PEACH BOTTOM ATOMIC POWER STATION UNIT 3 RADIATION BUILDUP ON THE REACTOR WATER CLEANUP (RWCU) TEST SPOOL - AN UPDATE

David C. DiCello
PECO Energy Company
Peach Bottom Atomic Power Station
RD1, Box 208
Delta, PA 17314 USA

SUMMARY

Peach Bottom Atomic Power Station (PBAPS) is located near the town of Delta, Pennsylvania, on the west bank of the Susquehanna river. It is situated approximately 20 miles south of Lancaster, Pennsylvania. The site contains two (2) boiling water reactors of General Electric design and each rated at 3,293 megawatts thermal. The units are BWR 4s and went commercial in 1977. There is also a decommissioned high temperature gas-cooled reactor onsite, Unit 1.

The installation of a RWCU pipe test spool on Peach Bottom Unit 3 was initially sponsored by EPRI and was exposed to reactor water in December 1989. The spool piece had various surface treatments including flex-honing (mechanical polishing), electropolishing, and preoxidation/passivation and was exposed to reactor water prior to filtration under normal BWR chemistry.

Initial contact dose rates and isotopic concentrations in the oxide layer of the pipe were made in 1991 following one fuel cycle. The initial 1991 measurement was made while Unit 3 was a natural zinc plant. In May 1992, zinc injection was started in conjunction with the removal and replacement of the admiralty brass condenser with a Titanium condenser. The latest measurements were made in October 1993 following a second fuel cycle run on the pipe.

The as-received section with no treatment showed the highest contact dose rate of 675 mr/hr. The test section which was flex-honed (mechanically polished) and passivated had the lowest dose rate and measured 400 mR/hr on contact or a 41% reduction from the as-received section. The next best treatment was the electropolished and passivated section which had a 480 mR/hr contact dose rate or a 29% reduction from the as-received section. Surface treatment of as-received pipe resulted in 30 to 40% reductions in pipe dose rates and this data can be used to cost justify pipe surface treatments in the future. Data from other less effective surface treatments are also presented.[1]

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[1] Data collection and analysis provided by Radiological & Chemical Technology, Inc., 1700 Wyatt Drive, Suite 16, Santa Clara, CA 95054.

Authors' Biographies

David C. DiCello is Manager, Radiological Engineering, at the PECO Energy Company's Peach Bottom Atomic Power Station (PBAPS). He manages the overall implementation of the ALARA program at the station and supervises a staff of six (6) Radiological Engineers. He previously served as the Health Physics Technical Support Supervisor at PBAPS and as an in-plant Radiological Engineer at PECO Energy's Limerick Generating Station. Prior to joining PECO Energy, he worked as a Corporate Radiological Engineer for Long Island Lighting at the Shoreham Nuclear Power Station. Previously he worked at Princeton University as the Assistant University Health Physicist. He has a B.S. in Biological Services from the University of Pittsburgh and an M.S in Radiological Health from the University of Pittsburgh - Graduate School of Public Health. He is both comprehensively and power reactor certified by the American Board of Health Physics (ABHP).

PECO Energy Company
Peach Bottom Atomic Power Station, PS-1-1
RD1, Box 208
Delta, PA 17314-9739

Phone: (717) 456-4189
Fax: (717) 456-3574

R. Mark Moore is the Manager, Radiation Protection, at the PECO Energy Company's Peach Bottom Atomic Power Station (PBAPS). He manages the overall Health Physics program at Peach Bottom. Previous assignments with PECO Energy included Services Training Manager, Quality Assurance Engineer and Health Physics Technician. He holds a B.S. in Engineering from Widner University.

Richard P. Farrell is Manager, Support Health Physics at the PECO Energy Company's Peach Bottom Atomic Power Station (PBAPS). He manages the Technical Support group of Health Physics at the station. The group consists of 5 professional Health Physicists who generate the technical guidance for the station Radiation Protection program, including Dosimetry, Respiratory Protection, Instrumentation and Applied Health Physics procedures. Prior to working at PBAPS, he worked as a Corporate Health Physicist at the PECO Nuclear Group headquarters, Iowa Electric at the Duane Arnold Energy Center, and General Public Utilities at the Oyster Creek Nuclear Generating Center, where he worked as the Dosimetry Supervisor and a Senior Radiological Engineer respectively. He has a BS in Radiation Protection from the Thomas Edison State College and an MS in Health Physics from the Rutgers University Graduate School. He is a registered Radiation Protection Technologist and an Associated Member of the American Academy of Health Physics.