PREFACE

THREE MILE ISLAND UNIT 2 – REMOTE TECHNOLOGY AND ENGINEERING

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This issue of *Nuclear Technology* discusses remote technology and engineering applied in decontaminating, defueling, and decommissioning Three Mile Island Unit 2 (TMI-2).

The radiological hazards surrounding the reactor vessel eliminated typical hands-on approaches to decontaminate, defuel, and decommission the TMI-2 facility. Remotely operated vehicles were used to view, monitor, and record the physical and radiological conditions in the reactor building basement before finalizing decontamination plans. Remotely controlled manipulators were used extensively to operate decontamination tools and video cameras.

Defueling restraints (e.g., high-radiation levels and hard, resolidified reactor core materials) forced the development of sophisticated defueling equipment. A work platform, placed directly above the water-filled reactor vessel, allowed operators to stand directly above the reactor vessel and remove radioactive debris with long-handled tools. Drilling through the hard, resolidified core components, first for samples and eventually for dismantling, was accomplished with a purpose-built drill rig and hard-faced bits. Even the frequently performed reactor head and plenum removal had to be accomplished with remotely placed equipment.

Equipment used to characterize the reactor vessel internals incorporated radiation detectors in remotely operated devices that could swim through the reactor piping or were attached to long-handled tools that could reach deep into the reactor cavity.

After successfully removing the reactor core proper, plasma-arc cutting equipment, designed to operate under 35 ft of 5300-ppm borated water, separated the lower core support structure. Removing the support structure provided access to the lower head, where molten material had flowed and resolidified during the accident.

Three-dimensional computerized solids model of the reactor vessel and the purpose-built defueling tools provided a means of trying out prototype defueling procedures before tool fabrication. This resulted in saving time, cost, and exposure.

The techniques and equipment designed for TMI-2 decommissioning are currently being used at other nuclear facilities and are being incorporated in decommissioning plans worldwide. Transfer of the decontamination and decommissioning technology has been one of the beneficial accomplishments of the TMI-2 Recovery Program.