section of NQA-1-1994 or NEI 06-14 Quality Assurance Program Description (QAPD)	Comments
initiating protective measures should be clear and distinct from process or operational alarm system to avoid confusion.) (8) Procedures required to restore the plant to normal conditions following an emergency. (9) Requirements for periodically testing of procedures, communications network and alarm systems to assure that they function properly. See also U.S. Nuclear Regulatory Commission (NRC) "Guide to the Preparation of Emergency Plans for Production and Utilization Facilities." [17]		
5.3.10 Test and Inspection Procedures		
Test and inspection procedures shall contain a description of objectives; acceptance criteria that will be used to evaluate the results; prerequisites for performing the tests or inspections including any special conditions to be used to simulate normal or abnormal operating conditions; limiting conditions; and the test or inspection procedure. These procedures shall also specify any special equipment or calibrations required to conduct the test or inspection.	NQA-1, Supplement 11S-1, Section 3, and Subpart 2.18, Section 2 QAPD, Part V, Section 3.2	
Test and inspection results shall be documented and evaluated by responsible authority to assure that test and inspection requirements have been satisfied.	NQA-1 Basic Requirements 10 and 11, Supplements 10S-1 and 11S-1 QAPD, Section 5.4	
Where tests and inspections are to be witnessed, the procedure shall identify hold points in the testing sequence to permit witnessing. The procedure shall require appropriate approval for the work to continue beyond the designated hold point. The test and inspection procedures shall require recording the date, identification of those performing the test or inspection, as found condition, corrective actions performed, if any, and as-left condition.	NQA-1, Supplement 10S-1, Sections 4 and 9, Supplement 11S-1, Sections 3, 4, and 5, and Subpart 2.18, Section 2 QAPD, Part V, Section 3.2	

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 5237 (CP RAI #189)

SRP SECTION: 17.5 - Quality Assurance Program Description - Design Certification, Early Site Permit and New License Applicants

QUESTIONS for Quality and Vendor Branch 1 (AP1000/EPR Projects) (CQVP)

DATE OF RAI ISSUE: 11/16/2010

QUESTION NO.: 17.5-12

As discussed in Sections 17.3 and 17.5 of the CPNPP 3 and 4 FSAR, the CPNPP 3 and 4 Quality Assurance Program will transition from the NuBuild Quality Assurance Program Plan to the CPNPP 3 and 4 Quality Assurance Program Description (QAPD) as the project progresses following issuance of the COL. Additionally, in response to NRC RAI 2996 (RAI Number 79), Question 17.5-6, the applicant stated, in part, that full transition to the QAPD will be completed no later than 30 days prior to fuel load, and all nuclear operations will be conducted using a fully implemented QA program based on the QAPD. Please add this information to Section 17.5 of the CPNPP 3 and 4 FSAR and add a specific reference for the CPNPP 3 and 4 QAPD to the References Sections 17.3.1 and 17.5.2 of the CPNPP 3 and 4 FSAR.

ANSWER:

Luminant has made the requested changes and will confirm that revision levels and dates for all the references in Subsections 17.3.1 and 17.5.2 are consistent.

Impact on R-COLA

See attached marked-up FSAR Revision 1 page 1.6-2, 17.3-2 and 17.5-1.

Impact on DCD

None.

CP SUP 1.6(1)

