



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 – 0001**

April 25, 2011

MEMORANDUM TO: ACRS Members

FROM: Weidong Wang, Senior Staff Engineer */RA/*
Reactor Safety Branch B, ACRS

SUBJECT: CERTIFICATION OF THE MINUTES OF THE ACRS
SUBCOMMITTEE ON THE AP1000 REACTOR,
DECEMBER 15-16, 2010, ROCKVILLE, MARYLAND

The minutes of the subject meeting were certified on April 21, 2011, as the official record of the proceedings of that meeting. A copy of the certified minutes is attached.

Attachment: As Stated

cc: w/o Attachment: E. Hackett
Y, Dias-Sanabria

Certified on: April 21, 2011
Certified by: Harold Ray

**REVISION 17 TO AP1000 DESIGN CONTROL DOCUMENT
And
VOGTLE ELECTRIC GENERATING PLANT COMBINED OPERATING LICENSE
APPLICATIONS**

December 15-16, 2010
ROCKVILLE, MARYLAND

INTRODUCTION

The Advisory Committee on Reactor Safeguards (ACRS) Subcommittee on the Westinghouse Electrical Company's AP1000 advanced pressurized water reactor (PWR) design met in Room T-2B3 at the Headquarters of the U.S. Nuclear Regulatory Commission (NRC), located at 11545 Rockville Pike, Rockville, Maryland, on December 15-16, 2010. The Subcommittee was briefed by representatives of the Westinghouse Electrical Company (WEC), the NuStart¹ Energy multi-utility consortium, and NRC's Office of New Reactor Licensing (NRO) on two main items. One was the Aircraft Impact Assessment, which is part of Revision 17 to the proposed amended Design Control Document (or DCD) describing the standard plant design for the AP1000 PWR. The other was the selected chapters of the combined operating license application (COLA) Final Safety Analysis Report (FSAR) submitted by Southern Nuclear Operating Company (SNC), for two additional units at the Vogtle Electric Generating Plant (VEGP) site. As part of the respective review processes, NRC's regulations under 10 CFR Part 52 direct the staff to consult with the ACRS on safety-related issues before any reactor design can be certified or any NRC operating license can be approved.

In September 2008, the Westinghouse Electric Company submitted Revision 17 of the DCD, describing the standard design for the AP1000 advanced pressurized water reactor (PWR), to the NRC. Since then, the NRC staff of NRO has been engaged in a review of those revisions and has complemented this review with meetings with Westinghouse representatives and members of the AP1000 design center group. AP1000 Subcommittee reviewed AIA in the meetings dated Nov. 2-3 and Nov. 17-19, 2010. The remaining AIA items would be reviewed in the Dec. 15-16 meeting.

In the meantime, the Subcommittee reviewed AP1000 Reference COL (RCOL). In a letter dated April 28, 2009 (ADAMS accession number ML091210083), NuStart informed the NRC that it had changed the RCOL designation for the AP1000 design center from Bellefonte Units 3 and 4 to the Vogtle Electric Generating Plant (VEGP) Units 3 and 4. To effect this transition, SNC took the responsibility to all of the open items (OIs) in the staff's SER that related to standard contents, on behalf of the AP1000 design center. The standard contents are identical information for all the COL applications. In the June 2010 AP1000 Subcommittee meeting, AP1000 Subcommittee started to review the plant specific designs. Since then, the AP1000

¹ The NuStart Energy LLC consortium consists of Constellation Generation Group, Duke Energy, EDF International North America, Entergy Nuclear, Exelon Generation, Florida Power & Light Co., Progress Energy, Southern Nuclear Operating Company (SNC), General Electric Energy, TVA, and WEC.

Subcommittee has reviewed the Vogtle RCOL Chapters 2, 4, 7, 10, 11, 12, 16, 17, and 18. The remaining chapters were reviewed in the Dec. 15-16 meeting. Upon completion of this review, the staff would issue a FSER related to the certification of the standard design.

The Chairman for this ACRS Subcommittee was Mr. Harold Ray. Mr. Weidong Wang was the cognizant ACRS staff engineer for this topic and served as the Designated Federal Official for this meeting. Mr. Peter Wen, an ACRS staff engineer supported this two-day meeting as well. Part of meeting was open to public attendance and part of the meeting, involving with the proprietary information discussion, was closed. The Subcommittee received no written comments or requests for time to make oral statements from any members of the public concerning the subject of this meeting. This two-day meeting convened at approximately 8:30 am each morning.

ATTENDEES

The following list of Individuals (and their affiliations) attending this meeting was compiled using both the sign-in sheets (Attachment 1) and the Subcommittee meeting transcript.

ACRS

H. Ray, Subcommittee Chairman	S. Banerjee, Member	D. Bley, Member
M. Bonaca, Member	M. Ryan, Member	W. Shack, Member
J. Armijo, Member	C. Brown, Member	J. Stetkar, Member
G. Wallis, Invited ACRS Consultant	T. Kress, Invited ACRS Consultant	W. Wang, ACRS Staff
P. Wen, ACRS Staff		

NRC Staff

F. Akstulewicz, NRO	J. Dixon-Herrity, NRO	S. Goetz, NRO
D. Habib, NRO	L. Harris, NSIR	R. Hernandez, DSRA
J. Honcharik, NRO	R. Hsu, NRO	C. Jackson, DSRA
R. Joshi, NRO	G. Makar, NRO	D. MCGovern, NRO
E. Mckenna, NRO	J. Mckirgan, NRO	R. Moody, NSIR
B. Musico, NSIR	P. Patel, NRO	R. Patel, NRO
S. Peng, NRO	E. Powell, NRO	T. Scarbrough, NRO
S. Schroer, NRO	E. Spicher, NRO	B. Tegeler, NRO
D. Terao, NRO	E. Thomas, NRO	V. Thomas, NRO

W. Chalk, NRO	J. Donoghue, NRO	C. Erlanger, NSIR
D. HABIB, NRO	M. Hart, NRO	T. Martinez-Navedo, NRO
D. MCGovern, NRO	T. Nakanishi, NRR	R. Prato, NRO
J. Rycyna, NSIR	T. Shaw, NSIR	T. Simms, NRO
B. Tegeler, NRO	L. Wheeler, NRO	

Others

A. Aughtman, SNC	T. Amundson, SNC	T. Andreychek, WEC
C. Brockhoff, WEC	M. Bronson, Bechtel	R. Burger, WEC
Ed Cummins, WEC	M. Genuske, WEC	E. Grant, NuStart
N. Haggerty, NuStart	B. Hirmanpour, NuStart	B. Miller, SNC
G. Moffatt, SCANA	D. Moore, SNC	R. Ofstun, WEC
D. Patton, Bechtel	C. Pierce, SNC	B. Prunty, Bechtel
J. Redd, SNC	M. Richmond, Bechtel	T. Ray, WEC
T. Schmidt, SCANA	J. Sims, Nuclear Power Plant Security Consulting	W. Sparkman, SNC
G. Becker, SNC	D. Brock, SNC	C. Cummins, WEC
M. Demaglio, WEC	M. Evans, WEC	J. Flowers, SNC
B. Jones, SNC	D. Lindgren, WEC	M. Snyderman, WEC

SCHEDULED PRESENTATIONS

The published meeting agenda in Attachment 2 for this Subcommittee meeting, include the following topics:

Chapter 1 Introduction and General Description of Plant
 Chapter 3 Design of Structures, Components, Equipment and Systems
 Chapter 5 Reactor Coolant System and Connected Systems
 Chapter 6 Engineered Safety Features
 Chapter 8 Electric Power
 Chapter 9 Auxiliary Systems
 Chapter 13 Conduct of Operations
 Chapter 14 Initial Test Program and ITAAC-Design Certification
 Chapter 15 Accident Analysis
 Chapter 19 Severe Accidents

In general, for each chapter or topic, a standard briefing template was followed that consisted of essentially two elements:

- (1) A discussion of the DCD or RCOLA by representatives of applicants.
- (2) A discussion of the draft safety evaluation report by the NRC staff.

Both during and following the scheduled presentations, the speakers responded to specific questions and comments from the ACRS Subcommittee members. The scope of the questions, comments, and the speaker's responses, has been captured in the meeting transcript.

ACRS Subcommittee meeting transcripts can be found at the following NRC Internet website location: <http://www.nrc.gov/reading-rm/doc-collections/acrs/tr/subcommittee/>.

The briefing slides for non-proprietary information can be found in Attachment 3.

Opening Remarks

Subcommittee Chairman Ray made the opening remarks. He stated that the purpose of this meeting was to continue review of the Vogtle AP1000 RCOLA and of follow-ups on the AP1000 design certification aircraft impact analysis inspection. The ACRS have received no written comments or requests for time to make oral statements from members of the public regarding today's meeting. The portions of the meeting, that were considered to be proprietary or security-related, would be closed to the public.

Mr. Buzz Miller, the executive vice president of Nuclear Development for Southern Nuclear and for Georgia Power Company made opening comments as well. He thanked this subcommittee for the time and commitment. He said he was looking forward for the review completion by the the Full ACRS committee in January, 2011. He introduced his team of professionals.

Key Discussion Points

In Chapter 1, the applicant presented an overview of the application. The applicant presented closure of the open items, departures, exemptions, and the variances that the applicant had identified from the early site permit application. The applicant also presented supplemental information, such as site location, construction schedule, early site permit incorporation, and construction plans.

For Chapter 6, the applicant stated that the DCD was incorporated by reference and there were no departures. Key COL items included the containment cleanliness program, coating program, and inspection programs. The Containment cleanliness program covered limits in containment for outage debris leftover, storage of outage materials, containment entry and exit requirements, and sampling. Member Bley asked about any differences between the presented programs stringent and the programs at operating plants. The applicant responded that AP1000 would be a little more requirement than what the operating units of the SNC require. But there are operating plants outside of SNC fleet that have these similar stringent controls. Dr. Wallis asked about the accessibility to the areas where debris might accumulate. The applicant responded that the AP1000 is very accessible in most of the areas where it expects traffic that could cause debris.

Member Bonaca had a concern about the debris limitation, which isn't a tech spec item. Chairman Ray commented that the ACRS would identify this as a concern.

The containment coating program discussed during the meeting includes: procurement, application, inspection and monitoring of Service Level I, II, and III coatings. While the applicant was discussing Service Level I and III containment coatings, Chairman Ray asked about the distinction between Service Level I and III. The applicant responded that there is essentially no difference between them. A Westinghouse representative further elaborated that the differentiation in definitions came from historical reasons. If the coating application was inside containment and was important to safety, it was called a Service Level I coatings. If the coating application was external to the containment, it was called Service Level III coatings.

Applicant addressed the ACRS Review Action Item 60, which is related to the containment coating program. This action item requested the applicant to 1) define and explain the visual inspection that the applicant will actually conduct, and 2) address how the buildup of contamination on the containment exterior could affect the required uniform wetting of the exterior by water during a DBA. Diagrams of the containment and related structures were presented.

Chairman Ray commented that the presentation on coating and inspection programs showed that the applicant is responsive and he asked how this information would be reflected in the COL. The applicant responded that the information presented is contained within program documents and implementing procedures. The COL application would not contain this level of detail.

Member Armijo requested an information briefing on how the shield building coatings would be periodically inspected. In its response the following day, the applicant stated that Westinghouse selected an epoxy system for the shield building coating. Visual inspection would look for blistering, flaking, and peeling, which are discussed in ASTM standards. The frequency for the inspection would be set by the licensee in accordance with engineering practice and industry guidance documents. The applicant also highlighted the inspectability of the shield building.

Member Banerjee had a concern about the water distribution from the weir, which is critical to cooling of the containment. The applicant explained in detail that there is no debris accumulation in those regions which might mal-distribute the water. Chairman Ray and Member Banerjee asked for more information about the use of screens at the containment vessel weir inlets. WEC presented the screen design and provided a design diagram. The screens provide a layer of defense in the Foreign Matter Exclusion (FME) program to prevent inadvertent introduction of FME into the water channels.

The staff presented its evaluation on programs for the containment cleanliness, containment protective coatings, sampling, and corrective action and found the programs to be acceptable.

For Chapter 3, Design of Structures, Components, Equipment and Systems, the presentation was focused on Sections 3.7 and 3.8. There were no departures taken from the DCD in Chapter 3. The COL items discussed include seismic analysis of dams, post-earthquake procedures, seismic interaction review, reconciliation of seismic analyses of structures, location of free field acceleration sensor, structures inspection program, construction procedures program, and as-designed piping analysis. Chairman Ray requested a clarification of the term "seismic interaction review". The applicant responded that the seismic interaction review is a walkdown of the plant after construction. It would check seismic Category 1 equipment and make sure that it's probably installed per the qualifications.

The applicant also addressed the ACRS Action Item 46, which is about use of risk-ranking for motor-operated valve testing. The applicant responded that it would use V-EC 1658-A, which is a

risk ranking approach for motor-operated valves. That was an Owner's Group process which has been accepted by the NRC for the operating units.

The staff presented the evaluation of Chapter 3 with the technical topics of interest in: functional design, qualification, and IST (In-Service Testing) program for pumps, valves, and dynamic restraints. Site-Specific topics of Interest included: Limited Work Authorization (LWA) for foundation base slab, seismic design and system analysis, and construction and inspection. For squib valve, Chairman Ray asked about the acceptance criteria for its IST program. The staff responded that the FSAR provides a description of what they have to do for the IST and licensee would develop the IST program. In responding to the question on the testing raised by Member Brown, the staff stated that ASME is developing new sections of the code which address the squib valves and ASME recognizes that it needs to develop improved IST activities for new reactors.

Chairman Ray asked the applicant to address the development of IST surveillance activities for squib valves. The applicant responded to the request on the following day. It stated that industry and regulatory guidance is considered in development of IST program for squib valves. In addition, the IST program for squib valves incorporates lessons learned from the design and qualification process for these valves such that surveillance activities provide reasonable assurance of the operational readiness of squib valves to perform their safety functions. Members had many questions on the squib valve testing and they expressed interests to look at the program when it is available.

For the Chapter 19, the applicant discussed the confirmation that the seismic margin analysis documented in the AP-1000 DCD is applicable to the Vogtle site. VEGP completed an evaluation against the ground motion response spectra (GMRS). It demonstrated that the site specific High Confidence of Low Probability of Failure values are equal to or greater than 1.67 times the GMRS, which, as evaluated by the staff, it is acceptable.

During the staff presentation, Member Armijo asked if a shield building height error correction was made. The staff responded that it has not been fixed and it would be fixed in DCD. Member Armijo commented that if the COLA is incorporating DCD by reference then all the current analyses may be based on the wrong number. He recommended making sure it gets closed properly.

For Chapter 13, emergency planning and cyber security were discussed. The applicant presented Departure 18.8-1, which 1) moved operations Support Center (OSC) from ALARA (As Low As Is Reasonably Achievable) briefing room to the control support area for each unit, and 2) moved the Technical Support Center (TSC) from the Control Support Area (CSA) to the centrally located communication support center (CSC) located between the power blocks for Units 2 and 3. In responding to questions on data communication between reactor units and TSC by Chairman Ray, the applicant stated that the TCS information is coming over a business network. The business network would be in a lower level of the defensive architecture. Member Brown, along with other members, had a concern on the lower level for the plant data coming through that business network. Members had concerns with potential corruption of information on display. Chairman Ray commented that the potential corrupted information in the TSC could affect safety and the ACRS needed to take a note of this issue.

