nuclear technology®

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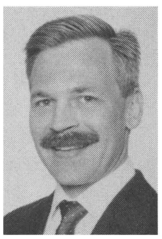
TMI-2: REMOTE TECHNOLOGY AND ENGINEERING

DATA ACQUISITION METHODS USED AT THREE MILE ISLAND UNIT 2

Rayford L. Patterson
Michael L. Estabrook
D. C. Wilson

Rayford L. Patterson (top) (AAS, drafting and design technology, Hinds Junior College) has been a field engineer in nuclear and fossil plant construction and maintenance for Bechtel Power Corporation since 1975, working in the mechanical and piping area. He is currently responsible for implementation of the data acquisitions tasks in the Three Mile Island Unit 2 (TMI-2) reactor building. His interests include plant design layout and systems engineering. **Michael L. Estabrook** (bottom) (BS, mechanical engineering, Washington State University) has 9 years of engineering experience, including 5 years in engineering supervision. He is currently assigned to the TMI-2 recovery program, where he has been involved in personnel management, developing and conducting training programs, designing special tooling, supervising remote equipment testing and operation, and developing equipment maintenance standards. **D. C. Wilson** (no photo available) (engineering, University of Connecticut) is a senior piping/mechanical field engineer with 16 years of nuclear power plant construction experience at various U.S. facilities. While at TMI-2, he was supervisor of the reactor disassembly group, primarily focusing on fuel removal techniques. His interests are in plant design and mechanical equipment operations.



FUEL REMOVAL EQUIPMENT FOR THREE MILE ISLAND UNIT 2

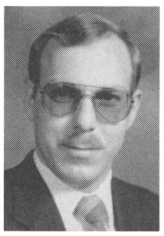
Gregory L. Calhoun

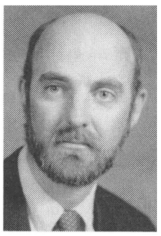
Gregory L. Calhoun (BS, mechanical engineering, University of Pittsburgh, 1967) is manager of reactor equipment services engineering in Westinghouse Electric Corporation's (WEC's) Nuclear Service Division. He is responsible for engineering and tooling design for the maintenance and repair of reactor equipment. He has 22 years of experience in the design, testing, inspection,

repair, and replacement of reactor components with WEC. In 1987, he was manager of defueling tooling at Three Mile Island Unit 2 on loan to GPU Nuclear Corporation.

DISASSEMBLY AND DEFUELING OF THE THREE MILE ISLAND UNIT 2 REACTOR VESSEL LOWER CORE SUPPORT ASSEMBLY

Lawrence H. Porter
William E. Austin

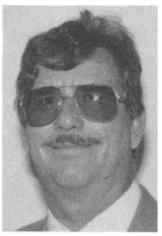




Lawrence H. Porter (top) (BS, nuclear engineering, Rensselaer Polytechnic Institute, 1977) is a senior engineer with GPU Nuclear Corporation (GPU). Since 1985 until recently, he was involved with the planning and defueling of the Three Mile Island Unit 2 (TMI-2) reactor vessel. He is now assigned to the TMI projects department of GPU. Previously he was a plant modification project engineer with Consumers Power Company and an engineer with the Naval Reactors, a division of the U.S. Department of Energy. **William E. Austin** (BS, engineering operations, North Carolina State University, 1969; MBA, College of William and Mary, 1973) is the TMI technical functions site manager with GPU. He joined GPU in 1981 and held various project management positions associated with the recovery of TMI-2. Most recently, he was assigned as task manager for the disassembly and defueling of the lower core support assembly of the damaged TMI-2 reactor. Previously, he was a senior engineer with Newport News Shipbuilding assigned to refueling and overhaul projects of the Naval Nuclear Program.

