October 27, 2005

ORGANIZATION: General Electric Nuclear Energy (GE)

PROJECT: Economic and Simplified Boiling Water Reactor (ESBWR) Design Certification

SUBJECT: SUMMARY OF MEETING HELD ON AUGUST 30, 2005, REGARDING THE ESBWR DESIGN CERTIFICATION APPLICATION

The Nuclear Regulatory Commission (NRC) hosted a public meeting with General Electric Nuclear Energy (GE) on August 30, 2005, at NRC Headquarters to discuss GE's ESBWR design. A list of attendees is provided as Enclosure 1. Enclosure 2 contains the agenda for the meeting.

GE provided handouts during the meeting which can be accessed through the Agencywide Documents Access and Management System (ADAMS). This system provides text and image files of NRC's publicly available documents. The handouts mentioned above may be accessed through the ADAMS system under Accession Nos. ML052490427 and ML052490428. If you do not have access to ADAMS or if there are problems in accessing the handouts located in ADAMS, contact the NRC Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to pdr@nrc.gov. A summary of the meeting is included below.

By letter dated August 24, 2005, GE submitted an application for final design approval and standard design certification of the ESBWR standard plant design. The purpose of the meeting was for GE to provide an overview of the ESBWR design certification application, the ESBWR design, and the ESBWR probabilistic risk assessment (PRA) to facilitate the staff's review of the application. GE began their presentation with an overview of the contents of the design certification application which includes the design control document (DCD) and the PRA report (NEDC-33201P). The staff informed GE that a non-proprietary version of the PRA would need to be submitted.

GE provided an overview of the ESBWR, which is a 4,500 MWth (1,550 MWe gross) plant design using natural circulation and passive safety systems. The passive safety systems include the gravity driven cooling system (GDCS), the isolation condenser system (ICS), and the passive containment cooling system (PCCS). GE indicated that the safety relief valves (SRVs) are not expected to open for any transients or design-basis accidents except for the anticipated transient without scram (ATWS) event due to the heat removal capability of the ICS. The GDCS pools contain enough capacity to flood the entire lower drywell to a level above the top of active fuel (TAF). During a loss of coolant accident (LOCA), the lowest water level is not reached until 500 to 600 seconds after the initiating event, the minimum water level is well above the TAF, and there is no fuel heatup.

The GDCS system relies on opening squib valves. The staff had a question about the reliability of the squib valves and whether the valves had been tested. GE informed that staff that there is significant operating experience with squib valves and that full scale tests had been performed on this specific squib valve design. The staff also asked whether the check valve

upstream of the squib valve in the GDCS flow path was testable. GE said that the check valves were testable and they would provide additional details later.

The ESBWR safety systems provide 72-hour passive cooling capability. To accomplish this function, additional water is required for the PCCS/ICS pools after the first 36 to 40 hours. The ESBWR design provides additional capacity via an automatic connection to a normally separated pool which contains condensate grade water. The connection is opened using a pneumatic valve which fails open upon loss of power. The ESBWR has four divisions of safety related electrical power supplied by battery banks and inverters. All four electrical divisions provide 24 hours capability for monitoring and control and two of the four electrical divisions also provide 72 hours capability for monitoring only. The ESBWR design employs a digital instrumentation control system which includes the engineered safety feature and reactor protection systems.

Additional non-safety-related systems are provided in the design, such as diesel generators and the fuel and auxiliary pool cooling system, which provides defense-in-depth and are identified by GE as plant investment protection (PIP) systems. The fire protection system has been identified for regulatory treatment of non-safety systems (RTNSS) for the function of providing makeup to the ICS/PCCS pool and the spent fuel pool for post-72-hour to post-7 day accidents.

During the PRA overview, GE discussed the scope of the PRA and the contents of the PRA report. GE presented the results of their PRA and provided a discussion of how the reduced core damage frequency was achieved by providing redundancy and diversity in the design. GE also discussed the design and function of the basemat internal melt arrest and coolability (BiMAC) system which is a severe accident mitigation design feature.

/RA/

Amy E. Cubbage, ESBWR Project Manager
New Reactors Section
New, Research and Test Reactors Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Project No. 717

Enclosures: As stated

cc w/encls: See next page

upstream of the squib valve in the GDCS flow path was testable. GE said that the check valves were testable and they would provide additional details later.