For Chapter 15, the main discussion was on the calorimetric uncertainty. The applicant presented that some analyses assumed one percent uncertainty and Caldon Check Plus Leading Edge Flow Meter (LEFM) ultrasonic flow measurement (UFM) instrumentation would be used for feedwater flow to support this uncertainty. Member Banerjee questioned the location and calibration of the

instruments. The applicant responded that they are located downstream of a header and they would be calibrated at a certified laboratory. The details on the calibration process and how the calibration is certified are documented in the Cameron SER, which the NRC staff reviewed in the past. Dr. Wallis commented that it is important to know whether or not it is installed exactly as it was calibrated. The applicant responded that DCD has an ITAAC to confirm the installation.

In its evaluation, the staff stated that the power uncertainty was assumed at two percent in analyses in DCD Revision 15. In DCD, Revision 17, one percent uncertainty was assumed in some analyses. The staff found that the approach is consistent with what the staff had been approving in the past. It was based on two main topical reports, ER-80P and ER-157P. Dr. Banajee requested to see these reports and he was concerned about the temperature and velocity profiles effect on the uncertainty.

For Action Item 64, ACRS requested information addressing an additional hazard when a truck is onsite to replenish the stored hydrogen volume. The applicant stated that they would have administrative controls limit amount and route of deliveries of explosive hazard materials.

At the end of RCOL presentation, expectations concerning the topics for the full committee meeting were discussed.

Follow-ups on the AP1000 design certification aircraft impact analysis inspection presentation included the security related information and the presentation was closed to the public.

Attachments (3):

1. Sign-In Sheets
2. Meeting Agenda
3. Presentation Materials for non-proprietary information

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

SUBCOMMITTEE MEETING ON AP1000

December 15, 2010

Date

NRC STAFF SIGN IN FOR ACRS MEETING

PLEASE PRINT

	<u>NAME</u>	<u>NRC ORGANIZATION-</u>
1	Richard THOMAS	NRC/NRO/DE
2	Suzanne Schroer	NRC/NRO/DSRA
3	RAJU PATEL	NRC/NRO/CAVA
4	Lynn Mrowca	NRC/NRO/DSRA
5	VAUGHN THOMAS	NRC/NRO/DE
6	Jose Pires	NRC/RES/DE/SGSEB
7	SUNWOO PARK	NRO/DE/SEB
8	Yong Li	NRC
9	Michelle Hart	NRO/DSE/RSAC
10	Pei-Ying Chen	NRO/DE/EMB
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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

SUBCOMMITTEE MEETING ON AP1000

December 15, 2010

Date

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1	ED CUMMINGS	WESTINGHOUSE
2	Was Sparkman	SNC
3	Charles Herbst	SNC
4	Donald P. Moore	SNC
5	TED AMUNDSON	SNC
6	JASON REDD	SNC
7	Charles Pire	SNC
8	Ron Wessel	Westinghouse
9	Amy M. Monroe	SCE & G
10	William LARAY	Westinghouse
11	Chuck Brockhoff	Westinghouse
12	Amy Aughtman	SNC
13	Eddie R Grant	Wastate/EXCEL
14	MATTHEW EVANS	WESTINGHOUSE
15	JAMES DIORIO	WESTINGHOUSE
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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

SUBCOMMITTEE MEETING ON AP1000

December 16, 2010

Date

NRC STAFF SIGN IN FOR ACRS MEETING

PLEASE PRINT

<u>NAME</u>	<u>NRC ORGANIZATION-</u>
1 Ravi Jushi	NRO/NWE1/
2 ANTHONY MINARIK	NRO/DNRL/NWE1
3 Denise McGovern	NRO/DNRL/NWE1
4 Wayne Chalk	NSIR/DSP/ISCPB
5 PAUL PIERINGER	NRO/DCIP/COLP
6 Mike Junge	NRO DCIP COLP
7 Eileen McConna	NRO/DNRL
8 Don Habib	NRO/DNRL
9 Thomas Galletta	NRO/DNRL
10 Greg Makar	NRO/DE
11 JOHN RYCHINA	NSIR/DSP
12 TIM SHAW	MSR/DSP
13 David Terao	NRO/DE/CIB1
14 Michelle Hart	NRO/OSER/RSAC
15 Joe Donoghue	NRO
16 Tanya Simmons	NRO
17 LARRY WHEELER	NRO/DSRA/SBP
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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

SUBCOMMITTEE MEETING ON AP1000

December 16, 2010
Date

NRC STAFF SIGN IN FOR ACRS MEETING

PLEASE PRINT

	<u>NAME</u>	<u>NRC ORGANIZATION-</u>
1	JEFFREY GRUBB	NRC/NRO/DNKL
2	Ann Hodgdon	OGC/NRP
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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

SUBCOMMITTEE MEETING ON AP1000

December 16, 2010

Date

PLEASE PRINT

<u>NAME</u>	<u>AFFILIATION</u>
1 GARY Becker	Southern Nuclear
2 Jennifer Baker	Southern Nuclear
3 Jerry G. Sims	Nuc. Power Pl. Security Ensuring LLC
4 Pete Prunty	Bechtel (SNC)
5 AL PAGLIA	SCE+G
6 Dave Waters	Progress Energy
7 Michael Bronson	Bechtel (SNC)
8 Edward T. Bonnette (Tim)	SCE+G
9 William E. Hutchins	Westinghouse
10 James Flowers	Southern Nuclear
11 Bradley Yeates	Southern Nuclear
12 MARK WILSON	SNC
13 TED AMUNDSON	SNC
14 Ron Davis	ENERCON - NuStart
15 Mike Snyderman	Bechtel (SNC)
16 Amy M. Monroe	SCE+G
17 Elizabeth Thomas	SNC
18 Charles Herbst	SNC
19 Ron Wessel	Westinghouse
20 ED CUMMINS	WESTINGHOUSE
21 JASON REDD	SNC
22 Dan Patton	Bechtel (SNC)
23 DONALD WINDGREN	WESTINGHOUSE
24 Chuck Brackhoff	Westinghouse
25 JOHN PRIBULA	BECHTEL (SNC)
26 MATTHEW EVANS	Westinghouse
27 Neil Haggerty	NuStart
28 Thom Ray	Westinghouse
DAVE HARRIS	

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

SUBCOMMITTEE MEETING ON AP1000

December 16, 2010

Date

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	<u>NAME</u>	<u>AFFILIATION</u>
1	Wes Sparkman	SNC
2	Bob Hirmanpour	NuStart
3	JAMES DIORIO	WESTINGHOUSE
4	Rolf Ziesing	Westinghouse
5	NATE ANDRULONIS	WESTINGHOUSE
6	Nathan Salsi	Westinghouse
7	Eddie R Grant	NuStart / EXCEL
8	RICH GRUMSIR	NUSTART / Excel
9	Rustin Burger	Westinghouse
10	Sam Bradley	Westinghouse
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**Advisory Committee on Reactor Safeguards
Meeting of the Subcommittee on the
Westinghouse AP1000 DCD and AP1000 RCOL
Rockville, MD
December 15-16, 2010**

- Agenda -

Cognizant Staff Engineers: Weidong Wang (301-415-6279, Weidong.Wang@nrc.gov)
Peter C Wen (301-415-2832, Peter.Wen@nrc.gov)

December 15, 2010

Item	Topic	Presenter(s)	Time
1	Opening Remarks and Objectives	Harold B. Ray, ACRS	0830 – 0845
2	Applicant – Chapter 1	Vogle	0845 – 0900
3	Staff – Chapter 1	NRC	0900 – 0915
4	Applicant– Chapter 6	Vogle	0915 – 1015
	Break		1015 – 1030
5	Staff – Chapter 6	NRC	1030 – 1130
6	Applicant– Chapter 5	Vogle	1130 – 1145
7	Staff – Chapter 5	Staff	1145 - 1200
	Lunch		1200 – 1300
8	Vogle – LOLA (Closed)	Vogle	1300 – 1315
9	Staff – LOLA (Closed)	NRC	1315 - 1330
10	Applicant– Chapter 14	Vogle	1330 – 1400
11	Staff – Chapter 14	NRC	1400 – 1430
	Break		1430 – 1445
12	Applicant– Chapter 3	Vogle	1445 – 1545
13	Staff – Chapter 3	NRC	1545 – 1645
14	Applicant – Chapter 19	Vogle	1645 – 1700
15	Staff – Chapter 19	NRC	1700 – 1715
16	Committee Discussion	Harold B. Ray, ACRS	1715 – 1730
	Adjourn		1730

Notes:

Presentation time should not exceed 50% of the total time allocated for a specific item.
Number of copies of presentation materials to be provided to the ACRS - 35.
CLOSED Sessions for the purpose of discussing proprietary information.

December 16, 2010

Item	Topic	Presenter(s)	Time
1	Opening Remarks and Objectives	Harold B. Ray, ACRS	0830 – 0835
2	Applicant – Chapter 13	Vogtle	0835 – 0935
3	Staff – Chapter 13	NRC	0935 – 1035
	Break		1035 – 1050
4	Applicant – Chapter 8	Vogtle	1050 – 1105
5	Staff – Chapter 8	NRC	1105 – 1120
6	Applicant – Chapter 9	Vogtle	1120 – 1140
7	Staff - Chapter 9	NRC	1140 - 1200
	Lunch		1200 – 1300
8	Applicant – Chapter 15	Vogtle	1300 – 1315
9	Staff – Chapter 15	NRC	1315 – 1330
10	Resolution of ACRS Action Items	ACRS, Vogtle, NRC	1330 - 1415
11	Upcoming ACRS Interactions	NRC	1415 - 1430
	Break		1430 - 1445
10	Applicant – Aircraft Impact (Closed)	Westinghouse	1445 – 1515
11	Staff – Aircraft Impact (Closed)	NRC	1515 – 1545
14	Committee Discussion	Harold B. Ray, ACRS	1545 – 1615
	Adjourn		1615

Notes:

Presentation time should not exceed 50% of the total time allocated for a specific item.

Number of copies of presentation materials to be provided to the ACRS - 35.

CLOSED Sessions for the purpose of discussing security-related information.



Bellefonte 3&4

Lee Nuclear 1&2

Summer 2&3

Vogtle 3&4

Harris 2&3

Levy 1&2

Turkey Point 6&7

AP1000 Reference Combined License Application Presentation to ACRS Chapter 1

December 15-16, 2010

Presenters: Chuck Pierce, Amy Aughtman, Eddie Grant



Compacting Backfill for Plant Vogtle Unit 4 with Units 1 and 2 in background
November 4, 2010

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VEGP 3&4 Overview





VEGP 3&4 Overview

- COL Application submitted March 28, 2008
- IBR of WEC AP1000 DCD Amendment Application
- IBR of SNC VEGP Early Site Permit Application
 - ESP and LWA-A issued August 26, 2009
- Submitted initially as Subsequent COLA following TVA BLN as the Reference COLA
- VEGP became Reference COLA for AP1000 plants in 2009
- LWA-B submitted October 6, 2009
 - Scope includes reinforcing steel, sumps and drain lines, other embedded items, and first concrete



Figure 1-2 50-Mile Vicinity



R-COLA Chapter 1:

Introduction and General Description of the Plant

1.1 Introduction

1.2 General Plant Description

1.3 Comparisons with Similar Facility Designs

1.4 Identification of Agents and Contractors

1.5 Requirements for Further Technical Information

1.6 Material Referenced

1.7 Drawings and Other Detailed Information

1.8 Interfaces for Standard Design

1.9 Compliance with Regulatory Criteria

1.10 Nuclear Power Plants to be Operated on Multi-Unit Sites



R-COLA Chapter 1: SER Open Items

SER Open Items (closed in AFSER)

OI 1-1: *Incorporation of Certified Design*

OI 1-2: *License Conditions Determination (NRC)*

OI 1.4-2: *Regulatory Criteria Conformance*

OI 1.4-3: *Construction Hazards Identification and Controls*

OI 1.4-4: *Construction Hazards Program Milestone*

OI 1.5-1: *Parts 30, 40 & 70 License Information*



R-COLA Chapter 1: Other Topics

Departures and Exemptions

Departures Listed in FSAR Table 1.8-201

COLA Part 7 provides discussions and justifications

ESP Variances

Identified in FSAR Table 1.6-202

COLA Part 7 provides discussions and justifications



R-COLA Chapter 1: Plant-Specific Items

Plant-Specific Supplemental Information

VEGP SUP Examples

- Location
- Schedule
- ESP Incorporation
- Southern Nuclear Operating Company & contractors
- DCD plant interfaces
- Company fleet-specific practices



R-COLA Chapter 1: SER Open Items

OI 1-1: Incorporation of Certified Design

- The Staff noted that the AP1000 design certification amendment was not yet complete and that the COL applicant may need to supplement the COL application based on the outcome of the AP1000 design certification rulemaking.
- The applicant has addressed several revisions to the DCD amendment and agreed to incorporate by reference the final approved DCD into the COL application.
- The staff found the response acceptable and is addressing completion of this item, i.e., incorporation of the final approved DCD, as confirmatory.



R-COLA Chapter 1: SER Open Items

OI 1.4-2: Regulatory Criteria Conformance

- The Staff noted that the application discussions of Regulatory Guide conformance were still under review and the Staff had not yet made a determination of whether the responses to related RAIs were acceptable.
- In response to various RAIs primarily related to consistency between Tables 1.9-201 and Appendix 1AA, the applicant provided revised COL information related to Regulatory Guide conformance.
- The staff found the responses acceptable and concluded that the open item has been satisfactorily resolved.



R-COLA Chapter 1: SER Open Items

OI 1.4-3: Construction Hazards Identification and Controls

- The Staff noted that the application discussions of potential hazards to operating units due to construction activities were still under review and the Staff had not yet made a determination of whether the responses to related RAIs were acceptable.
- The NRC issued a draft of ISG-22, "Interim Staff Guidance on Impact of Construction of New Nuclear Power Plants on Operating Units at Multi-Unit Sites," which discusses the evaluation of potential hazards from constructing new plants on SSCs important to safety for existing (or new) operating plants that are located at the site.
- The staff found the responses to RAIs and proposed FSAR revisions acceptable and concluded that open item has been satisfactorily resolved.



R-COLA Chapter 1: SER Open Items

OI 1.4-4: Construction Hazards Program Milestone

- The Staff noted that the application discussion of the implementation of a program to identify and mitigate potential hazards to operating units due to construction activities were still under review and the Staff had not yet made a determination of whether the responses to related RAIs were acceptable.
- The NRC issued a draft of ISG-22, which discusses the appropriate implementation timing for the construction hazards program.
- The staff found the proposed implementation milestone acceptable and concluded that open item has been satisfactorily resolved.



R-COLA Chapter 1: SER Open Items

OI 1.5-1: Parts 30, 40 & 70 License Information

- The Staff noted that the application information supporting issuance of licenses pursuant to Parts 30, 40 and 70 activities were still under review and the Staff had not yet made a determination on acceptability of the information provided in the application.
- In response to this Open Item and subsequent RAIs, the applicant provided additional information, including a revised VEGP COL FSAR Table 13.4-201 and a materials control and accounting program description.
- The staff found the information acceptable and concluded that open item has been satisfactorily resolved.