THREE MILE ISLAND UNIT 2 PREPARATIONS FOR DEFUELING

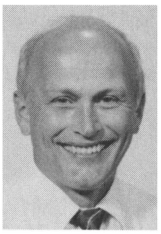
Paul M. Shearer
Sander Levin



Paul M. Shearer (right) (AS, drafting, Northwest Mississippi Junior College, 1958) is manager of refueling engineering tooling design at Three Mile Island (TMI). Following 24 years in shipyard naval nuclear work, he joined Bechtel National at TMI in 1983, where he has been involved in disassembling and defueling the TMI-2 reactor. **Sander Levin** (photo not available) (BA, physics, Franklin Marshall College, 1967) is director of defueling for TMI-2. Following 6 years in the U.S. Navy as an officer on board nuclear submarines, he joined GPU Nuclear Corporation in 1972 at TMI, where he has served in several positions involving operations, maintenance, engineering, and construction.

EX-VESSEL DEFUELING FOR THREE MILE ISLAND UNIT 2

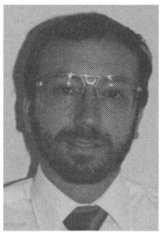
Robert J. Wolfgang
Rayford L. Patterson



Robert J. Wolfgang (top) (BS, mechanical engineering, University of Maryland, 1972) is a mechanical engineer at Bechtel North American Power Corporation (BNAPC). During his assignment at Three Mile Island Unit 2 (TMI-2), he was the task planning manager for ex-vessel defueling. He currently works on the Scrubgrass Power Plant project. His interests include plant operation and system engineering. **Rayford L. Patterson** (AAS, drafting and design technology, Hinds Junior College, 1975) is a field engineer in nuclear and fossil plant construction and maintenance for BNAPC in the mechanical/piping discipline. He is currently at the TMI-2 site primarily responsible for the implementation of data acquisition tasks in the TMI-2 reactor building. His interests include plant design layout and system engineering.

DEVELOPMENT OF REMOTELY CONTROLLED DEVICES FOR THREE MILE ISLAND UNIT 2

R. H. Fillnow
P. R. Bengel
David L. Giefer



Photographs and biographies of **R. H. Fillnow** and **P. R. Bengel** were not available at publication time. **David L. Giefer** (right) (MS, engineering, Kansas State University, 1974) is a senior engineering supervisor at Bechtel National. He is responsible for system and component design efforts related to mechanical, chemical, and nuclear systems. He worked at Three Mile Island Unit 2 for 8 years, and his responsibilities included the design and development of specialized systems to be used for decontamination, reactor defueling, and radiation area access. His current efforts involve the development of an advanced test stand for evaluation of bipropellant rocket engine components.

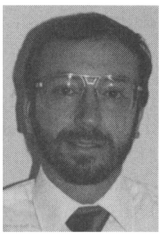
CONCEPTION AND DEVELOPMENT OF TWO MOBILE TELEOPERATED SYSTEMS FOR THREE MILE ISLAND UNIT 2

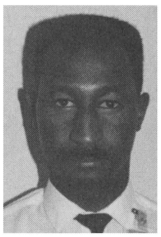
Leona E. Champeny
William L. Whittaker

Photographs and biographies of **Leona E. Champeny** and **William L. Whittaker** were not available at publication time.

IMPLEMENTATION OF REMOTE EQUIPMENT AT THREE MILE ISLAND UNIT 2

David L. Giefer
Andre B. Jeffries

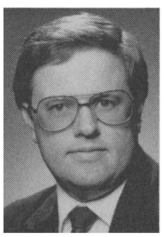


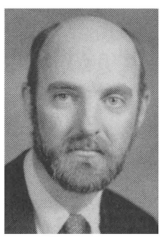


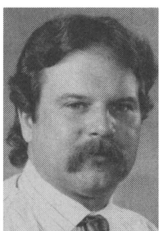
David L. Giefer (top) (MS, engineering, Kansas State University, 1974) is a senior engineering supervisor at Bechtel National. He is responsible for system and component design efforts related to mechanical, chemical, and nuclear systems. He worked at Three Mile Island Unit 2 (TMI-2) for 8 years, and his responsibilities included the design and development of specialized systems to be used for decontamination, reactor defueling, and radiation area access. His current efforts involve the development of an advanced test stand for evaluation of bipropellant rocket engine components. **Andre B. Jeffries** (BS, electrical engineering, Alabama University–Normal, 1985) is an electrical engineer with Bechtel National. He is responsible for instrumentation, control, and power distribution systems. He worked with the robotic and defueling engineering groups for $3\frac{1}{2}$ years at TMI.

