

April 12, 2013

MEMORANDUM TO: Michael E. Mayfield, Director
Division of Advanced Reactor Program
Office of New Reactors

Thomas A. Bergman, Director
Division of Engineering
Office of New Reactors

Patrick L. Hiland, Director
Division of Engineering
Office of Nuclear Reactor Regulation

FROM: Michael J. Case, Director */RA/*
Division of Engineering
Office of Nuclear Regulatory Research

SUBJECT: ISSUANCE OF "APPLICATION OF ACOUSTIC EMISSION AND
OTHER ONLINE MONITORING TECHNOLOGIES TO HIGH
TEMPERATURE GAS REACTORS" – PNNL-20606

The Division of Engineering is announcing the issuance of the subject report, which can be accessed through ADAMS ML130101A207. The work related to in-service inspection (ISI) was conducted as per the NRC High-Temperature Gas-Cooled Reactor (HTGR) Research Plan (ML110310182) and the Advanced Reactor Research Infrastructure Development Assessment (ML070740637). The RES/DE staff initiated work at Pacific Northwest National Laboratory (PNNL) to (1) conduct a literature survey on the use of Acoustic Emission (AE) and other online monitoring methods for leak detection, crack detection, and other crack monitoring and (2) analyze the existing ASME code for application to advanced reactors and make recommendations regarding the use or modification of existing AE provisions for use as leak detection, crack detection, and crack monitoring techniques.

Online monitoring (OLM) technologies such as AE and others, especially guided ultrasonic waves (GUWs), are candidate technologies for performing monitoring and surveillance of HTGR structures. PNNL completed a review of published literature on two prospective online monitoring technologies, Acoustic Emission (AE) and Guided Ultrasonic Waves (GUW). This report is an assessment of AE and GUW for online monitoring of degradation in HTGRs based on a review of open literature. Rules for online degradation monitoring in LWRs with AE are included in Section XI and Section V, Article 13 of the ASME Boiler and Pressure Vessel Code.

We wish to acknowledge the support provided by Neil Ray, Donald Carlson, and Stephen Cumblidge of your staff for reviewing the draft and providing suggestions; their comments have been addressed. If you have questions, please contact me or Amy.Hull@nrc.gov.

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ADAMS ACCESSION No: ML13102A261

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