R-COLA Chapter 1: Other Topics

Departures and Exemptions

One new Standard Departure

- 8.3-1 re voltage regulating transformers

Two VEGP Specific Departures

- 9.2-1 re potable water system filtration
- 18.8 1 re emergency operations facilities locations

One new STD Exemption

- SNM Material Control and Accounting Program Description



R-COLA Chapter 1: Other Topics

Early Site Permit Variances

- 1.2-1 revised site layout
- 1.6-1 update of DCD Revision referenced in ESP application
- 1.6-2 update of DCD Revision referenced in ESPA SSAR Section 3.8.5, Foundations
- 1.6-3 update of DCD Revision referenced in ESPA SSAR Chapter 15, Accident Analyses
- 2.2-1 updated site-specific chemicals
- 2.3-1 updated temperature characteristics for consistency with DCD changes



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Presentation to the ACRS Subcommittee

Vogtle Units 3 and 4 COL Application Review

**ASE Chapter 1
Introduction and Interfaces**

December 15-16, 2010

Staff Review Team

- Technical Staff
 - Mike Dusaniwskyj, NRR
 - Larry Harris, NSIR
 - Robert Moody, NSIR
 - Ed Roach, DCIP
- Project Management
 - Ravindra Joshi, Projects

Overview

Completed Milestones:

- Received VEGP COL Application-3/28/2008
- Acceptance Review Completed-4/24/2008
- VEGP designated as RCOLA-4/28/2009
- Vogtle ESP/First LWA granted—8/26/09
- Received the Second LWA request-10/6/2009
- Safety Review Phases 1 through 4 are complete
- Phase 5—ACRS Subcommittee Review December 15-16
- Phase 5—ACRS Full Committee January 2011

Vogtle COL Application

- Vogtle COL application incorporates the ESP site safety analysis report (SSAR) and incorporates by reference the Westinghouse AP1000 Design Certification (DC) and DC amendment.
- Vogtle ESP/LWA1 was granted on August 26, 2009.
- Vogtle Application consists of:
 - material incorporated by reference (IBR) from portions of the ESP, and DCD
 - Staff's safety evaluation for ESP and DC reflected in NUREG-1923, and NUREG-1793 and its supplement, respectively
 - Staff's safety evaluation of AP1000 DC amendment was completed and presented to the committee
 - standard content material (applicable to all AP1000 COL applicant)
 - Vogtle's safety evaluation for standard content generally references Bellefonte safety evaluation report with open items
 - Vogtle's safety evaluation provides the basis for standard content open item resolution
 - Vogtle plant specific information.
 - Second LWA request received 10/6/2009

ACRS Interactions--RCOL

- AP1000 COL Standard Content Review
 - 19 of 19 SER with open items chapters issued; most presented
- Areas where standard content SER has not yet been provided
 - Chapter 6 and Sections 3.7 and 3.8
 - Cyber security and fitness for duty
 - Loss of large areas due to fires/explosions
 - Security (outside of ACRS charter)
- The Advanced Safety Evaluation Report (ASER) was issued on a chapter-by-chapter basis
- All open items on standard content were resolved prior to chapter issuance. Plant-specific issues were also resolved prior to chapter issuance. Some confirmatory items remained.
- Three meetings (June 24-25, July 21-22, and September 20-21) were completed with the ACRS AP1000 subcommittee through this calendar year. Chapters 2, 4, 7, 10, 11, 12, 16, 17, and 18 were presented at those meetings

Vogtle COL Overview

Part Number	Description	Evaluation
1	General and Administration Information	Section 1.5.1
2	Final Safety analysis Report	In appropriate SER Chapters
3	Environmental Report	Final Environmental Impact statement
4	Technical Specifications	Chapter 16
5	Emergency Plan	Chapter 13
6	Limited Work Authorization # 2	Section 3.8.5
7	Departure Reports	In appropriate SER Chapters
8	Security Plan	Section 13.6
9	Withheld Information	In appropriate SER Chapters
10	Proposed Combined License Conditions (Including ITAAC)	In appropriate SER Chapters
11	Information Incorporated by Reference (e.g., quality assurance plan, material control and accountability program)	In appropriate SER Chapters
	Other Parts (e.g., Mitigative Strategies Document, Cyber Security Plan)	In appropriate SER Chapters

Overview of Vogtle COL FSAR Chapter 1

FSAR Section	Summary of Departures/Supplements
1.1 Introduction	Incorporated By Reference (IBR) with standard and site specific supplements
1.2 General Plant Description	IBR with site-specific supplements
1.3 Comparisons with Similar Facility designs	Completely IBR
1.4 Identification of Agents and Contactors	IBR with site-specific supplements
1.5 Requirements for Further Technical Information	Completely IBR
1.6 Material Referenced	IBR with standard and site-specific supplements
1.7 Drawings and Other Detailed Information	IBR with site-specific supplements
1.8 Interface for Standard Designs	IBR with site-specific supplements
1.9 Compliance with Regulatory Criteria	IBR with standard and site-specific supplements
1.10 Nuclear Power Plants to be Operated on Multi-Units Sites	Standard and site-specific supplemental information

Technical Topics of Interest

Vogle COL Technical Topics of Interest

- Departures and Exemptions
 - **Departures**
 - COL application organization and numbering (Section 1.3)
 - PWS Filtration (Section 9.2-1)
 - Emergency response facility locations (Sections 12.5, 13.3 and 18.8)
 - Class 1E voltage regulating transformer current limiting features (Section 8.3.2)
 - **Exemptions**
 - COL application organization and numbering (Section 1.5.4)
 - From requirements of 10 CFR 70.22(b), 70.32(c), and 10 CFR 74.31, 74.41 and 74.51(Section 1.5.4)

Technical Topics of Interest

ESP COL Action Items

- Hydrazine Hazard from Onsite Storage Tanks(Section 2.2.3)
- Other Chemicals Hazards from Onsite Storage Tanks (Section 2.2.3)
- Ultimate Heat Sink Design (Section 2.3.1)
- Chelating Agents (Section 2.4.13)
- Access Control Measures to Address Existing Spur (Section 13.6)

Technical Topics of Interest

VEGP ESP Variances

- Variance from VEGP ESP SSAR Section 1.6, “Material Incorporated by Reference” (Section 1.4.4)
- Variance from VEGP ESP SSAR Section 3.8.5, “Foundation” (Section 3.8.5)
- Variance from VEGP ESP SSAR Chapter 15, “Accident Analysis (Chapter 15)
- Section 1.2, “General Site Description,” Section 13.3, “Emergency Planning,” and VEGP ESP Part 5, “Emergency Plan” (Section 13.3)
- Variance from VEGP ESP SSAR Section 2.2.3.2, “Hazardous Chemical” and VEGP ESP SSAR Table 2.3-6, “Potential Hazards”(Section 2.2)
- Variance from VEGP ESP SSAR Section 2.3.1.5, “Meteorology (Section 2.3)

Technical Topics of Interest

Other Topics of Interest

- **Financial and Technical qualifications Review**
 - Technical qualification review in accordance with 10 CFR 52.97(a)(1)(iv) --- (Section 1.4.4)
 - Evaluates financial resources to build, operate and eventually decommission a nuclear facility in accordance with 10 CFR 52.79(a)(1)(iv)--(Section 1.5.1)
- **Special Nuclear Material (SNM) Material Control & Accounting(MC&A) Program**
 - The SNM MC&A program will be developed for control and accounting of SNM in accordance with applicable requirements of 10 CFR 74 Part A and B and will be consistent with ANSI 15.8-2009.
 - The SNM MC&A meets reporting and recording requirements of 10 CFR 74.11, 74.13, 74.15 and 74.19.
 - The Physical Security Plan will be implemented prior to receipt of fuel onsite in accordance with 10 CFR 73.55.
 - The program will be implemented prior to receipt of SNM at the plant site.
 - Staff finds the program acceptable

Technical Topics of Interest

Exemption: Special Nuclear Material (SNM) Material Control & Accounting Program (MC&A)

- The provisions of 10 CFR 70.22(b) requires an application for a license for SNM to include a full description of the applicant's program for MC&A of SNM under 10 CFR 74.31, 10 CFR 74.33, 10 CFR 74.41, and 10 CFR 74.51
- However, 10 CFR 70.22(b), 10 CFR 70.32(c), 10 CFR 74.31, 10 CFR 74.41, and 10 CFR 74.51 include exceptions for nuclear reactors licensed under 10 CFR Part 50 but does not include exception to reactor licensees under 10 CFR 52
- The applicant requested an exemption from requirements of 10 CFR 70.22(b), 70.32(c), and 10 CFR 74.31, 74.41 and 74.51
- The applicant stated that the purpose of this exemption request is to seek a similar exception for this COL under 10 CFR Part 52, such that the same regulations will be applied to the SNM MC&A program as nuclear reactors licensed under 10 CFR Part 50

Technical Topics of Interest

Exemption: Special Nuclear Material (SNM) Material Control & Accounting Program (MC&A)

- The NRC staff reviewed the subject exemption, which will allow the applicant to have a similar exception for the COL under 10 CFR Part 52, such that the same regulations will be applied to the SNM MC&A program as nuclear reactors licensed under 10 CFR Part 50,
- Staff Determined
 - that this requested exemption will not present an undue risk to the public health and safety and
 - is otherwise in the public interest. In addition, this exemption is consistent with the Atomic Energy Act or any other statute and is therefore authorized by law.
 - Therefore, granting this exemption will not adversely affect the common defense and security.
 - Further, the application of the regulation in these particular circumstances is not necessary to achieve the underlying purpose of the rule.

Standard Content Open Items

Open items

- 1-1, to update application based on outcome of AP1000 design certification amendment
- 1-2, staff to determine which FSAR commitments require a license condition
- 1.4-2, Regulatory Guide tables to be updated and confirmed correct references
- 1.4-3, staff to complete review of applicant's assessment of potential hazards due to construction of one unit on operating units on site
- 1.4-4, to provide a positive commitment for when management programs to be in place to address hazards of construction on operating units
- 1.5-1, to provide a discussion of which parts of application support issuance of 10 CFR 30, 40 and 70 (byproduct, source material and Special Nuclear Material) licenses

Resolution of Standard Content Open Items

- 1-1 To update application based on outcome of AP1000 design certification amendment
 - The applicant will incorporate by reference the certified Design

- 1-2 Staff to determine which FSAR commitments require a license condition
 - Using the guidance of ISG-15, the staff identified certain FSAR commitments in individual sections of the SER

- 1.4-2 Regulatory Guide tables to be updated and confirmed correct references
 - The applicant revised Appendix 1AA and Table 1.9-201

Resolution of Standard Content Open Items

- 1.4-3 Staff to complete review of applicant's assessment of potential hazards due to construction of one unit on operating units on site
- The applicant's proposed revision to the FSAR meets the guidance of ISG-22(draft) and therefore meets the requirements of 10 CFR 52.79(a)(31)
- 1.4-4 Applicant to provide a positive commitment for when management programs to be in place to address hazards of construction on operating units
- The applicant proposed to revise the FSAR to positively state that the management programs will be in place when there is an operating unit on the site.

Resolution of Standard Content Open Items

- 1.5-1 Applicant to provide a discussion of which parts of application support issuance of 10 CFR 30 and 40 (byproduct and source material) licenses
- The applicant provided information on the following programs:
 - radiation protection program
 - fire protection program,
 - security program
 - non-licensed staff training program,
 - emergency plan for the 30/40/70 license
 - material control and accounting (MC&A) program for special nuclear material (SNM).
 - This information meets the requirements of 10 CFR 30, 40 and 70.
 - The staff proposed the license conditions provisions for the VEGP COL, as it relates to authorization pursuant to regulations in 10 CFR Parts 30, 40, and 70 and the SNM MC&A program



Bellefonte 3&4

Lee Nuclear 1&2

Summer 2&3

Vogtle 3&4

Harris 2&3

Levy 1&2

Turkey Point 6&7

AP1000 Reference Combined License Application Presentation to ACRS Chapter 6

December 15-16, 2010

Presenters: Amy Aughtman, Eddie Grant



R-COLA Chapter 6:

Engineered Safety Features

6.1 Engineered Safety Feature Materials

6.2 Containment Systems

6.3 Passive Core Cooling System

6.4 Habitability Systems

6.5 Fission Product Removal and Control Systems

6.6 Inservice Inspection of CI, 2, 3, and MC Components



R-COLA Chapter 6: Major Topics

- **DCD incorporated by reference**
 - No Departures taken
- **Majority of FSAR Chapter information IBR of DCD or related to addressing COL Information Items**
- **Standard supplemental information**
 - Dual unit control room hazards evaluations
 - Hazardous chemical details
 - Section XI inspection accessibility
- **Site specific supplemental information**
 - Site specific control room hazards evaluations



R-COLA Chapter 6: COL Items

STD COL 6.1-1 Procedure Review for Austenitic Stainless Steels
– conformance with RG 1.31 and RG 1.44

STD COL 6.1-2 Coating Program

- addressed procurement, application, inspection and monitoring of Service Level I, II, and III coatings
- SER open item
- separate presentation to address ACRS questions

STD COL 6.2-1 Containment Leak Rate Testing Program

- using Appendix J, Option B per NEI 94-01 and RG 1.163



R-COLA Chapter 6: COL Items

STD COL 6.3-1 Containment Cleanliness Program

- limit outage debris left in containment
- limit storage of outage materials in containment
- include containment entry and exit requirements, material controls, housekeeping, and
- sampling per NEI 04-07 addressing GL 2004-02

STD & VEGP COL 6.4-1 Local Hazardous Gas Services and Monitoring

- provided table of evaluated onsite chemicals
- no unacceptable evaluation results

STD COL 6.4-2 Procedures & Training for Control Room Habitability

- confirmed consistent with intent of Generic Issue 83 and Regulatory Guide 1.196



R-COLA Chapter 6: COL Items

STD COL 6.6-1 Inspection Programs

- ASME Code Section III, Class 2, 3 and MC
- Pre-service / Inservice inspection (PSI/ISI) program
- Use of approved ASME Section XI Code Cases

STD COL 6.6-2 Construction Activities

- Procedures to address anomalies and construction issues
- Preserve accessibility and inspection capability
- Change control provides same process as original design



R-COLA Chapter 6: SER Open Items

SER Open Items (closed in AFSER)

OI 6.1.2-1: *Control of Coatings*

(Design and Construction Phase)

OI 6.4-1: *Design Features Credited in Habitability Analysis*

OI 6.4-2: *Training and Procedures re: RG 1.196*



R-COLA Chapter 6: SER Open Items

OI 6.1.2-1: *Control of Coatings (Design and Construction Phase)*

- Staff noted the information provided about the control of coatings during the design and construction phase, although acceptable, was not included in the FSAR.
- In a July 2, 2010, letter, the applicant proposed additional information for FSAR Subsection 6.1.2.1.6 to further address "Service Level I and Service Level III Coatings."
- The staff found the information consistent with the information reviewed for the BLN SER and applicable to VEGP, and therefore, acceptable.



R-COLA Chapter 6: SER Open Items

OI 6.4-1: *Design Features Credited in Habitability Analysis*

- Staff noted that applicant's chemical analysis includes assumptions associated with design features, such as the intake location for the CR ventilation system and requested that the credited design features be identified in the FSAR.
- In a June 17, 2010, letter, the applicant proposed modifications to FSAR Table 6.4-201 to indicate design features considered in the impact evaluation.
- The staff determined that the modifications sufficiently described the design assumptions considered by the applicant.



R-COLA Chapter 6: SER Open Items

OI 6.4-2: *Training and Procedures re RG positions*

- Staff asked the applicant to include in the FSAR the essential elements of the training and procedures necessary to demonstrate that the regulatory requirements are met .
- In a January 5, 2010, letter, the applicant proposed additional information for FSAR Subsection 6.4.3, addressing how procedures, testing and training related to Control Room habitability would be consistent with the regulatory positions in RG 1.78 and RG 1.196.
- The staff found that the applicant committed to appropriately update the FSAR and therefore, the open item is resolved.