The ESBWR safety systems provide 72-hour passive cooling capability. To accomplish this function, additional water is required for the PCCS/ICS pools after the first 36 to 40 hours. The ESBWR design provides additional capacity via an automatic connection to a normally separated pool which contains condensate grade water. The connection is opened using a pneumatic valve which fails open upon loss of power. The ESBWR has four divisions of safety related electrical power supplied by battery banks and inverters. All four electrical divisions provide 24 hours capability for monitoring and control and two of the four electrical divisions also provide 72 hours capability for monitoring only. The ESBWR design employs a digital instrumentation control system which includes the engineered safety feature and reactor protection systems.

Additional non-safety-related systems are provided in the design, such as diesel generators and the fuel and auxiliary pool cooling system, which provides defense-in-depth and are identified by GE as plant investment protection (PIP) systems. The fire protection system has been identified for regulatory treatment of non-safety systems (RTNSS) for the function of providing makeup to the ICS/PCCS pool and the spent fuel pool for post-72-hour to post-7 day accidents.

During the PRA overview, GE discussed the scope of the PRA and the contents of the PRA report. GE presented the results of their PRA and provided a discussion of how the reduced core damage frequency was achieved by providing redundancy and diversity in the design. GE also discussed the design and function of the basemat internal melt arrest and coolability (BiMAC) system which is a severe accident mitigation design feature.

/RA/

Amy E. Cubbage, ESBWR Project Manager
New Reactors Section
New, Research and Test Reactors Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Project No. 717

Enclosures: As stated

cc w/encls: See next page

ML052490427 and ML052490428-Handouts
ML052940440-Meeting Summary
ADAMS ACCESSION NUMBER: ML052490424-Pkg.

OFFICE	RNRP/PM	RNRP/SC
NAME	ACubbage	LDudes
DATE	10/ 24/2005	10/ 27/2005

OFFICIAL RECORD COPY

Distribution for August 30, 2005, Meeting Summary dated

Distribution
Hard Copy
RNRP Rdg.
ACubbage
LDudes

E-mail
DMatthews
WBeckner
RNRP Group
DE Branch Chiefs
DE Section Chiefs
OGC
ACRS/ACNW
RJasinsky
JStarefos
JJolicoeur, EDO
FEltawila
JRosenthal
JDanna
JHan
KAlm-Lytz
YDiaz
ZCruz
HLi
NRay
MPohida
TAttard
JHoneharik
MReinhart
JBongarra
CLi
DHuyak
NSaltos
JLee
MHartzman
BMusico
JHuang
HWalker
SBasu
VKlein
RLandry
AZoynokos
DAJohnson
JTsao
RMcIntyre
TCheng
SMWong
YCLi
BLee
JZorn
GArmstrong, Jr.
JFair
JJacobson
SJones
JHernandez
JSGuo
GParry
PSekerak
IMadni
GHammer
JRaval
BParks
AHowe
NTrehan
DBarss
MMitchell
DJeng
MRubin
MRazzaque
JDehmel
GThomas
JRidgely
JPulsipher
MWaterman
MChiramal

ATTENDEES FOR MEETING WITH GENERAL ELECTRIC
ESBWR DESIGN CERTIFICATION
AUGUST 30, 2005

Name	Affiliation
Amy Cubbage	NRR/RNRP
Ronald Hagen	DOE
Rick Kingston	GE
David Hinds	GE
Bob Fraser	Black & Veatch
George Stramback	GE
Louis Quintana	GE
Lauren Quinones	NRR/RNRP
Larry Rossbach	NRR/RNRP
Joe Williams	NRR/RNRP
Joe Hegner	Dominion
Jerry Wilson	NRR/RNRP
Kristi Alm-Lytz	NRR/IPSB
Russ Wells	Parallox
George Youngblood	ISL
Yamir Diaz	NRR/DE
Zahira Cruz	NRR/DE
Charles Brinkman	Westinghouse
Hulbert Li	NRR/DE
William Beckner	NRR/RNRP
Neil Ray	NRR/DE
Mark Pohida	NRR/DSSA/SRSB
Tony Attard	NRR/DSSA
John Honeharik	NRR/DE/EMCB
Mark Reinhart	NRR/DSSA/SPSB
J. Bongarra	USNRC/NRR/DIPM