PERFORMANCE OF THE AUTOMATED CUTTING EQUIPMENT SYSTEM DURING THE PLASMA CUTTING OF THE THREE MILE ISLAND UNIT 2 LOWER CORE SUPPORT ASSEMBLY

Michael S. McGough
William E. Austin
George J. Knetl





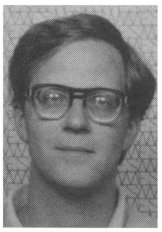


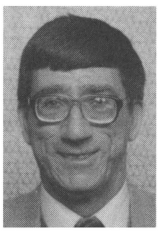
Michael S. McGough (top) (BS, physical metallurgy, Washington State University; MBA, University of Pittsburgh) is vice president of sales and marketing for PCI Energy Services. **William E. Austin** (center) (BS, engineering operations, North Carolina State University, 1969; MBA, College of William and Mary, 1973) is the Three Mile Island (TMI) technical functions site manager with the GPU Nuclear Corporation (GPU). He joined GPU in 1981 and held various project management positions associated with the recovery of TMI-2. Most recently, he was assigned as task manager for the disassembly and defueling of the lower core support assembly of the damaged TMI-2 reactor. Previously, he was a senior engineer with Newport News Shipbuilding assigned to refueling and overhaul projects of the Naval Nuclear Program. **George J. Knetl** (bottom) has been involved in numerous nuclear plant repair and modification efforts. He

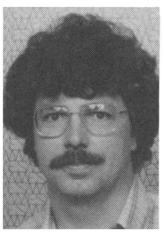
has been closely involved in the development and field implementation of electric discharge machining techniques for reactor internals modification efforts. He was the PCI on-site project manager for the duration of the implementation of the automated cutting equipment system at TMI-2.

CRITICALITY ANALYSIS SUPPORT FOR THE THREE MILE ISLAND UNIT 2 FUEL REMOVAL OPERATIONS

Cecil V. Parks
Robert M. Westfall
B. L. Broadhead



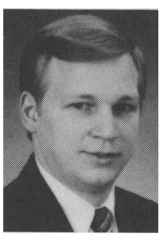




Cecil V. Parks (top) (BS, nuclear and mechanical engineering, 1976, and MS, nuclear engineering, 1978, North Carolina State University; PhD, nuclear engineering, The University of Tennessee, 1985) is head of the Reactor and Fuel Cycle Analysis Section of the nuclear engineering applications department of Martin Marietta Energy Systems at Oak Ridge National Laboratory (ORNL). Since 1980, he has been project leader for the SCALE code system. He has extensive experience in spent-fuel characterization, criticality safety analysis, and shielding associated with away-from-reactor applications. **Robert M. Westfall** (center) (BS, engineering physics, University of Oklahoma, 1962; MS, nuclear engineering, University of Washington, 1963; PhD, nuclear engineering, University of Virginia, 1974) is head of the nuclear engineering applications department of Martin Marietta Energy Systems at ORNL. His 25-year career at ORNL, Centre d'Etudes Nucléaires at Saclay, and National Aeronautics and Space Administration Lewis Research Center has been devoted to the computational aspects of reactor physics. His interests include cross-section preparation and transport analyses for criticality safety, radiation shielding, and reactor design studies. **B. L. Broadhead** (bottom) (BS, nuclear engineering, Mississipppi State University, 1977; MS, 1979, and PhD, 1983, nuclear engineering, The University of Tennessee) is a staff member of the Reactor and Fuel Cycle Analysis Section in the nuclear engineering applications department of Martin Marietta Systems at ORNL. His current research interests are in the areas of spent-fuel characterization, shipping cask shielding studies, and criticality safety determination.