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Presentation to the ACRS Subcommittee

Vogtle Units 3 and 4 COL Application Review

**ASE Chapter 6
Engineered Safety Features**

December 15-16, 2010

Staff Review Team

- **Technical Staff**
 - Greg Makar, Component Integrity, Performance and Testing Branch (CIB1)
 - Christopher Jackson, Shie-Jeng Peng, Michelle Hayes, Containment and Ventilation Branch (SPCV)
- **Project Management**
 - Donald Habib, Project Manager

Overview

Section	Content	Open Items, Topics of Interest
6.1.1 Engineered Safety Materials Features, Metallic Materials	Standard	
6.1.2 Engineered Safety Materials Features, Organic Materials	Standard	<ul style="list-style-type: none"> • OI 6.1.2-1, Control of Coatings During Design and Construction • CI 6.1-2, Service Level II Coatings • Coatings Program Overview
6.2 Containment Systems	Standard	
6.3 Passive Core Cooling System	Standard	<ul style="list-style-type: none"> • Cleanliness Program
6.4 Habitability Systems	Plant Specific	<ul style="list-style-type: none"> • OI 6.4-1, Control Room Habitability • OI 6.4-2, Control Room Habitability Procedures and Training • Concentrations of Site-Specific Chemicals • Control Room Air Exchange Rate
6.5 Fission Product Removal and Control Systems	IBR	
6.6 Inservice Inspection of Class 2, 3, and MC Components	Standard	

6.1.2 Protective Coatings Overview

- DCD Section 6.1.3.2 – Coating Program

The Combined License applicants referencing the AP1000 will provide a program to control procurement, application, inspection, and monitoring of Service Level I, Service Level II, and Service Level III coatings. The program for the control of the use of these coatings will be consistent with subsection 6.1.2.1.6. (reflects DCD revisions proposed in March 2010)

- STD COL 6.1-2

Standard COL information to provide the coating program information

- Regulations/Guidance

- DCD Section 6.1.2.1.6
- 10 CFR Part 50, Appendix B
- Regulatory Guide 1.54, Rev. 1

Open Item 6.1.2-1, Control of Coatings During Design and Construction

- The applicant provided Standard COL information about the coatings program
- The staff requested additional information about the details of the program
- The response addressed the staff's technical concerns but did not propose to include all of the information in an FSAR revision
- The applicant proposed an FSAR revision in July 2010
- This is now **Confirmatory Item 6.1-1**

Confirmatory Item 6.1-2, Service Level II Coatings

- Not associated with an open item
- Resulted from a change in the AP1000 DCD to include Service Level II coatings in the COL information item on the coatings program
- The applicant proposed revisions to the FSAR to address the Service Level II coatings
- The proposed FSAR revisions are **Confirmatory Item 6.1-2**

STD COL 6.1-2 Coatings Program Requirements

- Procurement, application, inspection, and monitoring of SL I, II, and III coatings
 - Appendix B program for SL I and SL III (and procurement of SL II in containment)
- Conformance to RG 1.54, Rev. 1
 - RG 1.54, Rev. 1, endorses a system of ASTM standards developed for nuclear plant coatings
 - ASTM D5144 is a top-level standard describing the approach and referencing the more detailed standards
 - ASTM D5144: “Use of Protective Coating Standards in Nuclear Power Plants”
 - The detailed standards are organized into three categories: quality assurance for coating materials, qualification/certification of people, and coatings maintenance.

STD COL 6.1-2 Coatings Program

Information Provided: Service Level I and III Coatings

- Consolidated, Appendix B coatings program will be in place prior to fuel loading (RG 1.54, Rev. 1 and ASTM D5144)
- Design and construction phase based on Westinghouse specifications (RG 1.54, Rev. 1, and ASTM D5144)
- Standards for procurement, application, and quality assurance inspection are specified through ASTM D5144
- Monitoring according to ASTM D5163 (SL I) and D7167 (SL III)
- The staff found this acceptable:
 - Appendix B program
 - Addresses the DCD requirements
 - The proposed ASTM standards conform to RG 1.54, Rev. 1, or more recent guidance

STD COL 6.1-2 Coatings Program

Information Provided: Service Level II Coatings in Containment

- Coating program based on ASTM D5144
- Procurement to the same standards as SL I coatings with respect to radiation tolerance and DBA performance
- Performance monitoring according to the same standards as SL I coatings
- The staff found this acceptable because SL II coatings in containment will be treated like SL I for procurement and performance monitoring

Containment Cleanliness Program

- Administrative procedures implement the containment cleanliness program.
- Implementation of the program minimizes the amount of debris left in containment following personnel entry and exits.
- The program:
 - defines personnel and material controls;
 - defines the inspection and reporting requirements

Containment Cleanliness Program

- Implementation
 - Controls to account for the quantities and types of materials introduced into the containment.
 - Limits on the types and quantities of materials, including scaffolding and tools, to ensure adequate accountability controls.
 - Storage of aluminum is prohibited without engineering authorization.
 - Cardboard boxes or miscellaneous packing material is not brought into containment without approval.

Containment Cleanliness Program

- Program addresses containment entries that are made at power.
- Controls for loose items, such as keys and pens, which could be inadvertently left in containment.
- Methods and controls for securing any items and materials left unattended in containment.
- Administrative controls for accounting for tools, equipment and other material are established.

Containment Cleanliness Program

- Administrative controls for accounting of the permanent removal of materials previously introduced into the containment.
- Limits on the types and quantities of materials, including scaffolding and tools, that may be left unattended in containment during outages and power operation.
- Types of materials considered are tape, labels, plastic film, and paper and cloth products.
- Requirements and actions to be taken for unaccounted for material.

Containment Cleanliness Program

- Requirements for final containment cleanliness inspections consistent with the design bases provided in DCD Subsection 6.3.8.1.
 - 59.0 kg (130 pounds-mass (lbm)), of which up to 3.0 kg (6.6 lbm) is fiber.
- Record keeping requirements for entry/exit logs.
- Housekeeping procedures require that work areas be maintained in a clean fashion and returned to original conditions upon completion of work.

Sampling Program

- A sampling program is implemented consistent with NEI Guidance Report 04-07, as supplemented by the NRC in the Safety Evaluation.
- Latent debris sampling is implemented before startup.
- The sampling is conducted after containment exit cleanliness inspections to provide reasonable assurance that the plant latent debris design bases are met.

Sampling Program

- Guidance Report 04-07 sampling program
 - Concrete walls, the liner, and vertical piping/equipment should each be sampled at a minimum of three locations.
 - Sample collection for horizontal surfaces.
 - Analyze debris samples to determine composition and physical properties.
 - Characterize the fiber-to-particulate mass ratio.

Corrective Action Program

- Results are evaluated post-start up and any nonconforming results will be addressed in the Corrective Action Program.
- Operating reactors entered non-conforming debris into CAP. One reactor shut down when debris generation assumptions were discovered to be inconsistent with the as-found plant.

Comparison with Operating Fleet

- Operating reactor containment cleanliness has improved significantly over past 10 years
- Like operating reactors, AP1000 cleanliness program requires cleanup of work areas, walk downs and good maintenance practices
- Specific FSAR-described program
- Specific sampling techniques are identified
- Latent debris is categorized into two types
- Specific acceptance criteria for each type of debris established

6.4 Habitability Systems Overview

- Standard Content Open Items
 - Open Item 6.4-1 – Hydrazine and carbon dioxide may exceed IDLH limits at ground level. What are design features credited in safety analysis to prevent the problem?
 - Open Item 6.4-2 – How are procedures and training for control room habitability provided to meet regulatory positions?
- Site-Specific Issues
 - MPA and ammonium bisulfate may exceed IDLH limits at ground level. What are design features credited in safety analysis to prevent the problem?
 - Applicant proposed to modify control room air exchange rate used in safety analysis to a conservative value.

Open Item 6.4-1

Control Room Habitability

- **Issue:**
 - SER Section 2.2.3 identified that potential releases of hydrazine and carbon dioxide might exceed IDLH limits at ground level at control room intake while the applicant stated that their control room concentrations remained below their IDLH limits. The staff issued RAI 6.4-8 to request information on the design features credited in applicant's safety analysis.
- **Resolution:**
 - The applicant responded that they credited the relative height between chemical release point and control room intake and the control volume size in their safety analysis. The applicant proposed to revise the FSAR to indicate the design features are credited in the safety analysis.
 - The staff audited applicant's calculation and performed confirmatory analysis, and concluded that the applicant provided acceptable resolution to this open item. The proposed FSAR revision is **Confirmatory Item 6.4-1**.

Open Item 6.4-2

Control Room Habitability Procedures and Training

- **Issue:**
 - The applicant did not provide sufficient information on the procedures and training for control room habitability to meet regulatory positions. The staff issued RAI 6.4-7.
- **Resolution:**
 - The applicant proposed to revise the FSAR to address how procedures, testing, and training related to control room habitability would be implemented to comply with the regulatory positions.
 - The staff concluded that the information and proposed FSAR revision provided by the applicant are acceptable. The proposed FSAR revision is **Confirmatory Item 6.4-3**.

6.4 Site-Specific Issue

Concentrations of Site-Specific Chemicals

- **Issue:**
 - SER Section 2.2.3 identified that the releases of MPA and ammonium bisulfite might exceed IDLH limits at ground level at the control room intake while the applicant stated that their control room concentrations remained below their IDLH limits. The staff issued RAIs 6.4-2 and 6.4-3 to request information about the applicant's safety analysis.
- **Resolution:**
 - The applicant responded and provided information on the physical properties for these chemicals and input data used to model the analysis. The applicant proposed to revise the FSAR to indicate the design features are credited in the safety analysis.
 - The staff audited applicant's calculation and performed confirmatory analysis, and concluded that the applicant has provided acceptable information to resolve this issue. The proposed FSAR revision is **Confirmatory Item 6.4-2**.

6.4 Site-Specific Issue

Control Room Air Exchange Rate

- **Issue:**
 - Non-conservative data for control room air exchange rate was described in FSAR. The staff issued RAI 6.4-3 to request clarification and justification.
- **Resolution:**
 - The applicant responded and revised their analysis with a conservative control room air exchange rate and analysis conditions. The applicant proposed to revise FSAR to reflect the changes.
 - The Staff reviewed applicant's FSAR mark-ups and performed confirmatory analysis. The Staff concluded that the applicant's changes and conclusion are acceptable.



Bellefonte 3&4

Lee Nuclear 1&2

Summer 2&3

Vogtle 3&4

Harris 2&3

Levy 1&2

Turkey Point 6&7

AP1000 Reference Combined License Application Presentation to ACRS Chapter 5 Standard Topics

December 15-16, 2010

Presenters: Amy Aughtman, Eddie Grant



R-COLA Chapter 5:

Reactor Coolant System and Connected Systems

5.1 Summary Description

5.2 Integrity of Reactor Coolant Pressure Boundary

5.3 Reactor Vessel

5.4 Component and Subsystem Design



R-COLA Chapter 5: SER Open Items

SER Open Items (closed in AFSER)

None



R-COLA Chapter 5: Other Topics

New COL Information Items

STD COL 5.2-3 – Unidentified RCS Leakage

STD COL 5.3-7 – Quickloc Weld ISI



R-COLA Chapter 5: Recent Revisions

New COL Information item 5.2-3 - Response to Unidentified RCS Leakage Inside Containment

WEC added additional information item via RAI response

STD COL 5.2-3 information was provided:

- operating procedures specify operator actions in response to prolonged low level unidentified reactor coolant leakage conditions
 - provide operators time to take action before the TS limit is reached
- procedures include identifying, monitoring, trending, and redressing prolonged low level leakage
- procedures to be developed using the guidance of Reg. Guide 1.45



R-COLA Chapter 5: Recent Revisions

New COL Information item 5.3-7 - Quickloc Weld ISI

WEC added additional information item via RAI response

STD COL 5.3-7 information was provided by letter:

- perform 100% volumetric examination of the weld build-up on the reactor vessel head for instrumentation penetrations (Quickloc)
- conducted once during each Section XI 120-mo inspection interval
- acceptance standards per ASME Code, Section XI, IWB-3514
- Personnel performing exams and examination systems qualified per ASME Code, Section XI, Appendix VIII



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Presentation to the ACRS Subcommittee

Vogtle Units 3 and 4 COL Application Review

**ASE Chapter 5
Steam and Power Conversion**

December 15-16, 2010

Staff Review Team

- Technical Staff
 - John Honcharik, (CIB)
 - Chang Li, (SBPA)
- Project Management
 - Sujata Goetz-AP1000 Vogtle COL

Overview

- Chapter 5 SER without Open Items
 - Topics of Interest
 - Quickloc Nozzle ISI (COL Information Item 5.3-7)
 - Reactor Low level Leakage (COL Information item 5.2-3)

Quickloc Nozzle ISI

- Proposed COL Information Item 5.3-7 to be included in the AP1000 DCD concerning augmenting the Inservice Inspection (ISI) program for Quickloc weld buildup.
- The applicant proposed a STD COL 5.3-7 to address this AP1000 DCD COL Information item in the VEGP COL FSAR:
 - COL holder will augment the plant-specific ISI program related to the Quickloc weld buildup on the reactor vessel head to include 100 percent volumetric inspection.
- The NRC staff finds the STD COL 5.3-7 acceptable since it will ensure the integrity of the reactor coolant pressure boundary weld during service, which meets the requirements of GDC 32 of Appendix A to 10 CFR Part 50, as it relates to periodic inspection to ensure the integrity of the RCPB is maintained

RCS Low Level Leakage

- The applicant responded to STD COL 5.2-3, in which it committed the development of operating procedures for the prolonged low-level RCS leakage detection prior to fuel load.
- Staff is satisfied with the response, because it meets the relevant guidance in RG 1.45, Revision 1. Conformance with these guidelines provides an acceptable basis for satisfying the requirements of GDC 30.



Bellefonte 3&4

Lee Nuclear 1&2

Summer 2&3

Vogtle 3&4

Harris 2&3

Levy 1&2

Turkey Point 6&7

AP1000 Reference Combined License Application Presentation to ACRS

Chapter 14 Initial Test Program

December 15-16, 2010

Presenters: Amy Aughtman, Bob Hirmanpour



R-COLA Chapter 14 – Content

Initial Test Program

- 14.1 SPECIFIC INFORMATION TO BE INCLUDED IN PRELIMINARY/FINAL SAFETY ANALYSIS REPORTS**
- 14.2 SPECIFIC INFORMATION TO BE INCLUDED IN STANDARD SAFETY ANALYSIS REPORTS**
- 14.3 CERTIFIED DESIGN MATERIAL**
- 14.4 COMBINED LICENSE APPLICANT RESPONSIBILITIES**



R-COLA Chapter 14: SER Open Items

SER Open Items (closed in AFSER)

SER contained two tracking open items. These open items were closed in AFSER with no action needed by the COL Applicant.



R-COLA Chapter 14: Additional Changes

- **Nonsupervisory Test Engineers Qualification**

VEGP will follow the guidance provided in RG 1.28 and Appendix 2A-1 of ASME NQA-1-1994, "Quality Assurance Requirements for Nuclear Facility Applications."

- **Initial Test Program License Condition**

The approved preoperational and startup test procedures will be included in the schedule submitted to the NRC; changes to the ITP are reported within one month of such a change; and results of tests conducted during preoperational testing and power ascension will be reviewed and evaluated.



