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TMI Unit-2 Technical Information & Examination Program

DISCLAIMER

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Submerged Demineralizer System Processes Contaminated Water

A major stage in the recovery and cleanup of the damaged TMI-2 reactor began in July with testing of an ion exchange water treatment process known as the Submerged Demineralizer System (SDS). The SDS will process 100,000 gallons of coolant in the reactor coolant system, and 600,000 gallons of more highly contaminated water from the basement of the Unit 2 containment building. Together with the containment entry program (see article, this issue) the cleanup of this water is one of the two major ongoing projects of the recovery program.

Removal of the contaminated water from the reactor building will significantly reduce the levels of direct and mobile airborne radiation present in the building. The water is a source of direct radiation to plant personnel who must go into the reactor building during containment entries to maintain plant systems. The removal of contaminated water, which entered the reactor building through an open relief valve during the accident more than two and a half years ago, is a necessary step in the recovery effort.

The SDS is an ion exchange process, similar to the EPICOR II system used earlier in the recovery effort to treat

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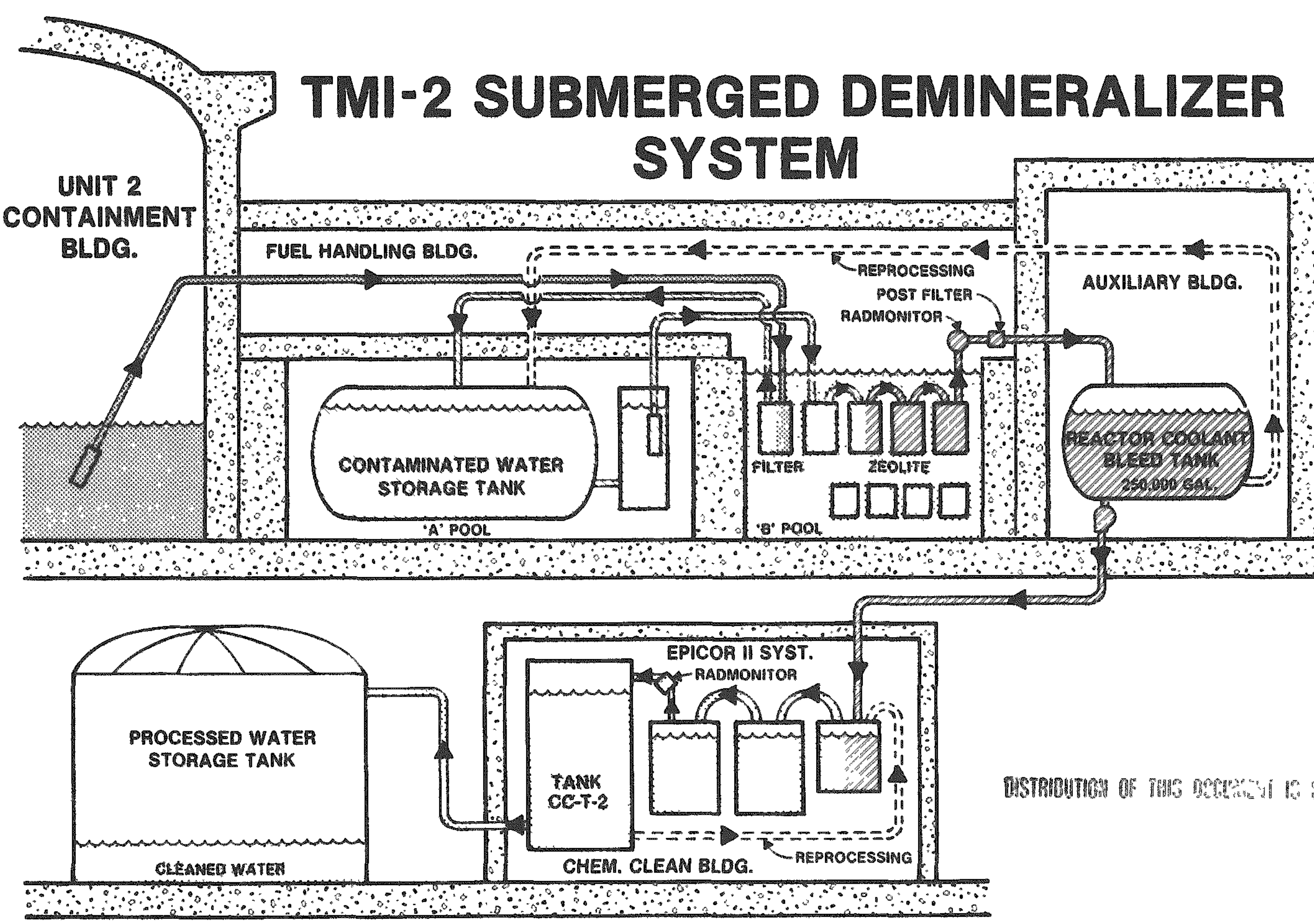

Submerged Demineralizer System being used to process contaminated water from the basement of the TMI Unit 2 containment building.

