Westinghouse Electric Company
Nuclear Power Plants
P.O. Box 355
Pittsburgh, Pennsylvania 15230-0355
USA

U.S. Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, D.C. 20555

Direct tel: 412-374-6306
Direct fax: 412-374-5005
e-mail: sterdia@westinghouse.com

Your ref: Project Number 740
Our ref: DCP/NRC1812

January 12, 2007

Subject: AP1000 COL Standard Technical Report Submittal

In support of Combined License application pre-application activities, Westinghouse is submitting Revision 0 of AP1000 Standard Combined License Technical Report Number 66. This report completes and documents, on a generic basis, activities required for COL Information Item 19.59.10-4 in the AP1000 Design Control Document. Changes to the Design Control Document identified in Technical Report Number 66 are intended to be incorporated into FSARs referencing the AP1000 design certification or incorporated into the design certification using supplemental rulemaking if Part 52 is revised to permit revision of the design certification. This report is submitted as part of the NuStart Bellefonte COL Project (NRC Project Number 740). The information included in this report is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification.

The purpose for submittal of this report was explained in a March 8, 2006 letter from NuStart to the U.S. Nuclear Regulatory Commission.

Pursuant to 10 CFR 50.30(b), APP-GW-GLR-070, Revision 0, "Development of Severe Accident Management Guidelines," Technical Report Number 66, is submitted as Enclosure 1 under the attached Oath of Affirmation.

Technical Report 66 summarizes the Severe Accident Management Guidance. The AP1000 SAMG will be available for NRC onsite review at Westinghouse offices in Monroeville, Pennsylvania after January 31, 2007. It is expected that when the NRC review of Technical Report Number 66 is complete, COL Information Item 19.59.10-4 will be considered complete for COL applicants referencing the AP1000 Design Certification.

D079

Questions or requests for additional information related to the content and preparation of this report should be directed to Westinghouse. Please send copies of such questions or requests to the prospective applicants for combined licenses referencing the AP1000 Design Certification. A representative for each applicant is included on the cc: list of this letter.

Very truly yours,

A. Sterdis, Manager
Licensing and Customer Interface
Regulatory Affairs and Standardization

/Attachment

1. "Oath of Affirmation," dated January 12, 2007

/Enclosure

1. APP-GW-GLR-070, Revision 0, "Development of Severe Accident Management Guidelines," Technical Report Number 66, dated January 2007.

cc:	S. Bloom	-	U.S. NRC	1E	1A
	S. Coffin	-	U.S. NRC	1E	1A
	G. Curtis	-	TVA	1E	1A
	P. Grendys	-	Westinghouse	1E	1A
	P. Hastings	-	Duke Power	1E	1A
	C. Ionescu	-	Progress Energy	1E	1A
	D. Lindgren	-	Westinghouse	1E	1A
	A. Monroe	-	SCANA	1E	1A
	M. Moran	-	Florida Power & Light	1E	1A
	C. Pierce	-	Southern Company	1E	1A
	E. Schmiech	-	Westinghouse	1E	1A
	G. Zinke	-	NuStart/Entergy	1E	1A

ATTACHMENT 1

"Oath of Affirmation"

ATTACHMENT 1

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of:	)
NuStart Bellefonte COL Project	)
NRC Project Number 740	)

APPLICATION FOR REVIEW OF
"AP1000 GENERAL COMBINED LICENSE INFORMATION"
FOR COL APPLICATION PRE-APPLICATION REVIEW

W. E. Cummins, being duly sworn, states that he is Vice President, Regulatory Affairs & Standardization, for Westinghouse Electric Company; that he is authorized on the part of said company to sign and file with the Nuclear Regulatory Commission this document; that all statements made and matters set forth therein are true and correct to the best of his knowledge, information and belief.

W. E. Cummins
Vice President
Regulatory Affairs & Standardization

Subscribed and sworn to
before me this 12th day
of January 2007.