Name	Affiliation
Chang Li	NRR/DSSA/SPLB
Doug Huyak	USNRC/NSIR/RSS
Nick Saltos	USNRC/DSSA/SPSB
Jay Lee	NRC/DSSA/SPSB
Mark Hartzman	NRC/DE/EMEB
Bruce Musico	NRC/NSIR/EPD
John Huang	NRR/NRR/DE
Harold Walker	NRC/NRR/DSSA
Sud Basu	NRC/RES/DSARE
Joe Colaccino	NRC/NRR/DRIP
Veronica Klein	NRC/NRR/DSSA
James Han	NRC/RES/DSARE
Jack Rosenthal	RES/AREB
Ralph Landry	NRR/DSSA
John Thorp	NRR/DRIP/RNRP
Rick Wachowiak	GE
Jenny Weil	McGraw Hill
Robert Gamble	GE
Andromahe Zoynokos	NRR/DE/EEIB
Don A. Johnson	NSIR/DPR/EPD
John Tsao	NRR/DE/EMCB
Rich McIntyre	NRR/DIPM
Thomas Cheng	NRR/DE/EMEB
See Meng Wong	NRR/DSSA/SPSB
Y.C. (Renee) Li	NRR/DE/EMEB
Brian Lee	NRR/DSSA/SPSB
Alan Levin	Framatome ANP
Jason Zorn	OGC/RP
Gary Armstrong, Jr.	NRR/DIPM/IROB

Name	Affiliation
John Fair	NRR/DE/EMEB
J. Jacobson	OIP
Steven Jones	NRR/DSSA/SPLB
Jorge Hernandez	NRR/DSSA/SPLB
Jin-Sien Guo	NRR/DSSA/SPLB
Gareth Parry	NRR/DSSA
Patrick Sekerak	NRR/DE/EMEB
Imtiaz Madni	NRC/RES/DSARE
Gary Hammer	NRR/DE
J. Raval	NRR/DSSA/SPSB
B. Parks	RES/DRAA
Allen Howe	NRR/DE/EEIB
N. Trehan	NRR/DE/EEIB
S. Bloom	NRR/DRIP/RNRP
Dan Barss	NSIR/DPR/EPD
Matthew A. Mitchell	NRR/DE/EMCB
David Jeng	NRR/DE/EMEB
Mark Rubin	NRR/DSSA
Muhammad Razzaque	NRR/DSSA
J. C. Dehmel	NRR/DIPM
George Thomas	NRC/NRR
John Ridgely	RES/DRAA
James Pulsipher	NRC/NRR/SPSB-C
Mike Waterman	RES/DET/ERAB
Matt Chiramal	EEIB/DE/NRR
Alan Beard	GE Nuclear

Agenda for Public Meeting Regarding ESBWR Design Certification
August 30, 2005

9:00 a.m. - 9:10 a.m.	Introductory Remarks	A. Cubbage, NRR D. Hinds, GE
9:10 a.m. - 10:50 a.m.	ESBWR Design Overview	General Electric
10:50 a.m. - 11:00 a.m.	Opportunity for Public Comment	All
11:00 a.m.	Adjourn	

Enclosure 2

ESBWR

cc:

Mr. David H. Hinds, Manager
ESBWR
P.O. Box 780, M/C L60
Wilmington, NC 28402-0780

Mr. George B. Stramback
Manager, Regulatory Services
GE Nuclear Energy
1989 Little Orchard Street, M/C 747
San Jose, CA 95125

Mr. David Lochbaum, Nuclear Safety Engineer
Union of Concerned Scientists
1707 H Street, NW., Suite 600
Washington, DC 20006-3919

Mr. Paul Gunter
Nuclear Information & Resource Service
1424 16th Street, NW, Suite 404
Washington, DC 20036

Mr. James Riccio
Greenpeace
702 H Street, Suite 300
Washington, DC 20001

Mr. Adrian Heymer
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

Mr. Thomas P. Miller
U.S. Dept. of Energy, NE-20, Rm. A286
Headquarters - Germantown
19901 Germantown Road
Germantown, MD 20874-1290