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Presentation to the ACRS Subcommittee

Vogtle Units 3 and 4 COL Application Review

ASE Chapter 14

Initial Test Program and ITAAC-Design Certification

December 15-16, 2010

Staff Review Team

- **Technical Staff**
 - Raju Patel, Quality and Vendor Branch 1
- **Project Manager**
 - Terri Spicher, Senior Project Manager, VEGP COL Review

Resolution of Standard Content Open Items

- Open Item 14.2 -1 – Test Specifications and Test Procedures
- Open Item 14.2 -2 – Conduct of Test Program
- These open items are tracking open items and now these items are closed



Bellefonte 3&4

Lee Nuclear 1&2

Summer 2&3

Vogtle 3&4

Harris 2&3

Levy 1&2

Turkey Point 6&7

AP1000 Reference Combined License Application Presentation to ACRS Chapter 3

December 15-16, 2010

Presenters: Wes Sparkman, Eddie Grant, Don Moore



R-COLA Chapter 3:

Design of Structures, Components, Equipment and Systems

3.1 Conformance with NRC General Design Criteria

3.2 Classification of Structures, Components, and Systems

3.3 Wind and Tornado Loadings

3.4 Water Level (Flood) Design

3.5 Missile Protection

3.6 Protection Against the Dynamic Effects of Associated with the Postulated Rupture of Piping



R-COLA Chapter 3:

Design of Structures, Components, Equipment and Systems (cont'd)

3.7 Seismic Design

3.8 Design of Category I Structures

3.9 Mechanical Systems and Components

3.10 Seismic and Dynamic Qualification of Seismic Category I Mechanical and Electrical Equipment

3.11 Environmental Qualification of Mechanical and Electrical Equipment



R-COLA Chapter 3: 3.7 and 3.8 Topics

- **DCD incorporated by reference**
 - No Departures taken

- **Majority of FSAR information related to addressing COL Information Items**

- **Standard supplemental information**
 - Seismic instrumentation maintenance per RG 1.12
 - Installation and testing of seismic sensors

- **Site specific supplemental information**
 - Site specific 3D soil structure interaction analysis



R-COLA Chapter 3: COL Items

VEGP COL 3.7-1 Seismic Analysis of Dams

- addressed in ESP, no dams of impact

STD & VEGP COL 3.7-2 Post-Earthquake Procedures

- based on EPRI and RGs 1.166 and 1.167
- VEGP portion due to location of free-field instrumentation

VEGP COL 3.7-3 Seismic Interaction Review

- update for as-built information (ITAAC)

STD COL 3.7-4 Reconciliation of Seismic Analyses of NI Structures

- post-license update of as-built information



R-COLA Chapter 3: COL Items

VEGP COL 3.7-5 Location of Free Field Acceleration Sensor

- site-specific location identified

STD COL 3.8-5 Structures Inspection Program (new)

- Inspections consistent with maintenance rule (50.65) and related guidance of Regulatory Guide 1.160

STD COL 3.8-6 Construction Procedures Program (new)

- For seismic Cat. I concrete filled steel plate (SC) modules
- Inspections before and after concrete placement
- Includes use of construction mock-ups for SC modules

STD COL 3.9-7 As-Designed Piping Analysis (new)

- post-license completion of design reports (ITAAC)



R-COLA Chapter 3: SER Open Items

SER Open Items (closed in AFSER)

OI 3.6-1: *As-Designed Pipe Rupture Hazard Analysis*

OI 3.9-2: *Valve Operability Testing*

OI 3.9-3: *MOV Stroke Time Testing*

OI 3.9-4: *Other Power Operated Valve Testing*

OI 3.9-5: *Flow Induced Vibration Testing*

OI 3.10-1: *Seismic Qualification Implementation*



R-COLA Chapter 3: Other Topics

ACRS Action Items

#46 – Use of Risk-Ranking for MOV Testing

Supplemental Information

STD 3.7-1 – Maintenance & Repair of Seismic Instrumentation

STD 3.7-2 – Installation & Testing of Seismic Instrumentation

VEGP 3.7-3 - Ground Motion Response Spectra



R-COLA Chapter 3: SER Open Items

OI 3.6-1: As-Designed Pipe Rupture Hazard Analysis

- The Staff noted that RAI 3.6.2-1 requested the implementation milestone of the as-designed pipe rupture hazard analysis report. However, the applicant addressed the as-built rather than the as-designed aspect.
- In an April 23, 2010 letter, the applicant proposed an ITAAC for as-designed pipe rupture hazards analysis, a revised license condition, a revised FSAR Section 3.6.4.1, and a new FSAR Section 14.3.3.2 related to pipe rupture hazards analysis.
- The staff found the response acceptable and concluded that open item has been satisfactorily resolved.



R-COLA Chapter 3: SER Open Items

OI 3.9-2: Valve Operability Testing

- The Staff noted that the applicant needs to:
 - a) clarify the described MOV testing,
 - b) submit a request to apply an alternative to the ASME OM Code to use Code Case OMN-1, Rev. 1, and
 - c) update FSAR to be consistent with Revision 17.
- In March 1, 2010 and May 14, 2010 letters, the applicant proposed to apply JOG MOV Periodic Verification Program for POVs and MOVs, use ASME Code Case OMN-1 Rev 1, and revised FSAR material.
- The staff found the response acceptable and concluded that open item has been satisfactorily resolved.



R-COLA Chapter 3: SER Open Items

OI 3.9-3: MOV Stroke Time Testing

- The Staff noted that the applicant needs to address GL 96-05 for periodic verification of design basis capabilities.
- In a March 1, 2010 letter, the applicant addressed the GL and the provisions of RG 1.192 through use of JOG MOV Periodic Verification Program, use of ASME Code Case OMN-1 Rev 1, and revised FSAR material.
- The staff found the response acceptable and concluded that open item has been satisfactorily resolved.



R-COLA Chapter 3: SER Open Items

OI 3.9-4: Other Power Operated Valve Testing

- The Staff noted that the applicant needs to clarify the testing of design basis capabilities applicability to Power Operated Valves (other than AOVs/MOVs).
- In December 14, 2009 and March 1, 2010 letters, the applicant identified intent to apply the Periodic Verification Program for other POVs, and provided revised FSAR material.
- The staff found the response acceptable and concluded that open item has been satisfactorily resolved.



R-COLA Chapter 3: SER Open Items

OI 3.9-5: Flow Induced Vibration Testing

- The Staff noted that the applicant needs to further address flow induced vibration effects on valves and dynamic restraints within the IST Program as part of the initial test program.
- In a January 12, 2010 letter, the applicant identified the planned testing program to address vibration during the initial test program.
- The staff found the response acceptable and concluded that open item has been satisfactorily resolved.



R-COLA Chapter 3: SER Open Items

OI 3.10-1: Seismic Qualification Implementation

- Staff noted the applicant had not submitted: (1) descriptions of the implementation program for each type of equipment; and (2) milestones for completion of the different aspects of the seismic qualification program
- In February 5, 2010 & April 2, 2010 letters, the applicant submitted the planned methods of seismic qualification for safety-related, seismic Category I equipment types, and stated that the seismic qualification packages will be available to the NRC to support timely completion of its inspection and audit functions.
- The Staff found the response acceptable, and closed the open item



R-COLA Chapter 3: Action #46

Use of Risk-Ranking for MOV Testing

ACRS requested information addressing the "risk-ranking"

AP1000 will apply V-EC-1658-A, Risk Ranking Approach For Motor-operated Valves In Response To Generic Letter 96-05

- OG process - accepted by NRC (ML9806080181)
- Six step process including expert panel judgment
- Uses PRA as input
- Also considers valve function and other pertinent info
- Classification by safety significance or risk importance



R-COLA Chapter 3: Action #46

Use of Risk-Ranking for MOV Testing (cont'd)

The six basic steps of the process are:

- Identify MOVs to be Considered
- Calculate MOV At-Power Risk Importance
- Assess PSA Completion Issues
- Evaluate Other Considerations
- Develop Component Ranking Worksheets
- Conduct Plant Expert Panel Session for MOV Ranking

This process is in use across the country at operating plants.



R-COLA Chapter 3: Site-specific Topic

VEGP SUP 3.7-1 – Maintenance and Repair of Seismic Instrumentation

- Per procedures and Regulatory Guide 1.12

VEGP SUP 3.7-2 – Installation and Testing of Seismic Instrumentation

- Milestone of “prior to initial startup” provided for installation and acceptance testing
- Triaxial acceleration sensors
- Time-history analyzer



R-COLA Chapter 3: Site-specific Topic

VEGP SUP 3.7-3 – Ground Motion Response Spectra

- ESPA utilized two-dimensional soil structure interaction (SSI)
 - WEC performed 2D site-specific analysis for VEGP due to exceedances of AP1000 CSDRS by VEGP GMRS (Appendix 2.5E in ESPA).
 - Results demonstrated that the AP1000 has significant design margin when compared to site-specific seismic floor response spectra (FRS).
 - Only minor site-specific FRS exceedances in a narrow low frequency range. No effect on AP1000 plant design.



R-COLA Chapter 3: Site-specific Topic

VEGP SUP 3.7-3 – Ground Motion Response Spectra

- COLA site-specific three-dimensional SSI performed
 - SNC committed to perform 3D site-specific SSI analysis.
 - FSAR Subsection 3.7.1 revised to include 3D SSI results.
 - FSAR Appendix 3GG added to provide 3D SSI analysis & results.
 - Updated 3D SSI to reflect changes to NI (Shield Bldg.)
 - Results demonstrated AP1000 has significant design margin when compared to site-specific seismic FRS.
 - Only minor site-specific FRS exceedances in a narrow low frequency range. No effect on AP1000 plant design.
- AP1000 design applicability is thus confirmed.



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Presentation to the ACRS Subcommittee

Vogtle Units 3 and 4 COL Application Review

**ASE Chapter 3
Design of Structures, Components, Equipments and
Systems**

December 15-16, 2010

Staff Review Team

- Technical Staff
 - Thomas Scarbrough, Component Integrity, Performance, and Testing Branch
 - Robert Hsu, Engineering Mechanics Branch
 - Brett Tegeler, Structural Engineering Branch
 - Pravin Patel, Structural Engineering Branch
- Project Management
 - Terri Spicher, Project Manager

Overview

- **Standard Content Open Items**
 - **Open Item 3.6 -1** – Pipe rupture hazard analysis
 - **Open Item 3.9 -1** - Design and Qualification of Pumps, Valves, and Dynamic Restraints
 - **Open Item 3.9 -2** - Power-Operated Valve (POV) Inservice Testing (IST) Program
 - **Open Item 3.9 -3** - Motor-Operated Valve (MOV) Periodic Verification
 - **Open Item 3.9 -4** - POV (other than MOV) Diagnostic Testing
 - **Open Item 3.9 -5** - Potential Adverse Flow Effects
 - **Open Item 3.9 -6** - Technical Specification reference to ASME OM Code
 - **Open Item 3.10 -1** – Seismic qualification for Category I equipment
 - **Open Item 3.11 -1** – Environmental equipment qualification program

Overview

- Technical Topics of Interest
 - Functional Design, Qualification, and IST Program for Pumps, Valves, and Dynamic Restraints
 - Squib Valves
 - Piping Design
 - Surge Line Monitoring
- Site-Specific Topics of Interest
 - LWA for Foundation Base Slab
 - Seismic Design and System Analysis
 - Construction and Inspection

Presentation Agenda

1. Presentation by Component Integrity, Performance and Testing Branch
2. Presentation by Engineering Mechanics Branch
3. Presentation by Structural Engineering Branch

Component Integrity, Performance, and Testing Branch

Introduction

- Standard content open items
 - IST Program
- Technical areas of interest:
 - Squib Valves

Functional Design, Qualification, and IST Program for Pumps, Valves, and Dynamic Restraints

- Vogtle 3 & 4 COL application relies on AP1000 DCD and Vogtle FSAR to fully describe functional design, qualification, and IST programs for pumps, valves, and dynamic restraints.
- In response to RAIs, SNC and Westinghouse revising Vogtle FSAR and AP1000 DCD in support of COL application.
- NRC staff audited AP1000 design and procurement specifications to evaluate DCD implementation.

Functional Design and Qualification

- Vogtle FSAR Section 3.9 incorporates by reference AP1000 DCD to support functional design and qualification of safety-related components.
- AP1000 DCD specifies use of ASME Standard QME-1-2007 for qualification of active mechanical equipment that reflects lessons learned from valve testing and operating experience.
- Revision 3 to RG 1.100 accepts use of ASME QME-1-2007 with specific conditions.

IST Operational Program

- Vogtle FSAR Section 3.9 incorporates by reference AP1000 DCD to support IST program description.
- Vogtle FSAR Section 3.9.6 describes valve IST program based on 2001 Edition/2003 Addenda of ASME OM Code incorporated by reference in 10 CFR 50.55a
- AP1000 DCD Table 3.9-16 lists valves within IST program scope including valve type, safety-related missions, safety functions, ASME Code IST category, and IST type and frequency.
- No safety-related pumps in AP1000 design.

IST Operational Program

(continued)

- Vogtle FSAR supplements IST provisions in AP1000 DCD for preservice testing, reference values, MOV testing, solenoid-operated valves, prohibition of preconditioning, and check valve testing.
- FSAR describes periodic verification of design-basis capability of safety-related POVs (other than MOVs) that applies MOV lessons learned, including attributes in RIS 2000-03.
- FSAR describes IST program for snubbers consistent with ASME OM Code, Section ISTD.

Standard Content Open Item 3.9-1 and 3.11-1

- Issue
 - Determine whether any items remain applicable to COL applicant following NRC audit of AP1000 design, procurement, and qualification specifications
- Resolution
 - NRC audit report on AP1000 design and procurement specifications discussed in AP1000 SER Sections 3.9.6 and 3.11.1 without follow-up items for COL applicant
- Confirmatory Items
 - None

Standard Content Open Item 3.9-2

- Issue
 - COL application must describe IST program from POVs
- Resolution
 - Vogtle FSAR incorporates AP1000 DCD that specifies use of Joint Owners Group Program for MOV Periodic Verification
 - Proposed Vogtle FSAR provides justification for use of ASME OM Code Case OMN-1 (Revision 1) as alternative to MOV stroke-time provisions
 - Proposed Vogtle FSAR clarifies AP1000 DCD provisions for IST program
- Confirmatory Items
 - Confirm planned changes in next revision to Vogtle FSAR

Standard Content Open Item 3.9-3

- Issue
 - COL application must describe MOV periodic verification program
- Resolution
 - Vogtle will apply ASME OM Code Case OMN-1 (Revision 1) and JOG Program on MOV Periodic Verification (as accepted in NRC safety evaluation) to periodically demonstrate MOV design-basis capability
 - Proposed Vogtle FSAR describes MOV test criteria consistent with Regulatory Guide 1.206
- Confirmatory Items
 - Confirm planned changes in next revision to Vogtle FSAR

Standard Content Open Item 3.9-4

- Issue
 - COL application must address application of MOV lessons learned to other POVs
- Resolution
 - Vogtle FSAR describes POV diagnostic testing program using attributes from Regulatory Issue Summary (RIS) 2000-03 that incorporates MOV lessons learned
 - Proposed Vogtle FSAR clarifies specific POV program attributes
- Confirmatory Items
 - Confirm planned changes in next revision to Vogtle FSAR

Standard Content Open Item 3.9-5

- Issue
 - Nuclear power plant operating experience has revealed potential for adverse flow effects on plant components from acoustic resonance and hydraulic loading
- Resolution
 - Vogtle FSAR incorporates AP1000 DCD vibration testing program to confirm that flow-induced vibration will not adversely impact plant equipment
- Confirmatory Items
 - None

Standard Content Open Item 3.9-6

- Issue
 - Technical Specifications not consistent when referencing ASME OM Code
- Resolution
 - SNC will revise Tech Specs to ensure consistency in reference to ASME OM Code
- Confirmatory Items
 - Confirm planned changes in next revision to Vogtle Tech Specs

AP1000 Squib Valves

- AP1000 squib valve design and qualification specifications based on ASME QME-1-2007.
- Westinghouse finalizing squib valve designs and planning qualification process.
- Westinghouse and SNC will develop IST surveillance activities for squib valves based on final design and lessons learned from qualification process.
- NRC staff monitoring design and qualification process and IST development for AP1000 squib valves.
- AP1000 DCD includes ITAAC to confirm squib valve qualification.