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Debra McCarthy, Notary Public
Monroeville Boro, Allegheny County
My Commission Expires Aug. 31, 2009
Member, Pennsylvania Association of Notaries

Debra McCarthy
Notary Public

ENCLOSURE 1

APP-GW-GLR-070, Revision 0

Development of Severe Accident Management Guidelines

Technical Report Number 66

AP1000 DOCUMENT COVER SHEET

TDC: _____ Permanent File: _____ APY _____

RFS#: _____ RFS ITEM #: _____

AP1000 DOCUMENT NO.	REVISION NO.		ASSIGNED TO
APP-GW-GLR-070	0	Page 1 of 15	WINTERS

ALTERNATE DOCUMENT NUMBER: TR-66 WORK BREAKDOWN #: GW

ORIGINATING ORGANIZATION: Westinghouse Electric Company

TITLE: Development of Severe Accident Management Guidance

ATTACHMENTS:	DCP #/REV. INCORPORATED IN THIS DOCUMENT REVISION:
CALCULATION/ANALYSIS REFERENCE:	

ELECTRONIC FILENAME	ELECTRONIC FILE FORMAT	ELECTRONIC FILE DESCRIPTION
APP-GW-GLR-070.doc	Microsoft Word	

☒ WESTINGHOUSE CLASS 3 (NON PROPRIETARY)

Class 3 Documents being transmitted to the NRC require the following two review signatures in lieu of a Form 36.

LEGAL REVIEW Tom White	SIGNATURE/DATE 1-12-07
PATENT REVIEW Mike Corletti	SIGNATURE/DATE 1-9-2007

☐ WESTINGHOUSE PROPRIETARY CLASS 2

ORIGINATOR M. A. Lucci	SIGNATURE/DATE 1/8/07	
REVIEWERS	SIGNATURE/DATE	
VERIFIER R. J. Lutz	SIGNATURE/DATE 8 JAN 07	VERIFICATION METHOD Independent 3-Pass Review
AP1000 RESPONSIBLE MANAGER Gary G. Ament	SIGNATURE 1/15/07	APPROVAL DATE

* Approval of the responsible manager signifies that document is complete, all required reviews are complete, electronic file is attached and document is released for use.

APP-GW-GLR-070
Revision 0

January 2007

AP1000 Standard Combined License Technical Report

Development of Severe Accident Management Guidance

Westinghouse Electric Company LLC
P.O. Box 355
Pittsburgh, PA 15230-0355

1.0 INTRODUCTION

This technical report addresses AP1000 Design Control Document (DCD) (Reference 1) Combined Operating License (COL) Information Item 19.59.10-4 on page 19.59-37.

DCD Paragraph 19.59.10.5 Combined License Information 19.59.10-4 states:

> "The Combined License applicant referencing the AP1000 certified design will develop and implement severe accident management guidance using the suggested framework provided in WCAP-13914, "Framework for AP600 Severe Accident Management Guidance," (Reference 19.59-1)."

This technical report closes this COL information item with respect to development of the severe accident management guidance SAMG). The AP1000 SAMG, APP-GW-GJR-400 (Reference 2), have been developed from information in APP-GW-GL-027 (Reference 3), the AP1000 PRA (Reference 4) and additional studies performed during the AP1000 SAMG development. The Framework for AP1000 Severe Accident Management Guidance in Reference 3 was developed from the Framework for AP600 Severe Accident Management Guidance in WCAP-13914 (Reference 5). The AP1000 SAMG will be implemented by the licensee at each site using the AP1000 design. The SAMG implementation will include: making the appropriate SAMG information in the control room and TSC; defining the roles and responsibilities of the plant Emergency Response Organization with respect to usage of the SAMG; and providing SAMG training for the appropriate ERO members.

The AP1000 SAMG will be available for NRC onsite review at Westinghouse offices in Monroeville, Pennsylvania after January 31, 2007.

2.0 AP1000 SAMG DEVELOPMENT

Prevention and mitigation of accidents has been an integral part of the design process for AP1000. A significant driving force in the passive plant design is the key accident management philosophy of preventing accidents from progressing to core damage. In addition, in the event of a low probability core damage accident, plant features have been incorporated to retain a damaged core inside the containment, with the objective of terminating the progression of the accident and returning the plant to a controlled, stable state. Even though the AP1000 has a high degree of severe accident mitigation capability, it is useful to provide discussion of alternative actions that could be taken to further enhance the management capabilities. This document contains a summary of the overall philosophy and high level strategies that form the basis of the AP1000 severe accident management guidance.