Mr. Paul Leventhal
Nuclear Control Institute
1000 Connecticut Avenue, NW
Suite 410
Washington, DC 20036

Dr. Jack W. Roe
Nuclear Energy Institute
1776 I Street, NW
Washington, DC 20006-3708

Mr. Brendan Hoffman
Research Associate on Nuclear Energy
and Environmental Program
215 Pennsylvania Avenue, SE
Washington, DC 20003

Mr. Tom Clements
6703 Gude Avenue
Takoma Park, MD 20912

Ms. Patricia Campbell
Morgan, Lewis & Bockius, LLP
1111 Pennsylvania Avenue, NW
Washington, DC 20004

Mr. Glenn H. Archinoff
AECL Technologies
481 North Frederick Avenue
Suite 405
Gaithersburg, MD. 20877

Mr. Gary Wright, Director
Division of Nuclear Facility Safety
Illinois Emergency Management Agency
1035 Outer Park Drive
Springfield, IL 62704

Mr. Charles Brinkman
Westinghouse Electric Co.
Washington Operations
12300 Twinbrook Pkwy., Suite 330
Rockville, MD 20852

Mr. Ronald P. Vijuk
Manager of Passive Plant Engineering
AP1000 Project
Westinghouse Electric Company
P. O. Box 355
Pittsburgh, PA 15230-0355

Mr. Ed Wallace, General Manager
Projects
PBMR Pty LTD
PO Box 9396
Centurion 0046
Republic of South Africa

Mr. Russell Bell
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

Mr. Ron Simard
6170 Masters Club Drive
Suwanne, GA 30024
Mr. Jerald S. Holm

Framatome ANP, Inc.
3315 Old Forest Road
P.O. Box 10935
Lynchburg, VA 24506-0935

Ms. Kathryn Sutton, Esq.
Morgan, Lewis & Bockius, LLP
1111 Pennsylvania Avenue, NW
Washington, DC 20004

Mr. Robert E. Sweeney
IBEX ESI
4641 Montgomery Avenue
Suite 350
Bethesda, MD 20814

Mr. Eugene S. Grecheck
Vice President, Nuclear Support Services
Dominion Energy, Inc.
5000 Dominion Blvd.
Glen Allen, VA 23060

E-Mail:
mwetterhahn@winston.com
whorin@winston.com
gcesare@enercon.com
jerald.holm@framatome-anp.com
eddie.grant@exeloncorp.com
rob.sweeney@ibexesi.com
joseph_hegner@dom.com
louis.quintana@gene.ge.com
steven.hucik@ge.com
david.hinds@ge.com
chris.maslak@ge.com
james1.beard@ge.com

RNRP COVER PAGE

DOCUMENT NAME: **E:\Filenet\ML052940440.wpd**

SUBJECT: **SUMMARY OF MEETING HELD ON AUGUST 30, 2005, REGARDING THE ESBWR DESIGN CERTIFICATION APPLICATION**

ORIGINATOR: **A. Cubbage**

SECRETARY: **C. Nagel**

DATE: **November 7, 2005**

●●● ROUTING LIST ●●●

	NAME	DATE
1.	A. Cubbage	/ /05
2.	L. Dudes	/ /05
3.		/ /05
4.		/ /05
5.		/ /05
6.		/ /05
7.		/ /05
8.		/ /05
9.		/ /05

DOCUMENT DISPATCHED: ____ / ____ / ____

ADAMS ACCESSION #ML052490424 **TEMPLATE #: NRC-001**

DRAFT or FINAL Folder: 9 NRR/FLO 9 Copy to ADAMS DPC Processing Folder 9 Immediate 9 Normal 9 Packaging	Security Rights: Viewer = : NRC Users 9 Restricted to_____ Owner = : Originator 9 Others as appropriate
Document Type: 9 Memo 9 Letter 9 Technical Input Document 9 Other _____ (Listing - ML993570062)	Case/Reference #: (TAC, WITs, Yellow Ticket, etc.)
Availability: 9 Non-Publicly Available or 9 Publicly Available	Document Sensitivity: 9 Non-Sensitive 9 Sensitive (pre-decisional) (9 Copyright)
Keywords: (Include Template #)	Comments:

Quality Control Check by: _____ **Entered in ADAMS** _ / ____ / ____

Official Agency Record____ / ____ / ____