Table 1.6-201

Material Referenced

Report Number	Title	FSAR Section Number	
52-021, Docket Number	US-APWR Design Control Document, Rev. 2	All FSAR Chapters	
NEI 07-09A	Generic FSAR Template Guidance for Offsite Dose Calculation Manual Program Description, Rev.0	11.5	
NEI 07-10A	Generic FSAR Template Guidance for Process Control Program, Rev.0	11.4	
NEI 07-08A	Generic FSAR Template Guidance for Ensuring That Occupational Radiation Exposures Are As Low As Is Reasonably Achievable (ALARA), Rev. ~~3~~0	12.1	CTS-01106 CTS-01106
NEI 07-03A	Generic FSAR Template Guidance for Radiation Protection Program Description, Rev. 0	12.1, 12.5	RCOL2_12.03-12.04-1
NEI 08-08A	Generic FSAR Template Guidance for Life-Cycle Minimization of Contamination, Rev. 0	12.5	RCOL2_12.01-4 RCOL2_12.03-12.04-7
NEI 06-13A	Template for an Industry Training Program Description, Rev. 1	13.2	CTS-01107
NEI 06-06	Fitness for Duty Program Guidance for New Nuclear Power Plant Construction Sites, Rev. 3	13.7	
NEI 06-09	Risk-Managed Technical Specifications (RMTS) Guidelines, Rev. 0	16.1, Chapter 19	
NEI 04-10	Risk-Informed Method for Control of Surveillance Frequencies, Rev. 1	16.1	
NEI 06-14A	Quality Assurance Program Description, Rev. ~~0~~7	17.5	RCOL2_17.05-12
NEI 07-02A	Generic FSAR Template Guidance for Maintenance Rule Program Description for Plants Licensed Under 10 CFR Part 52, Rev. 0	17.6	

Power Plant Units 3 and 4 Quality Assurance Program Description" described in Section 17.5.

17.3.1 Reference

17.3-201 *Quality Assurance Program Description*, NEI 06-14A, Revision ~~6~~7, NEI, ~~May 2008~~July 2010. RCOL2_17.05-3 RCOL2_17.05-12

17.3-202 NuBuild Quality Assurance Project Plan, Revision 1, Luminant, October 2008.

17.3-203 Comanche Peak Steam Electric Station Final Safety Analysis Report, Chapter 17, Amendment 101, Luminant, 2007.

17.3-204 US-APWR Quality Assurance Program Description, SQ-QD-070001, Revision 5, MNES, November 2010. RCOL2_17.05-8 RCOL2_17.05-12

17.3-205 Quality Assurance Program Requirements for Nuclear Facilities, N45.2-1971, ANSI/ASME, 1971.

17.3-206 Quality Assurance Requirements for Nuclear Facility Applications, NQA-1-1994, ANSI/ASME, 1994.

17.3-207 Comanche Peak Units 3 and 4 Quality Assurance Program Description, Revision 2 RCOL2_17.05-12

17.5 QUALITY ASSURANCE PROGRAM DESCRIPTION

This section of the referenced DCD is incorporated by reference with the following departures and/or supplements.

CP COL 17.5(1) Replace the last paragraph in DCD Section 17.5 with the following.

The implementation of the QAP for CPNPP Units 3 and 4 will transition, upon issuance of the COL and as project progresses, from the NuBuild QAPP to the "Comanche Peak Nuclear Power Plant Units 3 and 4 Quality Assurance Program Description." The full transition to the QAPD will be completed no later than 30 days prior to fuel load. All nuclear operations will be conducted using a fully implemented QA program based on the QAPD. The QAPD is based on NEI 06-14A "Quality Assurance Program Description" (Reference 17.5-201) which was approved by the NRC. RCOL2_17.05-12

17.5.1 Combined License Information

Replace the content of DCD Subsection 17.5.1 with the following.

CP COL 17.5(1)
STD COL 17.5(1) ***17.5(1)*** *Development and implementation of the QAP for the site specific design activities (i.e., non-standard plant design) and for the construction and operation* CTS-01140

This COL item is addressed in Sections 17.0, 17.1, 17.2, 17.3 and 17.5.

17.5.2 References

CP COL 17.5(1) Add the following reference and Subsection 17.5.3 after the last reference in DCD Subsection 17.5.2.

17.5-201 *Quality Assurance Program Description,* NEI 06-14A, Revision ~~5~~7, NEI, ~~May 2008~~July 2010. RCOL2_17.05-12

17.5-202 Comanche Peak Units 3 and 4 Quality Assurance Program Description, Revision 2