The scope of the AP1000 severe accident management guidance is to address significant core damage accidents. Prior to core damage, the AP1000 Emergency Operating Procedures (EOPs) are to be used (see Reference 6). Although the EOPs provide strategies for the prevention of core damage, they do not address scenarios after significant core damage has occurred.

The AP1000 Severe Accident Management Guidance (SAMG) was developed for use after the AP1000 EOPs are no longer applicable. The AP1000 SAMG includes the application of insights that are derived from the AP1000 Probabilistic Risk Assessment (PRA), and elements that have been learned through severe accident management research over the past 20 years. As such, severe accident management guidance is the mechanism that brings the current level of knowledge on severe accidents to the hands of the operating and technical staff at the plant.

However, uncertainty of the core melt progression still exists, and thus the management of a severe accident is best provided by guidance that is less prescriptive than the guidelines for design basis events and other accidents prior to core damage.

The AP1000 SAMG was developed from the format and content of the Westinghouse Owners Group (WOG) SAMG (Reference 7) that has been implemented at all of the Westinghouse NSSS PWR units in the USA as well as various PWR designs around the world, including Westinghouse, AREVA, KWU and VVER designs. As such, the WOG SAMG has been thoroughly tested in severe accident drills and exercises since 1998 and has proven to be a robust, user friendly set of guidance. Thus the extension of the WOG SAMG to the AP1000 SAMG is a natural progression.

The starting point for the technical basis for the AP1000 SAMG is identical to that used for the WOG SAMG, namely the EPRI Severe Accident Management Technical Basis Document (Reference 8). This document details the severe accident phenomena and behavior as it was known in the early 1990's. The technical basis has been updated and supplemented by the results of recent world-wide research activities, the insights from the AP1000 PRA (APP-GW-GL-022, Reference 4), the AP1000 SAMG Framework (APP-GW-GL-027, Reference 2) which was completed prior to the start of the development of the AP1000 SAMG. A series of AP1000 severe accident analyses were performed to support the AP1000 SAMG development and insights from those analyses were also used in the AP1000 SAMG development.

3.0 AP1000 SAMG OVERVIEW

The Severe Accident Management Guidance (SAMG), APP-GW-GJR-400 (Reference 2), for the AP1000 plant consists of three volumes:

- Executive Volume which describes the methodology and criteria for the development of the AP1000 SAMG
- Guideline Volume which contains the SAMG guidelines to be used by the control room staff and the engineering support staff in responding to a severe accident
- Background Volume which details the technical basis for the guidance in the Guidelines Volume

3.1 Executive Volume

The AP1000 Executive Volume contains information related to the development of the AP1000 SAMG. The information in this document is useful for the development of the AP1000 training material because it provides the basic philosophy of the SAMG and its intended use during a severe accident. The sections of the Executive Volume include:

- Overview of AP1000 SAMG – provides a high level discussion of the AP1000 SAMG
- SAMG Framework, APP-GW-GL-027 (Reference 3) – provides the technical basis for the strategies implemented in the AP1000 SAMG
- Writer's Guide – provides the standard format and content for writing the SAMG Guidelines and Background Documents

- User's Guide – provides the rules of usage for the AP1000 SAMG for both the licensed control room operators and the engineering support staff in the Technical Support Center (TSC)

- Decision Making Process – describes the decision making process to be employed in using the SAMG, including the role of the licensed operators in the control room, the technical support staff in the TSC, and the plant management decision makers

- EOP and E-plan Interface – describes the interfaces between the AP1000 EOPs and the SAMG and between the SAMG and the Site Emergency Plan (Note that the E-Plan must be written to accommodate the SAMG. In particular, the E-Plan must identify emergency response organization roles and responsibilities for using the SAMG.)

- Setpoints and System Alignments – provides the basis for numerical values used in the SAMG guidelines and a high level summary of the system alignments included in the guidelines

- Equipment and Instrumentation Assessment – provides a discussion of the equipment and instrumentation survivability during a severe accident and the expected instrumentation response during various phases of a severe accident

3.2 Guideline Volume

The AP1000 Guideline Volume contains the severe accident management guidelines. The AP1000 Severe Accident Management Guidance (AP1000 SAMG) consists of three major parts. These distinct parts were defined based on in-depth investigations of human factors considerations, the interfaces with the AP1000 Emergency Operating Procedures (EOPs), the site Emergency Plan (E-Plan), the possible high level severe accident responses, the potential positive and negative impacts of most actions after core damage, and the progression and chronology of severe accidents. The parts consist of:

- Control Room Severe Accident Management Guidance

- TSC Severe Accident Management Guidance

- TSC Severe Challenge Response Guidance

3.2.1 Control Room Severe Accident Management Guidance

The Control Room Severe Accident Management Guidance consists of two separate guidelines; the appropriate guideline is determined by the status of the Technical Support Center (TSC) at the time the Severe Accident Management Guidance is implemented. Entry into the control room guidance is through a transition from the Inadequate Core Cooling EOP (FR-C.1).

SACRG-1, "Severe Accident Control Room Guideline Initial Response" is initially used by the control room staff and is continued until the TSC is functional and ready to use the TSC SAMG. Since the AP1000 EOPs are terminated at the time the SAMG is put into usage, this SAMG includes many of the steps that are in the EOPs for Inadequate Core Cooling (i.e., FR-C.1, Response to Inadequate Core Cooling). Additional steps are included to provide a broader focus

to include protection of the fission product barriers. Since this guideline is only designed for use during a few well defined, fast-acting accidents, and only until the TSC is functional, the actions can be well defined and prioritized. This control room guideline is written in two-column format similar to the EOPs to facilitate its usage by the control room staff.

SACRG-2, "Severe Accident Control Room Guideline for Transients after the TSC is Functional" is for use by the control room staff after the time the TSC is functional and ready to use the TSC SAMG. This guideline provides the control room staff with a structured set of activities for use during the time that the TSC is evaluating the plant conditions and the potential responses. This guideline is intended to foster communications between the control room staff and the TSC technical staff with the goal of enhancing the control room acceptance of the recommendations made by the TSC. Additionally, this guideline is intended to encourage information flow from the control room to the TSC in areas where the control room staff has special capabilities. For example, in the SAMG validation exercises, the control room staff was more adept at identifying equipment alignments when various pieces of equipment became available. A secondary objective of this guideline is to support the actions previously taken through continual or periodic monitoring of pertinent parameters. For example, if water is being added to the containment via the containment spray from the secondary fire water tank, as a result of a severe accident management strategy, the fire water tank level will require periodic monitoring to maintain sufficient water to prevent cavitation of the pumps in use. This guideline was also written in two-column format. The instructions contained in this guideline include:

- Monitoring support conditions for implementation of strategies
- Monitoring the reliability of plant parameters being employed in TSC evaluations
- Monitoring trends in specified key plant parameters to alert the TSC staff to unexpected changes
- Evaluating equipment status and availability
- Identifying potential equipment alignments to meet the TSC accident management objectives
- Monitoring plant status to promptly identify any unexpected change in plant status

3.2.2 TSC Severe Accident Management Diagnostics

The TSC Severe Accident Management Diagnostics consist of two distinct pieces: a Diagnostic Flow Chart (DFC) and a Severe Challenge Status Tree (SCST).

The Diagnostic Flow Chart is a tool for diagnosis of plant condition or status in relation to a controlled stable condition and for the early diagnosis of potential challenges to containment fission product boundaries. The diagnostic flow chart specifies the key parameters to be monitored and controlled during a severe accident. It provides for periodic monitoring of each key parameter until all parameters are at a point where the plant can be declared to be in a controlled stable state. The key parameters to be monitored in the diagnostic flow chart include:

- Containment water level

- RCS pressure
- Steam generator water level
- Core temperature
- Fission product releases
- Containment pressure
- Containment hydrogen concentration

A priority scheme for monitoring plant parameters and evaluating the need to implement a severe accident management strategy has been established based on a detailed review of a wide range of severe accident scenarios. The diagnostic flow chart considers severe accident phenomena which may challenge fission product boundaries, as identified in the AP1000 Probabilistic Risk Assessment (PRA). If the value of a particular parameter is outside the range defined as a controlled stable state, the TSC technical staff is directed to evaluate the need to implement strategies to bring the parameter within the range which defines a controlled stable condition. The evaluation of the need to implement strategies is detailed in a set of seven Severe Accident Guidelines (SAGs) which are discussed in the next section.