Vogtle SER Confirmatory Items

- 3.9.6-1 Justification for use of Revision 1 to ASME OM Code Case OMN-1
- 3.9.6-2 Clarification of FSAR provisions redundant to AP1000 DCD
- 3.9.6-3 Incorporation of FSAR provisions for MOV testing consistent with Generic Letter 96-05, Joint Owners Group MOV Program, and RG 1.206
- 3.9.6-4 Clarification of FSAR provisions for POV testing consistent with MOV lessons learned
- 3.9.6-5 Specification that squib valve IST activities will incorporate lessons learned from design and qualification process
- 3.9.6-6 Clarification of reference to ASME OM Code in Tech Specs

Vogtle SER Section 3.9.6 Conclusion

- NRC staff considers Vogtle 3 & 4 FSAR together with AP1000 DCD to provide acceptable design and qualification methodology, and description of IST program for valves and dynamic restraints, pending
 - resolution of Vogtle SER confirmatory items and
 - completion of AP1000 design certification amendment review.
- NRC staff will conduct inspections of IST operational program and ITAAC completion following COL issuance.

Engineering Mechanics Branch

Open Item 3.6 -1

- **Issue:**
 - The applicant needed to provide an implementation milestone to identify when the pipe rupture hazard analysis report would be completed.

- **Resolution:**
 - The applicant proposed to revise the FSAR to commit to an ITAAC for as-designed pipe rupture hazard analysis with a license condition for scheduling of the completed as-designed pipe rupture hazard analysis report since piping design has not yet been completed.

 - Staff review concluded that the applicant proposed license condition requiring completion of the as-designed pipe rupture hazards analysis report prior to installation of the piping and connected components in their final location, through ITAAC, will allow the staff sufficient time to verify that the as-design pipe rupture hazards analysis was completed in accordance with the license to allow any identified concerns with the design to be addressed early in the construction process.

Open Item 3.10 -1

- **Issue:**
 - The applicant needed to provide an implementation plan for seismic qualification of equipment and milestones on when different steps in the process would be completed.

- **Resolution:**
 - The applicant provided details on their planned methods of seismic qualification of equipment and explained that they did not expect to complete any of the steps until after they were required to start providing schedule information for closure of ITAAC. They plan to start providing status on this ITAAC at that time.

 - Staff review concluded that the item could be closed because the implementation plan followed guidance in SRP Section 3.10 and the schedule would allow staff to verify the license was being followed early in the construction process.

Piping Design

- Issue:
 - The applicant was required to provide as-designed piping analysis, prior to installation.

- Resolution:
 - The applicant revised the FSAR to commit to an ITAAC inspection of ASME Code Design Reports for as-designed piping using the methods and criteria outlined in AP1000 DCD Table 3.9-19. In addition, the applicant provided a license condition for scheduling of the completed as-designed piping Design Reports.

 - Staff review concluded that inclusion of the applicant proposed ITAAC requiring the completion of the review of as-designed piping Reports and the license condition to complete the as-designed piping prior to installation is acceptable as it will allow for verification that the design was followed early in the construction process.

Surge Line Monitoring

- **Issue:**

- The applicant needed to provide additional information on surge line monitoring including a test abstract. The staff needed to know why the surge-line monitoring only applies to the first plant.

- **Resolution:**

- The applicant was to add text to state that subsequent AP1000 plants (after the first AP1000 plant) confirm that the heatup and cooldown procedures are consistent with the pertinent attributes of the first AP1000 plant surge line monitoring and that any changes consider the impact on stress and fatigue analyses consistent with the concerns of NRC Bulletin 88-11.
- Chapter 14 was to be revised to include a test abstract and Chapter 3.9.3 was revised to add requirements for additional temperature and displacement monitoring at critical locations on the surge line.
- Staff is tracking these changes through Confirmatory Item 3.12-1 and upon inclusion, conclude that the applicant's position is acceptable to comply with NRC Bulletin 88-11. On this basis, the proposed program for surge line thermal monitoring is acceptable.

Structural Engineering Branch

Introduction

- This is the Advanced Safety Evaluation for 3.7 and 3.8.
 - First time being presented to the ACRS
 - No Open Items; only Confirmatory Items.
- LWA 2 (construction of base slab) was included in this review
 - IBR Rev. 17 of DCD

LWA for Foundation Base Slab (Basemat)

- **Issue:**
 - The applicant submitted LWA which includes rebar and embedded items, (i.e. reinforced steel, piping in basemat, concrete placement, etc.) in the basemat.
- **Background**
 - Basemat Design in accordance with ACI 349 (same as DCD).
- **Resolution:**
 - Staff found that based on ACI 349, the basemat has significant strength, stiffness, and ductility.
 - As a part of the AP1000 standard design review, the staff found the detailed design of the foundation base slab and detailed construction acceptable.

Seismic Design and Analysis

- **Issue:**

- Vogtle's Ground Motion Response Spectra (GMRS) exceeded DCD Certified Seismic Design Response Spectra (CSDRS)
- Applicant had to perform site specific analysis to demonstrate structures, systems and components (SSC's) will remain functional.

- **Resolution:**

- Applicant:
 - Performed 3-D SSI analysis for in-structure response (per DCD)
 - Used NI 15 SASSI

Seismic Design and Analysis (continued)

– Staff:

- Compared ISRS to the DCD at six (6) key locations
- Performed comparisons which showed that:
 - above 1 Hz there were no exceedances
 - Below 1 Hz, exceedance was at .55 Hz range.
- Found exceedance to be associated with tank sloshing and not considered safety significant
- Reviewed Vogtle's application of 4% damping instead of 5% damping in SSC's' designs, and verified response appropriately accounted for stress and strain levels in the design.
- Confirmed Vogtle's validation of NI 15 SASSI versus NI 10 and NI 20 (used by DCD) demonstrated sufficiently captured designs.
- Assured that concurrent changes to design and models of shield building were consistent with Vogtle model.
- Found this acceptable based on evaluation of the SSI, and justification for exceedances of GMRS, the design of the SSC's are acceptable.

Construction and Inspection

- **Issue:**
 - Staff needed to assure that construction and inspection is implemented as designed.
- **Resolution:**
 - **Applicant:**
 - Added COL 3.8-6 addressing the construction and inspection methods and procedures.
 - Added COL 3.8-5 addressing the construction inspection program conformance with maintenance rule (10 CFR 50.65) and RG 1.160 (Monitoring the Effectiveness of Maintenance at Nuclear Power Plants.)
 - **Staff:**
 - The staff agreed with COL 3.8-6 and COL 3.8-5 which commits to perform and develop construction and inspection program.
 - Staff found this to be acceptable.



Bellefonte 3&4

Lee Nuclear 1&2

Summer 2&3

Vogtle 3&4

Harris 2&3

Levy 1&2

Turkey Point 6&7

AP1000 Reference Combined License Application Presentation to ACRS

Chapter 19 Probabilistic Risk Assessment

December 15-16, 2010

Presenters: Wes Sparkman, Bob Hirmanpour



R-COLA Chapter 19 – Content

Probabilistic Risk Assessment

19.1 – 19.57 IBR'd DCD (no supplemental information)

19.55 SEISMIC MARGIN ANALYSIS

- **19.55 is being revised to include the site specific seismic margin analysis (see next slide)**

19.58 WINDS, FLOODS, AND OTHER EXTERNAL EVENTS

19.59 PRA RESULTS AND INSIGHTS



R-COLA Chapter 19: SER Open Items

SER Open Items (closed in AFSER)

OI 19.59-1: Seismic Margin Analysis

In response to staff requests and ISG-20, Westinghouse provided additional seismic margin analysis (DCD Amendment 18) to confirm 1.67 margin exists. COL Item VEGP COL 19.59.10-6 was added to confirm that the Seismic Margin Analysis documented in the AP1000 DCD is applicable to the Applicant's site.

VEGP completed an evaluation against the ground motion response spectra (GMRS) and demonstrated that site specific High Confidence of Low Probability of Failure (HCLPF) values are equal to or greater than 1.67 times the GMRS (note, site specific exceedances were evaluated and confirmed they are acceptable).

(Note: SER with Open Items included two additional OIs that were Bellefonte site specific).



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Presentation to the ACRS Subcommittee

Vogtle Units 3 and 4 COL Application Review

ASE Chapter 19

Probabilistic Risk Assessment & Severe Accidents

December 15-16, 2010

Staff Review Team

Technical Staff

- **Suzanne Schroer**
PRA and Severe Accidents Branch
- **Bret Tegeler**
Structural Engineering Branch

Project Manager

- **Ravindra Joshi, VEGP COL**

Overview of Chapter

- Standard content contains no open items
- Only two sections supplemented with site-specific information
 - **19.55—Seismic Margin Analysis**
 - 19.58—Winds, Floods, and Other External Events

Technical Topics of Interest for VEGP

VEGP COL FSAR Section 19.55

- Site-specific ground motion response spectra (GMRS) exceeds the certified seismic design response spectra (CSDRS)
- VEGP performed site-specific analysis
- Results:
At 1.67 times the VEGP GMRS, all in-structure response spectra (ISRS—6 locations evaluated) were bounded by the DCD ISRS



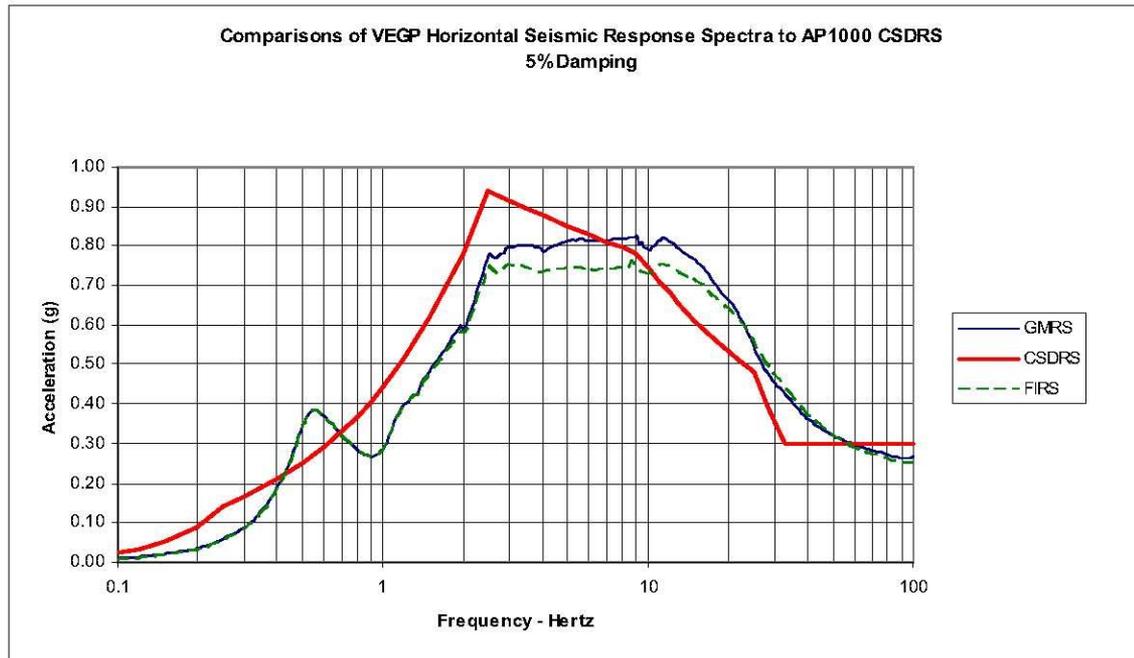
Presentation to the ACRS Subcommittee

Vogtle Units 3 and 4 COL Application Review

**ASE Chapter 19
REFERENCE SLIDES**

December 15-16, 2010

VEGP GMRS vs. CSDRS



VEGP SUP 3.7-3

Figure 3.7-201
VEGP AP1000 Horizontal Spectra Comparison

Other Technical Topics

VEGP COL FSAR Section 19.58

- summary of external events
- high winds
- floods
- transportation and other external events

Vogtle External Events

External Event	Screening Criteria Applied			
	Bounded	Negligible Frequency	Negligible Consequence	Not Applicable
Tornado	•			
Hurricane	•			
External flood				Max flood < 100' (grade)
Aviation	•	•		
Marine				No barge traffic
Pipeline	•		•	No pipelines for 10 mi.
Railroad			•	$D_{\text{closest track}} > D_{\text{standoff}}$
Truck			•	$D_{\text{closest highway}} > D_{\text{standoff}}$
Major depots and storage areas			•	< NRC review standard
On-site storage tanks			•	< RG 1.78
External fires			•	
Radiological hazards			•	



Bellefonte 3&4

Lee Nuclear 1&2

Summer 2&3

Vogtle 3&4

Harris 2&3

Levy 1&2

Turkey Point 6&7

AP1000 Reference Combined License Application Presentation to ACRS Chapter 13

December 15-16, 2010

Presenters: Wes Sparkman, Neil Haggerty, Ted Amundson



R-COLA Chapter 13: Conduct of Operations

13.1 Organizational Structure of Applicant

13.2 Training

13.3 Emergency Planning

13.4 Operational Programs

13.5 Plant Procedures

13.6 Physical Security

13.7 Fitness for Duty

13.8 Cyber Security



R-COLA Chapter 13: Other Topics

ESP Permit Conditions (PCs)

VEGP EP was approved in ESP with permit conditions:

- PCs 2-7 – Emergency Action Levels (EALs)
- PC 8 – Technical Support Center (TSC) location

COL Information Items

- COL Item 13.6-01 – Security Plan/PS-ITAAC
 - Physical Security will not be discussed during this presentation
- COL Item 13.6-05 – Cyber Security Plan

Other Chapter 13 Topics

- Section 13.7 – Fitness for Duty Programs



R-COLA Chapter 13: Recent Revisions

13.3 Emergency Planning

- Emergency plan with ITAAC approved under Early Site Permit (ESP) with permit conditions
- FEMA review of State and local plans concurrence included in ESP SER
- Permit conditions (PCs 2-7) related to EALs converted to a license condition (LC 4)
- Permit condition (PC 8) related to TSC addressed by departure 18.8-1



R-COLA Chapter 13: Recent Revisions

13.3 Emergency Planning

- **Departure 18.8-1**
 - Move Operations Support Center (OSC) from ALARA Briefing Room to the Control Support Area (CSA) for each unit
 - Move the Technical Support Center (TSC) from the CSA to the centrally located Communication Support Center (CSC) located between the power blocks for Units 2 and 3

- **Variance 1.2-1**
 - TSC relocation – Discussed in Chapter 1 presentation

- **New or Additional Information [10CFR 52.79(b)(4) and 10CFR 50.54(q)]**
 - Removed EAL scheme from EP and replaced with LC4
 - Relocation of TSC as addressed in Variance 1.2-1 (above)



R-COLA Chapter 13: Recent Revisions

COL Information Item 13.6-5: Cyber Security Plan (CSP)

- NRC issued Final Rule: Security Requirements (March 2009)
- RG 5.71, "Cyber Security Programs," Rev. 0 (January 2010)
- Vogtle 3 & 4 Cyber Security Plan, Rev. 0 (June 2010):
 - Based on CSP template in RG 5.71, Appendix A, with deviations identified and justified, including:
 - Actual AP1000 Defensive Architecture described
 - Addressing of Operational and Maintenance cyber security controls with justifications
 - Flexibility in analysis method for use of alternative controls
 - Critical Systems identified using plant's Licensing Basis
 - Addresses the same set of Cyber Security controls contained in Appendices B & C of RG 5.71

The VEGP 3 & 4 CSP provides a standard plan that satisfies requirements of the 10 CFR 73.54, Cyber Security Rule, for AP1000 plants.



