Bellefonte 3&4

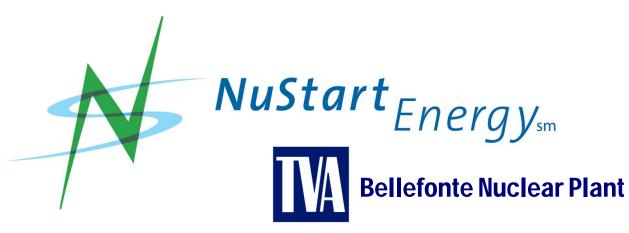
Lee Nuclear 1&2

Summer 2&3

Vogtle 3&4

Harris 2&3

Levy 1&2



AP1000 R-COL Application Acceptance Review Issues

Discussion of Schedule for Resolution of Hydrology Issue

January 31, 2008



Hydrology: Introduction

- NRC Staff expressed concern over TVA's Simulated Open Channel Hydraulics (SOCH) code
 - Model description and documentation not cited
 - Question regarding review of materials used to meet 10CFR50 Appendix B QA requirements
- Potential options cited by Staff:
 - Update Bellefonte analyses using USACE HEC-RAS model
 - Use bounding calculations to determine design-basis flood
 - Provide model description and documentation to enable NRC Staff review, and possible parallel Staff development of independent numerical model
- Discussion needed to:
 - Describe TVA hydrology experience
 - Provide information on supporting documentation
 - Clarify various issues in NRC acceptance letter
 - Propose actions to reach closure on issue and facilitate NRC review

Bellefonte 3&4 – Lee Nuclear 1&2 – Summer 2&3 – Vogtle 3&4 – Harris 2&3 – Levy 1&2



Background: TVA Hydrology Experience

- TVA created by Congress via TVA Act of 1933, with charter/mission to provide, in part, navigation and flood control to protect inhabitants of Tennessee River Valley
- Modeling of Tennessee River Basin covers over 1250 total miles of river, with total drainage area of over 40,000 mi², and containing 30 dams analyzed for outflows/failure effects
- TVA developed in-house hydrology and hydraulics expertise
 - Originally conducted analysis by hand
 - Later migrated methods to computer aided computations



Background (continued)

- TVA has long term expertise in flood analyses and modeling of watercourses within **Tennessee Valley**
- Analytical models and methods, originally developed by TVA's hydrologists and water resource engineers, continue to be used within both nuclear and non-nuclear program areas
- Underlying methods and computer code development (Garrison, Granju, Price - 1969) similar to basic underlying methods used by **USACE** as building block for HEC-RAS software

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Regulatory History

- TVA model received "extensive review" by NRC during licensing of three other nuclear plants in 1970's (NUREG 0011- Sequoyah SER, Browns Ferry SER, and NUREG-0847-Watts Bar SER)
- TVA model endorsed by the NRC in NUREG 0800 Section 2.4.4 - "detailed failure models [of dams]...by Tennessee Valley Authority are used..."
 - Recent revision of NUREG 0800 unclear as to basis for change in citation of TVA model
- TVA model is currently endorsed in guidance "Processing Applications for Early Site Permitting" (RS-002, Section 2.4.4, May 2004) using similar words
- Use of SOCH approved in 2007 SER for Sequoyah



Supporting Documentation

- Supporting documentation for TVA code does exist and is available for NRC review
- History of Analysis Method and SOCH Code
 - Hand computations originally used to predict flood levels converted to Simulated Open Channel Hydraulics (SOCH) FORTRAN Code in 1960s because no other standardized models available
 - Analysis method published in 1969 in peer-reviewed ASCE Journal



Supporting Documentation

- SOCH Method/Code (continued)
 - Analysis inputs updated in 1996 to reflect Dam Safety Program enhancements to dam structures
 - Program enhancements included altering potential failure modes
 - FORTRAN Code not altered
 - Analyses, codes, and supporting documentation collected into single TVA Nuclear Calculation, in compliance with TVA's Appendix B QA requirements and implementing procedures
 - Calculation now resides under TVA Nuclear QA configuration control
 - Supports design and licensing basis of three operating nuclear sites

Bellefonte 3&4 Lee Nuclear 1&2 Summer 2&3 Vogtle 3&4 Harris 2&3 Levy 1&2



Clarification of Acceptance Letter

- NRC Issue: model description and documentation not cited
 - Clarification: documented calculation available for review
- NRC Issue: question regarding review of materials used to meet 10CFR50 Appendix B QA requirements
 - Clarification:
 - Use of SOCH model remains consistent with existing fleet licensing basis
 - Calculation is in compliance with TVA's Appendix B QA program requirements and implementing procedures
- NRC statement that update to HEC-RAS model is in progress
 - Clarification: TVA regrets any confusion but has not indicated intent to adopt/apply HEC-RAS model to TVA system reservoirs

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TVA Points of Consideration

- Existing model documentation is adequate for existing fleet and use in fulfilling TVA responsibility for flood control in Tennessee Valley
 - NRC Staff encouraged to review existing documentation
 - A familiarization workshop on the SOCH model can be made available to assist NRC Staff in recreating ability to review model, as needed, consistent with previous and current NRC guidance
- Consideration of use of HEC-RAS model
 - Conversion of SOCH model to HEC-RAS not viable because of undue burden of significant cost and time required to model large and complex Tennessee River drainage basin without significant benefit
 - No regulatory basis for imposition of change
 - No indication existing model is inadequate
 - HEC-RAS would be unique for Bellefonte; Bellefonte would be outlier in TVA nuclear fleet and non-nuclear programmatic areas

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TVA Points of Consideration (continued)

- NRC development of an independent model is not warranted
 - No technical basis to abandon analysis previously approved by NRC
 - SOCH model previously provided reasonable and accepted results; no changes to code or computational methods have occurred that would suggest previous results are now less reasonable
 - TVA has confidence in development and use of analyses and methods and utilizes them in other non-nuclear programmatic areas



Proposed Approach

- Maintain use of SOCH model in Bellefonte COL application consistent with other TVA implementation
- NRC Staff review SOCH documentation in support of reasonable assurance conclusions
 - Documentation in accordance with TVA QA program available for review
 - Leverage review experience from 2007 Sequoyah Review
 - Familiarization workshop to facilitate NRC review

Approach should

- Preclude need for extended schedule for the hydrology review
- Enable focusing of Staff and applicant resources on risk-significant areas
- Support reasonable assurance determination regarding use of TVA's Hydraulic Model in predicting maximum flood levels at Bellefonte site

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Proposed Schedule

1. TVA make available calculation, supporting documents, and model description white paper to NRC for review

04/04/08

2. TVA conduct a familiarization workshop on SOCH code

05/16/08

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