The Severe Challenge Status Tree is a tool for diagnosis of ongoing fission product releases and challenges to fission product boundaries. The Severe Challenge Status Tree identifies key parameters which should be monitored on a regular basis to determine if their value exceeds a setpoint which indicates that a more serious condition exists. The status tree is monitored while using the diagnostic flow chart and evaluation of strategies identified by the flow chart diagnostics is ongoing. If a setpoint value in the status tree is exceeded, all other strategy evaluations are terminated and the implementation of a severe accident management strategy to deal with the more serious condition must have the highest priority. The key parameters in the status tree are:

- Fission product releases
- Containment pressure
- Containment hydrogen
- Containment vacuum

As in the case of the diagnostic flow chart, a priority amongst the severe challenges in the status tree has been established from detailed review of analyses of severe accident scenarios. The status tree considers severe accident phenomena which may challenge fission product boundaries, as identified in the AP1000 PRA. The status tree also considers challenges which are a result of implementation of strategies to try to recover from a severe accident condition or to prevent failure of fission product boundaries. These challenges are generally not identified in severe accident studies such as the AP1000 PRA due to the scope of such studies. If the value of a particular parameter exceeds the setpoint defined as a severe challenge, the TSC technical staff is directed to implement the most appropriate available strategy to mitigate the challenge. The

mitigation strategy is detailed in a set of four Severe Challenge Guidelines (SCGs) which are discussed below.

The major difference between the diagnostic flow chart and the status tree is the urgency of implementing a strategy. In the diagnostic flow chart, the need to implement a strategy is evaluated based on the positive and negative impacts of implementing the various strategies. The decision not to implement any strategies, at this time, to control a particular parameter is an acceptable evaluation result based on the potential negative impacts. In the status tree, if no strategies are implemented, a fission product boundary will be breached in a short period of time. Therefore, if a setpoint in the status tree is exceeded, the best available strategy must be implemented in a timely manner. The best available strategy is generally the one with the smallest potential negative impacts. Thus, the diagnostic flow chart is anticipatory to the fission product boundary challenges identified in the severe challenge status tree.

3.2.3 TSC Severe Accident Management

The Diagnostic Flow Chart (DFC) identifies specific guidelines which are appropriate for a given key parameter. Each of these guidelines contains one or more strategies which might be used to respond to that parameter. The strategies contained in the guidelines have been derived from a number of sources including: the AP1000 PRA, the Westinghouse Owners Group Severe Accident Management Guidance (developed for existing Westinghouse NSSS plants), various industry and NRC reports on accident management (including the EPRI Severe Accident Management Technical Basis Report, TR-101869), and additional investigations carried out during the development of the AP1000 SAMG.

The severe accident management strategies referenced from the Diagnostic Flow Chart are contained in a set of seven Severe Accident Guidelines (SAGs). The guidelines specify a method for the systematic, logical evaluation of the possible strategies that might be used to respond to a given parameter. The evaluation process is presented as a series of discrete steps which are derived from the overall cognitive processes associated with a decision to implement (or not implement) a given set of actions.

The seven SAGs are:

- Inject into Containment
- Depressurize the RCS
- Inject into the Steam Generators
- Inject into the RCS
- Reduce Fission Product Releases
- Control Containment Conditions
- Reduce Containment Hydrogen

Each of the guidelines helps the TSC staff answer four important questions:

- Is implementation of a strategy possible with the current plant configuration?
- What is the balance between the potential positive and negative impacts associated with implementing a strategy?
- How does one determine if the strategy has been successfully implemented?
- What are the long term concerns that should be monitored following strategy implementation to ensure that the strategy remains effective?

The severe accident management strategies referenced from the Severe Challenge Status Tree are contained in a set of four Severe Challenge Guidelines (SCGs). While the overall decision process is similar between the SAGs and the SCGs, there are several important differences which derive from the urgency for taking action when a severe challenge condition exists. The SCGs do not call for an evaluation of the benefits and negative impacts associated with the implementation of strategies with respect to the alternative of not implementing any strategy. Compared to the consequences of not responding to a severe challenge, the implementation of any strategy in the guidelines would be beneficial. The deletion of this step can also lead to a faster decision concerning the appropriate strategy for implementation. The four SCGs are:

- Mitigate Fission Product Releases
- Depressurize Containment
- Control Hydrogen Flammability
- Control Containment Vacuum

Each of the SCGs helps the TSC staff answer three important questions:

- What is the most appropriate strategy amongst those available?
- How does one determine if the strategy has been successfully implemented?
- What are the long term concerns associated with implementation of a strategy?