CRITICALITY PREVENTION DURING POSTACCIDENT DECONTAMINATION OF THREE MILE ISLAND UNIT 2 PLANT SYSTEMS

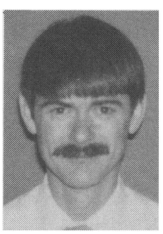
Gerald L. Palau



Gerald L. Palau (BS and MS, nuclear engineering, Pennsylvania State University) is manager of Bechtel National's radwaste operations support groups at the Limerick and Peach Bottom nuclear power stations. He has spent 6 years working on the Three Mile Island Unit 2 recovery project, primarily in the area of plant decontamination. Prior to that, he was a U.S. Department of Energy fellow at Pennsylvania State University.

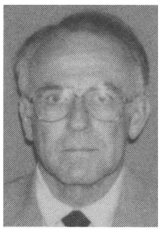
THREE MILE ISLAND UNIT 2 LICENSING HISTORY

James J. Byrne
Robert E. Rogan



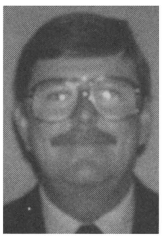
James J. Byrne (right) (BS, civil engineering, University of Pittsburgh, 1974) is the manager of Three Mile Island Unit 2 (TMI-2) licensing and has been involved in licensing the TMI-2 cleanup since 1980. His primary interests are nuclear licensing and the U.S. Nuclear Regulatory Commission (NRC) regulatory process. Prior to joining GPU Nuclear Corporation (GPU), he worked as a licensing engineer for Sargent & Lundy and served in the

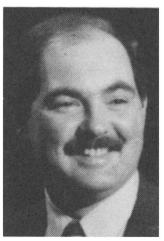
nuclear Navy. **Robert E. Rogan** (right) (MS, nuclear physics, Tulane University, 1968) is director of TMI-2 licensing and nuclear safety at GPU. He directs licensing and regulatory activities in support of the TMI-2 cleanup program and provides the independent safety review, programmatic nuclear safety oversight, and risk assessment functions in support of the project as well as the primary interface with the NRC on licensing and regulatory matters. He serves as principal advisor to senior project and corporate management on nuclear safety and regulatory affairs. He joined GPU in 1980 after completing 25 years of service in the U.S. Army, where he participated in the Atomic Energy Speciality Program and played an active role in military weapons systems research and development and the development of associated deployment strategies.



APPLICATION OF THREE-DIMENSIONAL COMPUTER SOLIDS MODELING TO THREE MILE ISLAND UNIT 2 DEFUELING ACTIVITIES

Richard D. Schauss
David K. Cowser
Michael J. Kelley





Richard D. Schauss (top) is an independent consultant with 19 years of experience in the nuclear industry with focus on development of technical computer applications in support of operational programs for radiation protection and engineering. His past accomplishments include the design and implementation of on-line radiation exposure management systems as well as the design of RADMAPS, a state-of-the-art radiation mapping system, and other specialized applications that integrate with three-dimensional plant configuration models. In addition to computer-aided design and three-dimensional solids modeling, his current interests include interactive multimedia systems for the integration and communication of complex technical information. **David K. Cowser** (center) (BS, mechanical engineering, University of Tennessee, 1982) is project engineer for the recovery of the damaged Three Mile Island Unit 2 (TMI-2) reactor. He has had extensive experience in the use of remote technologies to install, maintain, and decommission equipment and facilities used in fuel processing, isotope production, and reactor defueling. His interests include systems engineering, value engineering, and productivity improvement. **Michael J. Kelley** (bottom) (design drafting, Northern Chester County Technical School) is a design supervisor at the TMI nuclear power plant for Construction Systems Associates and is involved in the development and application of three-dimensional computerized models of TMI-2 for defueling purposes and for TMI-1 design changes.