R-COLA Chapter 13: Recent Revisions

SER Open Item 13.7-01 – Fitness for Duty Program

- NRC issued Final Rule re: Fitness for Duty Programs (March 2008)
- FFD Rule includes addition of Subpart K, FFD Programs for Construction
- NEI 06-06, Rev. 5, "Fitness for Duty Program Guidance for New Reactor Power Plant Construction Sites," Rev. 5, issued in August 2009
- Applicant's response to RAI Letter 049 (March 5, 2010) revised FSAR to:
 - Confirm consistency with NRC accepted NEI 06-06, Rev. 5
 - Identify FFD Programs that will be applied to the appropriate categories of personnel, including applicable regulatory basis
 - Confirm implementation milestones for various FFD Programs phases

With these changes, the COL addresses the required information related to the FFD Program per 10 CFR Part 26 and 10 CFR 52.79(a)(44).



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Presentation to the ACRS Subcommittee

Vogtle Units 3 and 4 – COL Application Review

ASE Section 13.3 Emergency Planning

December 16, 2010

Emergency Planning

- COLA incorporates by references ESP-004 & AP1000
- VEGP ESP Application (ESP-004)
 - Complete & integrated emergency plan
 - NRC: onsite E-plan, ITAAC, and ETE
 - FEMA: offsite E-plans (State & local)
- Limited scope of EP review for COLA

Technical Evaluation

- Staff addressed resolution of:
 - ESP Variance (VEGP VAR 1.2-1)
 - 7 ESP Permit Conditions (PCs 2-8)
 - AP1000 Departure (VEGP DEP 18.8-1)
 - AP1000 COL Information Items (STD COL)
 - Exception (basis for EP ITAAC)

ESP-004 Permit Conditions

- VEGP ESP PC 2 through PC 7
 - Emergency Action Levels (EALs)
 - Reflect NEI 07-01
 - Reflect completed AP1000 design
 - Based on in-plant conditions/State & local review
- VEGP ESP PC 8
 - ESP common TSC (Units 1-4)
 - AP1000 TSC location (VEGP DEP 18.8-1)

ACRS Action Item 67 & EP ITAAC

- COLA added 2 Unit 3 EP ITAAC
 - AC 5.1.8 (Unit 3 ITAAC, TSC habitability)
 - AC 8.1.1.D.2.d (Unit 3 ITAAC exercise objective)
 - NUREG-0696/NUREG-0737(Supp. 1) – TSC & EOF design shall incorporate good human factors engineering (HFE) principles
 - *“Demonstrate the capability of TSC and EOF equipment and data displays to clearly identify and reflect the affected unit.”*
- AP1000 DCD Tier 1 Table 3.1-1
- ESP-004 (Appendix E)
 - VEGP Units 3 & 4 EP ITAAC

EP Confirmatory Items

- Verified in future FSAR revision
 - 13.3-1 – VEGP VAR 1.2-1
 - Update TSC location description & figures
 - 13.3-2 – VEGP DEP 18.8-1 (TSC in CSC)
 - Change AP1000 departure from Tier 2* to Tier 2
 - 13.3-3 – STD COL 13.3-1
 - Revise to incorporate VEGP SUP 13.3-1

Post-COL Activities

- License conditions, implementation milestones, and ITAAC
 - Submit EALs & EIPs at least 180 days prior to fuel load
 - Submit EP program implementation schedule
 - Full participation exercise within 2 years of fuel load
 - Onsite exercise within 1 year of fuel load
 - EP ITAAC completed prior to fuel load

Emergency Planning

- **Conclusions**
 - Complete & integrated E-plans are adequate, and there is reasonable assurance that the plans can be implemented
 - There is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at the VEGP site, in support of full-power operations at VEGP Units 3 & 4



Presentation to the ACRS Subcommittee

Vogtle Units 3 and 4 COL Application Review

**Chapter 13.7
Fitness for Duty**

December 16, 2010

Staff Review Team

- Fitness for Duty, Lead Technical Reviewer
 - Wayne Chalk
- Fitness for Duty, Senior Program Manager
 - Paul Harris

Overview

- Background Information
- Application Standards
- Technical Review
- Conclusion

Background Information

- 10 CFR Part 26
 - Publication Date: March 31, 2008
 - Effective Date: April 30, 2008
 - Purpose
- Phases
 - Operations
 - Construction

Application Standards

- Acceptance Criteria
 - 10 CFR Part 26
 - 10 CFR 52.79(a)(44)
- References
 - NEI 06-06, Revision 5

Technical Review

- Areas Covered
 - Adequacy of Construction Phase
 - Adequacy of Operations Phase
- Milestones
 - Table 13.4-201 Operational Programs Required by NRC Regulations
- License Condition
 - Implementation Schedule

Conclusion

- No Outstanding Information
- One Confirmatory Item
- VEGP COL FSAR is Acceptable
- Conforms to Regulatory Requirements



Presentation to the ACRS Subcommittee

Vogtle Units 3 and 4 COL Application Review

**AFSER Section 13.8
Cyber Security**

December 16, 2010

Staff Review Team

- Technical Staff
 - Mike Shin, ISCPB
 - Tim Shaw, ISCPB
 - Eric Lee, ISCPB
 - John Rycyna, ISCPB
- Project Manager
 - Denise McGovern

Overview

- **Site-Specific Topics of Interest**
 - Vogtle cyber security plan (CSP) based on CSP template from RG 5.71
 - Commits to follow RG 5.71 with minor and acceptable site specific modifications
- **Technical Topics of Interest**
 - Defensive architecture follows guidance in RG 5.71

Elements of CSP

- Follows RG 5.71 guidance and commits to all elements including:
 - Establishing a cyber security team
 - Identifying critical digital assets
 - Application of security controls
 - Security controls in RG 5.71 appendixes
 - Configuration management process
 - Ongoing assessment of security measures for effectiveness

Defensive Architecture

- Follows RG 5.71 guidance
 - Multiple levels
 - Increasing security as levels increase
 - Control and isolation of communication between levels
- Staff found architecture acceptable



Bellefonte 3&4

Lee Nuclear 1&2

Summer 2&3

Vogtle 3&4

Harris 2&3

Levy 1&2

Turkey Point 6&7

AP1000 Reference Combined License Application Presentation to ACRS Chapter 15

December 15-16, 2010

Presenters: Amy Aughtman, Eddie Grant



R-COLA Chapter 15:

Accident Analyses

15.0 Accident Analyses

15.1 Increase in Heat Removal from the Primary System

15.2 Decrease in Heat Removal by the Secondary System

15.3 Decrease in Reactor Coolant System Flow Rate

15.4 Reactivity and Power Distribution Anomalies

15.5 Increase in Reactor Coolant Inventory

15.6 Decrease in Reactor Coolant Inventory

15.7 Radioactive Release from a Subsystem or Component



R-COLA Chapter 15: SER Open Items

SER Open Items (closed in AFSER)

OI 15.0-1 - *Documentation of Plant*

Calorimetric Uncertainty

OI 15.4-1: *Generic Letter 85-05*

"Inadvertent Boron Dilution Events"



R-COLA Chapter 15: SER Open Items

OI 15.0-1: Documentation of Calorimetric Uncertainty

WEC added additional information item via an RAI response.

STD COL 15.0-1 information was provided:

- Some analyses assume one percent uncertainty
- Caldon CheckPlus™ Leading Edge Flow Meter (LEFM) ultrasonic flow measurement (UFM) instrumentation is used for feedwater flow to support 1% power uncertainty
- Addressed action items from Caldon SER and Supplemental SER for approved methodology, including procedures
- ITAAC to confirm by inspection the instrumentation installed for feedwater flow measurement and its associated power calorimetric uncertainty calculation, and the calculated calorimetric values



R-COLA Chapter 15: SER Open Items

OI 15.4-1: Generic Letter 85-05

- The Staff requested that GL 85-05, “Inadvertent Boron Dilution Events” be included in FSAR Table 1.9-204 with cross reference to FSAR Section 13.5 where associated procedures are addressed.
- In a January 22, 2010, letter, the applicant proposed to include the item in FSAR.
- The staff found the response acceptable and concluded that open item has been satisfactorily resolved.



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Presentation to the ACRS Subcommittee

Vogtle Units 3 and 4 COL Application Review

**ASE Chapter 15
Accident Analysis**

December 15-16, 2010

Staff Review Team

- Technical Staff
 - Tony Nakanishi, Reactor Systems, Nuclear Performance & Code Review
 - Michelle Hart, Siting & Accident Consequences
- Project Management
 - Donald Habib, Project Manager

Overview

Section	Content	Resolved Open Items & Topics of Interest
15.0 Accident Analysis	Standard	<ul style="list-style-type: none"> COL Information Item 15.0-1, Plant Calorimetric Uncertainty Methodology
15.1 Increase in Heat Removal from Primary System	IBR	
15.2 Decrease in Heat Removal by the Secondary System	IBR	
15.3 Decrease in Reactor Coolant System Flow Rate	IBR	
15.4 Reactivity and Power Distribution Anomalies	Standard	<ul style="list-style-type: none"> Open Item 15.4-1, GL 85-05 (resolved)
15.5 Increase in Reactor Coolant Inventory	IBR	
15.6 Decrease in Reactor Coolant Inventory	IBR	
15.7 Radioactive Release from a Subsystem or Component	Plant-Specific	
15.8 Anticipated Transients without Scram	IBR	
15A Evaluation Models and Parameters for Analysis of Radiological Consequences of Accidents	Plant-Specific	<ul style="list-style-type: none"> DBA Radiological Consequences Analyses
15B Removal of Airborne Activity from the Containment Atmosphere Following a LOCA	IBR	

COL Information Item 15.0-1

Plant Calorimetric Uncertainty Methodology

- **Background**

- AP1000 DCD Rev.15 assumed a 2 percent power uncertainty for large break LOCA
- However, DCD Rev.17 assumed a 1 percent power uncertainty for large break LOCA, as allowed by 10 CFR Part 50, Appendix K
- COL information item 15.0-1 was added to DCD that called for COL applicant to determine a power uncertainty bounded by safety analysis.

- **Issue**

- Staff needed reasonable assurance that the applicant installs an NRC acceptable feedwater flow instrumentation and demonstrates a power uncertainty of 1 percent or lower using an NRC acceptable method.

- **Resolution**

- Applicant proposed the Caldon CheckPlus™ flow meter design and referenced topical reports ER-80P and ER-157P in the FSAR.
- Applicant acceptably addressed all conditions for using approved ER-80P and ER-157P.
- ITAAC will confirm that the applicant installed the CheckPlus™ design and demonstrated a power uncertainty of 1 percent or lower.
- License condition for applicant to notify staff when 1) documentation of instrument uncertainties is available and 2) documentation of administrative controls implementing CheckPlus™ maintenance and contingency is available.
- The proposed FSAR changes are now **Confirmatory Item 15.0-1**.

Open Item 15.4-1 (Resolved)

Generic Letter 85-05

- **Background**

- GL 85-05 urges each licensee to ensure its plants have adequate protection against boron dilution events.
- GL 85-05 was resolved in DCD Rev.15 (NUREG-1793, DCD SER) .
- COL Information Item 13.5-1 requires development of emergency operating procedures.
- In COL FSAR Rev. 0, GL 85-05 was included in Table 1.9-204, “Generic Communications Assessment,” listing of Bulletins and GLs

- **Issue**

- GL 85-05 was removed from Table 1.9-204 in FSAR Rev. 1.
- Staff identified **Open Item 15.4-1**.

- **Resolution**

- Applicant proposed to reinsert reference to GL 85-05 in Table 1.9-204 to provide a cross reference to COL Information Item 13.5-1.
- This FSAR change is now **Confirmatory Item 15.4-1**.

DBA Radiological Consequences Analyses

- **Issue**

- Appropriate incorporation by reference of the DBA dose analyses from the AP1000 DCD to thereby show compliance with the offsite dose factors in 10 CFR 52.79(a)(1) and the control room dose criterion in GDC 19.
 - VEGP DEP 18.8-1 site-specific TSC (SER 13.3)

- **Resolution**

- Vogtle site characteristic short-term atmospheric dispersion (χ/Q) values are bounded by the values given in AP1000 DCD as site parameters. (SER 2.3)
 - Site characteristic χ/Q values are the only site-related DBA dose analysis inputs
 - Dose is directly proportional to the χ/Q values for each time period
 - Vogtle $\chi/Qs < AP1000 \chi/Qs$
 - Vogtle DBA doses $< AP1000$ DBA doses
- AP1000 DCD showed compliance with the offsite and control room dose factors for all DBAs, therefore Vogtle also complies.



Bellefonte 3&4

Lee Nuclear 1&2

Summer 2&3

Vogtle 3&4

Harris 2&3

Levy 1&2

Turkey Point 6&7

AP1000 Reference Combined License Application Presentation to ACRS

Chapter 8 Electrical Power

December 15-16, 2010

Presenters: Amy Aughtman, Bob Hirmanpour



R-COLA Chapter 8 – Content

Electrical Power

- 8.1 Introduction
- 8.2 Offsite Power Systems
- 8.3 Onsite Power Systems



R-COLA Chapter 8: Major Topics

DCD incorporated by reference

- One Standard Departure taken (STD DEP 8.3-1)**

- Four COL information items**

- SER w/ Open Items contained no Standard Open Items**

- Chapter 8 includes supplemental information**

- Chapter 8 includes VEGP Site Specific Items**



R-COLA Chapter 8: COL Items

VEGP COL 8.2-1 Offsite Electrical Power

- Design of the ac power transmission system and testing and inspection plan.
 - Units 1, 2 and 3, 230/500 kV switchyard
 - Unit 4, 500 kV switchyard
 - Units 3 and 4, Reserve Auxiliary Transformer (RAT) supply, 230 kV Switchyard
 - Switchyard Control Building

VEGP COL 8.2-2 Technical Interfaces

- ac power requirements from offsite and the analysis of the offsite transmission system and the setting of protective devices.
- Performed a grid stability analysis to show:
 - With no electrical system failures, the grid will remain stable and the reactor coolant pump bus voltage will remain above the voltage required to maintain the flow assumed in the Chapter 15 analyses for a minimum of 3 seconds following a turbine trip.



R-COLA Chapter 8: COL Items

VEGP COL 8.3-1 **Grounding and Lightning Protection**

- Added description of grounding grid system, design per methodology outlined in IEEE 80, "IEEE Guide for Safety in AC Substation Grounding."
- Lightning protection required for VEGP (risk assessment performed per IEEE 665, "IEEE Standard for Generating Station Grounding").

STD COL 8.3-2 **Onsite Electrical Power Plant Procedures**

- Provided a description of procedures implementing periodic testing of protective devices that provide penetration overcurrent protection and inspection and maintenance of Class 1E and non-Class 1E batteries (Per RG 1.29 and IEEE 450)



R-COLA Chapter 8: Supplemental Information

- Provided site-specific information describing the transformer area location and Southern Company Transmission's (SCT) responsibility for maintaining transmission system reliability and conducting planning studies.
- Demonstrated site-specific conditions are bounded by the standard site conditions in the AP1000 DCD for rating the diesel generator.
- Indicated implementation of procedures for periodic verification of capability for automatic and manual transfer from the preferred power supply to maintenance power supply and vice-versa to satisfy the requirements of GDC 18.
- Indicated no site-specific non-Class 1E dc loads connected to the Class 1E dc system.



R-COLA Chapter 8: Additional Changes

- In response to an RAI, a revision to the FSAR was made to include condition monitoring of Submerged/Inaccessible Electrical Cables:

Condition monitoring of underground or inaccessible cables is incorporated into the maintenance rule program. The cable condition monitoring program incorporates lessons learned from industry operating experience, addresses regulatory guidance, and utilizes information from detailed design and procurement documents to determine the appropriate inspections, tests and monitoring criteria for underground and inaccessible cables within the scope of the maintenance rule (i.e., 10 CFR 50.65). The program takes into consideration Generic Letter 2007-01.