Another important part of the AP1000 SAMG is a separate TSC guideline to monitor long term activities after a particular strategy is implemented. This is contained in SAEG-1, "TSC Long Term Monitoring". These long term activities range from identification of the limitations for operation of equipment put into service by the implementation of a strategy, to monitoring tank water levels to permit continued operation of equipment which is put into service to implement a strategy. The activities to be monitored depend on a number of factors, including:

- the equipment put into service to implement the strategies
- the equipment in-service prior to implementation of the SAMG and which relates to the control of a DFC parameter

- the limitations on equipment usage identified in the guidelines which evaluate the possible strategies
- the equipment which is no longer in-service if implementation of a strategy is discontinued
- the change in plant conditions as a result of implementation of severe accident management strategies

Some of the activities in the SAEG-1 guideline are duplicated in the control room SACRG-2 guideline. This is designed to enhance the communication between the control room and the TSC as well as provide for monitoring of plant conditions necessary for continued use of a strategy.

The final part of the AP1000 SAMG is the SAMG exit guidance, SAEG-2, "SAMG Termination". When selected parameters in the diagnostic flow chart are below their setpoint values and stable or decreasing, the plant is considered to be in a controlled stable state. At this point, it is not expected that the plant condition will worsen and therefore no new severe accident management strategies would be required. However, since core damage has occurred, caution should be exercised in performing some subsequent actions due to the high level of fission products possible in various plant systems and structures. Additionally, some severe accident management strategies have been implemented and continuation of these strategies may be appropriate. Thus, generic SAMG exit guidance was developed. The generic exit guidance provides identification of current plant status, especially relative to those that exist due to AP1000 SAMG implementation.

3.2.4 Computational Aids

A number of Computational Aids have been developed to aid the TSC staff in both the diagnostics and in answering certain aspects of the questions posed in each of the guidelines. The four computational aids included in the AP1000 SAMG are:

- RCS Injection to Recover Core
- Injection Rate for Long Term Decay Heat Removal
- Hydrogen Flammability in Containment
- Containment Water Level and Volume

The computational aids are contained in a separate section of the AP1000 SAMG since some of the computational aids are used in several different guidelines. The computational aids are graphical correlations to provide useful information from plant instrumentation readings. They have been designed to be efficient and simple to use, requiring no computer capabilities. One of the features of the computational aids is the accounting of uncertainties in severe accident phenomena. The uncertainties have been considered by providing correction factors for certain specific plant conditions or by using bounding assumptions in the development of the computational aids. The basis and the methodology to develop the computational aids is also contained in the AP1000 SAMG.

3.3 Background Documents

The final part of the AP100 SAMG is the Background Documents. The background documents contain information related to the overall guideline as well as for individual steps in the guidelines. A separate background document is prepared for each guideline, including the diagnostics and the computational aids. The background documents provide all supporting information upon which actions are based and provide all the inputs and assumptions for the computational aids. Each background document contains the following sections:

- Introduction
- Description of the guideline including the need for the guideline, the applicable accidents, the major challenges and response actions in the guideline, and priorities
- Recovery / restoration techniques, including a high level action summary
- Detailed description of steps notes and cautions

4.0 REGULATORY IMPACT

The changes to the DCD presented in this report do not represent an adverse change to the design function or to how design functions are performed or controlled. The changes to the DCD do not involve revising or replacing a DCD-described evaluation methodology nor involve a test or experiment not described in the DCD. The DCD change does not require a license amendment per the criteria of VIII. B. 5.b. of Appendix D to 10 CFR Part 52.

The DCD change does not affect resolution of a severe accident issue and does not require a license amendment based on the criteria of VIII. B. 5.c of Appendix D to 10 CFR Part 52.

The closure of the COL Information Item will not alter barriers or alarms that control access to protected areas of the plant. The closure of the COL Information Item will not alter requirements for security personnel. Therefore, the closure of the COL Information Item does not have an adverse impact on the security assessment of the AP1000.

5.0 REFERENCES

1. APP-GW-GL-700, AP1000 Design Control Document, Revision 15.

2. APP-GW-GJR-400, AP1000 Severe Accident Management Guidelines, Revision A.

3. APP-GW-GL-027, Framework for AP1000 Severe Accident Management Guidance Development, Revision 0.

4. APP-GW-GL-022, AP1000 Probabilistic Risk Assessment, Revision 1.

5. WCAP-13914, Framework for AP600 Severe Accident Management Guidance, Revision 3.

6. APP-GW-GLR-40, Plant Operations, Surveillance, and Maintenance Procedures, Technical Report Number 70, Revision 0.

7. Westinghouse Owners Group Severe Accident Management Guidance, Westinghouse Electric Co., Revision 0, June 1994 and Revision 1, October 2001.

8. TR-101869, Severe Accident Management Technical Basis Document, Electric Power Research Institute, 1992.

6.0 DCD MARKUP

The following DCD markup identifies how COL application Final Safety Analysis Reports should be prepared to incorporate the subject change.

Revise the fifth paragraph of subsection 19.59.10.5 as follows:

~~The Combined License applicant referencing the AP1000 certified design will develop and implement s~~Severe accident management guidance which is summarized in APP-GW-GLR-070 (Reference 19.59-1) was developed for AP1000 using the suggested framework provided in ~~WCAP-13914~~ APP-GW-GL-027, "Framework for AP~~6~~1000 Severe Accident Management Guidance," (Reference 19.59-~~1~~2).

Revise Reference 19.59-1 and add Reference 19.59-2 of subsection 19.59.11 as follows:

19.59.11 References

19.59-1 "AP1000 Standard Combined License Technical Report," APP-GW-GLR-070, Revision 0, January 2007.

19.59-~~1~~2 "Framework for AP~~6~~1000 Severe Accident Management Guidance," ~~WCAP-13914~~ APP-GW-GL-027, Revision ~~3~~0, ~~January 1998~~June 2006.

Revise Table 19.59-18 as follows:

33.	The steam generator should not be depressurized to cool down the RCS if water is not available to the secondary side. This action protects the tubes from large pressure differential and minimizes the potential for creep rupture. The COL will develop and implement severe accident management guidance using the suggested framework provided in ~~WCAP-13914~~ APP-GW-GL-027.	19.59.10
34.	Depressurizing the RCS and maintaining a water level covering the SG tubes on the secondary side can mitigate fission product releases from a steam generator tube rupture accident. The COL will develop and implement severe accident management guidance using the suggested framework provided in ~~WCAP-13914~~ APP-GW-GL-027.	19.59.10
36.	AP1000 has a nonsafety-related containment spray system. Containment spray is not credited in the PRA. Failure of the nonsafety-related containment spray does not prevent the plant achieving the safety goals. The COL will develop and implement severe accident management guidance for operation of the nonsafety-related containment spray system using the suggested framework provided in ~~WCAP-13914~~ APP-GW-GL-027.	6.5.2 19.59 19.59.10
43.	Capability exists to vent the containment. The COL will develop and implement severe accident management guidance for venting containment using the suggested framework provided in ~~WCAP-13914~~ APP-GW-GL-027.	Appendix 19D 19.59.10

Revise the first paragraph of subsection 19D.3 as follows:

The goal of accident management is to achieve a controlled, stable state following a beyond design basis accident. Establishment of a controlled, stable state protects the integrity of the containment pressure boundary. The conditions for a controlled, stable state are defined by ~~WCAP-13914~~ APP-GW-GL-027, tThe Framework for AP61000 Severe Accident Management Guidance (SAMG) (Reference 19D-1)~~ which is considered valid for AP1000~~.

Revise Reference 19D-1 of subsection 19D.10 as follows:

19D.10 References

19D-1 "Framework for AP61000 Severe Accident Management Guidance," ~~WCAP-13914~~ APP-GW-GL-027, Revision ~~3~~0, ~~January 1998~~June 2006.

Revise Table 1.6-1 as follows:

19.59	~~WCAP-13914~~	Framework for AP~~6~~1000 Severe Accident Management Guidance, Revision ~~30~~, ~~January 1998~~June 2006
19D	~~WCAP-13914~~	Framework for AP~~6~~1000 Severe Accident Management Guidance, Revision ~~30~~, ~~January 1998~~June 2006