R-COLA Chapter 8: Additional Changes

- Westinghouse proposed a new COL Item for periodic testing of the battery chargers and voltage regulating transformers.
 - FSAR Subsection 8.3.2.1.4, Maintenance and Testing, will be revised to include establishment of procedures for periodic testing of the Class 1E battery chargers and voltage regulating transformers in accordance with the manufacturer recommendations. The procedures will include circuit breaker testing, fuse/fuse holder inspection, and verifying current limiting characteristic of Class 1E Battery chargers.
 - The FSAR revision included a Departure from DCD Subsection 8.3.2.2 since regulating transformers do not have current limiting capability (STD DEP 8.3-1)



R-COLA Chapter 8: Additional Changes

- Provided ITAACs for offsite power system.
 - ITAACs included minimum number of transmission lines, capacity, fault protection, and powering reactor coolant pumps for a minimum of 3 seconds following a turbine trip.



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Presentation to the ACRS Subcommittee

Vogtle Units 3 and 4 COL Application Review

**ASE Chapter 8
Electric Power**

December 15-16, 2010

Staff Review Team

- Technical Staff
 - **Tania Martinez Navedo**, Electrical Engineer
- Project Manager
 - **Tanya Simms**, Vogtle COLA Review

Presentation Outline

- Overview of Vogtle COL Chapter 8
- Staff Review Summary

Overview of Vogtle COL Chapter 8 - Electric Power

- FSAR Chapter 8 incorporates by reference the AP1000 DCD Chapter 8.
 - Supplemental information and COL information items are provided in Sections 8.1, 8.2, 8.3.1, and 8.3.2.

COL Section		Summary of Content
8.1	Introduction	-VEGP SUP 8.1-1 – Vogtle Units 3 and 4 connection to the utility grid -VEGP SUP 8.1-2 - Additional information on regulatory guidelines and standards

Overview of Vogtle COL Chapter 8 - Electric Power

COL Section		Summary of Content
8.2	Offsite Power System	<ul style="list-style-type: none"> -VEGP COL 8.2-1 – Transmission system description, and its testing and inspection plan -VEGP COL 8.2-2 – Switchyard description and protection relaying -VEGP SUP 8.2-1 – FMEA of the switchyard -VEGP SUP 8.2-2 – Transmission system requirements and studies -VEGP SUP 8.2-3 – Transmission system planning -VEGP SUP 8.2-4 – Stability and reliability of the offsite transmission power system -VEGP SUP 8.2-5 – History of the offsite power lines reliability -VEGP SUP 8.2-6 – Setting of the protective devices controlling the switchyard -Interface Requirements

Overview of Vogtle COL Chapter 8 - Electric Power

- Section 8.2.A specifically addresses the site-specific inspections, tests, analyses and acceptance criteria (SS-ITAAC), that the applicant proposed related to the offsite power system that are necessary and sufficient to provide reasonable assurance that the facility has been constructed and will operate in conformance with the COL, the provisions of the Atomic Energy Act, and NRC regulations.

Standard Section		Summary of Content
8.2.A	Site-Specific ITAAC for Offsite Power Systems	-STD SUP 14.3-1 - supplemental information related to the offsite power system

Overview of Vogtle COL Chapter 8 - Electric Power

Standard Section		Summary of Content
8.3.1	AC Power Systems (Onsite)	<ul style="list-style-type: none"> - VEGP COL 8.3-1 – Grounding system and lightning protection -STD COL 8.3-2 – Testing of penetration protective devices -VEGP SUP 8.3-1 – EDG rating based on site conditions -VEGP SUP 8.3-2 - Switchyard and power transformer voltage -VEGP SUP 8.3-4 - Periodic verification of onsite ac power system's capability to transfer between preferred and maintenance power supply

Attachment 3 **Overview of Vogtle COL Chapter 8 -
Electric Power**

Standard Section		Summary of Content
8.3.2	DC Power Systems (Onsite)	<ul style="list-style-type: none"> -STD DEP 8.3-1 – Class 1E voltage regulating transformer periodic testing -STD COL 8.3-2 – Inspection and maintenance of Class 1E batteries - STD SUP 8.3-3 Class 1E DC system

Staff Review Summary

- **Section 8.1 – Introduction**
 - Applicant has adequately addressed VEGP SUP 8.1-1 regarding Vogtle 3 and 4 Units' connection to the SBAA transmission system.
 - The applicant has adequately addressed VEGP SUP 8.1-2 regarding additional information for regulatory guidelines and standards.

Staff Review Summary

- **Section 8.2 – Offsite Power System**
 - The staff finds COL information items VEGP COL 8.2-1 involving the design details of the plant site switchyard and its interface with the local transmission grid adequately addressed pending closure of Confirmatory Item 8.2-1 and 8.2-2.
 - The staff concludes that the applicant's condition monitoring program for underground or inaccessible cables satisfies the recommendations of GL 2007-01, and the guidance in NUREG/CR-7000 and NUREG-0800 pending closure of Confirmatory Item 8.2-3

Staff Review Summary

- **Section 8.2 – Offsite Power System**
 - The applicant has adequately addressed VEGP SUP 8.2-1 thru 8.2-6 involving the offsite power system adequacy and availability, testing and inspection of switchyard components and failure modes and effects analysis.
 - The applicant provided sufficient information regarding the interfaces for standard design from the generic AP1000 DCD, Table 1.8-1, Items 8.1, 8.2, and 8.3.

Staff Review Summary

- **Section 8.2.A – Site-Specific ITAAC for Offsite Power Systems**
 - The applicant has adequately addressed STD SUP 14.3-1, involving site-specific ITAAC for the offsite power system pending closure of Confirmatory Item 8.2A-1 f
 - The ITAAC associated with the offsite power system are shown in VEGP COL Part 10, Appendix B, Table 2.6.12-1. Table 8.2A-1 of the SER reflects this table.

Staff Review Summary

- **Section 8.3.1 – AC Power System (Onsite)**
 - The applicant has adequately addressed the VEGP supplemental information involving the transmission system and its electrical connection to the onsite AC power system.
 - The applicant has adequately addressed VEGP COL 8.3-1 related to the grounding grid system design and lightning protection.
 - The applicant has adequately addressed VEGP SUP 8.3-1 involving the site-specific conditions bounded by the standard site conditions in the AP1000 DCD for rating the diesel generator.
 - The applicant has adequately addressed VEGP SUP 8.3-4 regarding the periodic verification and proper operation of the offsite power system capability for automatic and manual transfer from the preferred power supply to maintenance power supply and vice-versa. The staff concludes that GDC 18 is satisfied for this item.

Staff Review Summary

- **Section 8.3.2 – DC System (Onsite)**
 - The applicant has adequately addressed STD DEP 8.3-1 and Revised STD COL 8.3-2 related periodic testing of battery chargers and voltage regulating transformers pending closure of Confirmatory Item 8.3.2-2.



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AP1000 Reference Combined License Application Presentation to ACRS Chapter 9

December 15-16, 2010

Presenters: Wes Sparkman, Bob Hirmanpour



R-COLA Chapter 9: Auxiliary Systems

9.1 Fuel Storage and Handling

9.2 Water Systems (Plant Specific)

- **Raw water system (Section 9.2.11) covered in this presentation as a major topic. Other sections included only minor supplemental information or departure.**

9.3 Process Auxiliaries

9.4 Air-Conditioning, Heating, Cooling, and Ventilation System (Primarily Standard)

9.5 Other Auxiliary Systems (Primarily Standard)

App 9A Fire Protection Analysis (Primarily Standard)



R-COLA Chapter 9: SER Open Items

SER Open Items (closed in AFSER)

OI 9.1-1: Metamic monitoring program (see next slide)

OI 9.1-2: LLHS program implementation (LLHS program to be implemented and inspection to be performed prior to receipt of fuel onsite.)

OI 9.1-3: OHLHS program implementation (OHLHS program to be implemented prior to receipt of fuel onsite.)

OI 9.1-4 : OHLHS inspection implementation (OHLHS inspection to be performed prior to receipt of fuel onsite.)



R-COLA Chapter 9: Recent Revisions

OI 9.1-1 - Metamic monitoring program

Staff requested additional information regarding Metamic monitoring program.

STD COL 9.1-7, Metamic coupon monitoring program, was revised to include:

- Verification of continued presence of the boron via neutron attenuation measurement.
- Monitoring for unacceptable swelling.
- Monitoring for degradation. This includes tests to monitor bubbling, blistering, cracking, or flaking; and a test to monitor for corrosion, such as weight loss measurements and/or visual examination.

COLA Part 10 was revised to include License Condition 2, Item 9.1-7 for implementation of the Metamic coupon monitoring program prior to Commercial operation.



R-COLA Chapter 9: Plant Specific

9.2 Water Systems

9.2.11 Raw Water System (RWS)

- Two RWS subsystems – river water and well water
- River water subsystem
 - The source of water for the river water subsystem of the RWS is the Savannah River.
 - Provides makeup water to the circulating water system (CWS) cooling tower basins and dilution for Units 3 and 4 blowdown sump.
 - Not a potential flow path for radioactive fluids
 - Provides alternate source of dilution for radwaste discharge when the CWS is not in use.
- Well water subsystem
 - Design includes features to ensure redundancy and reliability as a source of makeup to the service water cooling towers.
 - Also provides makeup water for fire protection systems.



R-COLA Chapter 9: Plant Specific

9.2.11 Raw Water System (RWS) – Safety Design Basis

- The RWS serves no safety-related function, and therefore, has no nuclear safety design basis.
- In response to staff requests, additional information was provided to show:
 - RWS failures will not adversely affect SSCs that are safety-related or designated for RTNSS.
 - RWS was designed to be a “highly reliable and robust system” capable of operating during a loss of normal alternating current power to provide RWS makeup flow under normal and abnormal conditions.



R-COLA Chapter 9: Plant Specific

9.2.11 Raw Water System (RWS) – Safety Design Basis

- RWS does not provide any RTNSS functions as documented in WCAP-15985, "AP1000 Implementation of the Regulatory Treatment of Nonsafety-Related System Process."
- Contamination of the RWS piping is not credible based on the RWS design and the configuration relative to potential sources of contamination. No unique design provisions or other features are required for RWS to comply with 10 CFR 20.1406



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Presentation to the ACRS Subcommittee

Vogtle Units 3 and 4 COL Application Review

**ASE Chapter 9
Auxiliary Systems**

December 15-16, 2010

Staff Review Team

- **Technical Staff**
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 - **Tanya Simms, AP1000**

Overview of AP1000 Chapter 9 - Auxiliary Systems

Standard Section		Summary of Content
9.1	Fuel Storage and Handling	<ul style="list-style-type: none"> -Metamic Monitoring Program -Light Load Handling System -Overhead Heavy Load Handling Systems
9.2	Water Systems	-Plant Specific
9.3	Process Auxiliaries	-Air Systems
9.4	Air Conditioning, Heating, Cooling, and Ventilation System	-Inspections and Testing
9.5	Other Auxiliary Systems	<ul style="list-style-type: none"> -Fire Protection Program -Diesel Generator Fuel Oil System

Resolution of Standard Content Open Items

- **Open Item 9.1-1 (Metamic Coupon Monitoring Program)**
 - **Issue** - Metamic Monitoring Program – STD COL 9.1-7 specifies coupon surveillance program for SFP neutron absorbing material due to limited service experience with material. The applicant did not provide sufficient details.
 - **Resolution** - The commitment provided by the applicant proposed a License Condition to ensure the appropriate information is available for the staff's inspection of the details of the Metamic Monitoring Program prior to the start of plant operation.

Resolution of Standard Content Open Items

- **Open Item 9.1-2 (Implementation of Inservice Inspection of the Light load handling system (LLHS))**
 - **Issue** - Inspection & Testing Program – STD COL 9.1-5 specifies a program for in-service inspection (ISI) of LLHS. The applicant did not provide sufficient details.
 - **Resolution** - The commitment provided by the applicant will ensure that the procedures to clarify that the LLHS, including system inspections, is implemented prior to receipt of fuel onsite.

Resolution of Standard Content Open Items

- **Open Items 9.1-3 and 9.1-4 (implementation of Inservice Inspection of Overhead Heavy-Load Handling System (OHLHS) and The Plant Inspection Program)**
 - **Issue** - Inspection & Testing Program – STD COL 9.1-5 specifies a program for ISI of OHLHS and a schedule milestone for developing the plant inspection program for the handling systems. The applicant did not provide sufficient details.
 - **Resolution** - The commitment provided by the applicant will ensure that the procedures to clarify that the OHLHS, including system inspections and the plant inspection program, will be implemented prior to receipt of fuel onsite

RWS Description

- **RWS is nonsafety-related and non-seismic**
- **Two subsystems, river water subsystem and well water subsystem**
(some equipment is shared between Units 3 & 4)
 - **River water subsystem (Savannah River) supplies**
 - CWS natural draft cooling towers
 - Water for blowdown sumps
 - **Well water subsystem (2 deep wells) supplies**
 - SWS cooling towers (RTNSS and cold shutdown support)
 - Potable water
 - Fire protection
 - Demineralized water treatment
 - Cooling to CWS pumps

RWS Description

- **Shared well water subsystem for the Unit 3 & 4**
 - 2 Deep well makeup pumps
 - Underground HDPE piping
 - 300,000 gal storage tank
 - 4 Well water transfer pumps
 - Well water pump house diesel generator supports
 - well water makeup pumps
 - transfer pumps

Staff Review Summary

- **Well water subsystem has redundancy, a 300,000 gallon storage tank, and pumps are diesel backed**
- **Well water subsystem pumps well exceed the SWS basin makeup requirements**
 - Well water makeup pumps ~ (2) at 1500 gpm
 - Well water transfer pumps ~ (4) 750 gpm
- **Reliable materials are being utilized consistent with industry good practices**
- **RWS is non radioactive and contamination is not credible due to its configuration relative to potential sources of contamination**

Staff Review Summary

- **GDC 2 and GDC 4 have been satisfied**
 - Failure of the RWS/components will not affect the ability of any risk-significant systems to perform their intended safety functions
 - Failure of the RWS/components will not affect any RTNSS
- **Staff concludes that RWS:**
 - Meets all applicable regulations
 - Considered highly reliable to support CSD



R-COLA: Action #64

“Additional” Explosive Hazards During Delivery

ACRS requested information addressing an “additional hazard” when a truck is onsite to replenish the stored hydrogen volume

Administrative controls limit amount and route of deliveries of explosive hazard materials

- Limit distance and volume such that impact to pertinent SSCs is no greater than stationary evaluation results

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R-COLA: Squib Valves Action

AP1000 Squib Valve Testing

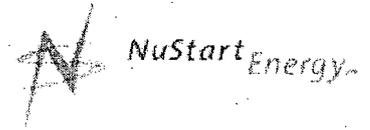
ACRS requested information addressing the development of inservice testing surveillance activities for the squib valves.

Staff Bullet from 12-15-2010

- Westinghouse and SNC will develop IST surveillance activities for squib valves based on final design and lessons learned from qualification process

COL 3.9-4 – Develop Inservice Testing Program

- FSAR 3.9.6.2.2 currently addresses this commitment



R-COLA: Squib Valves Action

AP1000 Squib Valve Testing (cont'd)

VEGP RAI Letter 56 – RAI 3.9.6-1

- Improved surveillance activities being considered by industry
- Include FSAR commitment to incorporate lessons learned
 - from design completion process
 - from qualification process

VEGP Response dated May 27, 2010

- Included in FSAR Revision 3 in August 2010

VEGP COLA FSAR 3.9.6.2.2

Industry and regulatory guidance is considered in development of IST program for squib valves. In addition, the IST program for squib valves incorporates lessons learned from the design and qualification process for these valves such that surveillance activities provide reasonable assurance of the operational readiness of squib valves to perform their safety functions.