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Demineralizer System

Continued from Page 1

500,000 gallons of water in the less contaminated auxiliary building (see July 31, 1980 *Update*). The SDS differs from the EPICOR II in two major ways. First, the SDS operates under water in the Unit 2 spent fuel pool adjacent to the reactor building. This underwater operation protects plant workers from the high radiation levels.

Second, the SDS uses an inorganic material called zeolite, rather than the predominantly organic resins used in EPICOR II, to absorb the fission products from the water. The SDS zeolite is composed of 40 percent Linde ionsiv zeolite-A-51 and 60 percent Ionsiv zeolite-IE-96. The inorganic zeolite can accommodate loadings in excess of 20,000 curies per cubic foot, while resins in the EPICOR II system normally accomodate loadings less than an average of 40 curies per cubic foot. The ion exchange process in the SDS effectively removes more than 99 percent of the fission products, primarily cesium and strontium, from the contaminated water. The ion exchange media are expected to produce a decontamination factor in excess of 30,000 for cesium and 250 for strontium. Tritium, a fission product also present in the water, can not be filtered out because of its structural similarity to the hydrogen component of the water molecule.

Radioactive water from the basement of the reactor building is being pumped into the SDS in the spent fuel pool by means of a suction pump floating on the surface of the contaminated water (see accompanying figure). The water passes through preliminary filters and on to the zeolite resin canisters. After it passes through the zeolite canisters, the water can be stored in tanks, or can be processed further with the EPICOR II system. The further processing through EPICOR II is expected to produce an average decontamination factor in excess of 100 for cesium and strontium.

SDS processing of contaminated water generates radioactive waste in the form of filters and ion exchange resins laden with radioactive concentrates. This waste will be temporarily stored in the fuel pool adjacent to the demineralizer system or in specially constructed containers on site. The Department of Energy (DOE) plans to ship the SDS resins to DOE facilities for research, development, and testing purposes.

The processed water from the SDS still contains concentrations of tritium in excess of 0.8 microcuries (μCi) per milliliter. Until the Nuclear Regulatory Commission (NRC) approves final disposition of this water, it will be stored in various tanks on site. Potential on-site use of the water may include pumping it back into the reactor building to protect workers from residual radiation on the building's basement floor, and using the water in decontamination activities and in various plant systems. Most of the water to be processed will be stored in two specially constructed 500,000 gallon tanks on site.

Actual implementation of SDS testing was not possible until the third week of June, when the NRC approved its use. Approval was contingent upon the conduct of an NRC study of the environmental consequences of the entire recovery program. This study, now completed, concluded that the cleanup program as planned can proceed with little risk to plant personnel or the public. NRC approval of the SDS allowed plant technicians to begin test processing of water through the system. Approximately 150,000 gallons of less heavily contaminated water from the auxiliary building were processed during the summer of 1981, and processing of the reactor building sump water began in September.

By the end of the third week in October, the SDS system had processed approximately 123,000 gallons of reactor building sump water. The system processing rate is about 5 gallons of water per minute. Recovery program estimates indicate that it will take about four to five months to process the contaminated water in the TMI Unit 2 containment building.

The SDS cost $11 million to design and build. Its use will be a significant step toward the cleanup of the damaged TMI Unit 2 nuclear plant. SDS operation will also provide generic information to the nuclear industry regarding processing of high specific activity liquids.

First Multilevel Sample Taken

EG&G engineers developed a unique multilevel sampling device to obtain representative liquid and sludge samples from the 600,000 gallons of highly contaminated water in the TMI-2 containment building basement. The device, called Water and Sludge Sample Device (WSSD), was designed to obtain eight simultaneous 150-milliliter samples at four different levels. This technique will allow scientists and engineers to determine the extent of stratification and flocculant dispersal patterns in the eight and a half feet of water in the containment basement.

The lightweight aluminum device was designed for easy operation under adverse conditions inside the containment building. Unique features of the WSSD include the following:

- Acquires eight simultaneous samples at four levels, two near the liquid surface, two at the mid-level, two near the bottom, and two sludge samples
- Minimizes stratification disturbance
- Minimizes losses of flocculant during sampling by rapid sample acquisition
- Minimizes losses of entrained gas in the sample
- Permits exact sample locations to be determined relative to the basement floor
- Provides known sample volumes
- Ensures that outside of sample bottle remains contamination-free by using watertight bottle housings
- Allows immediate visual observation of the sample

In addition lightweight design of the WSSD permits operation by one individual.

The lower portion of the WSSD is shown in the accompanying photograph. Evacuated sample bottles are placed septum down into the shield base to engage with an O-ring to form the lower watertight seal. Installation of the shield cap over the shield base

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Sample Taken

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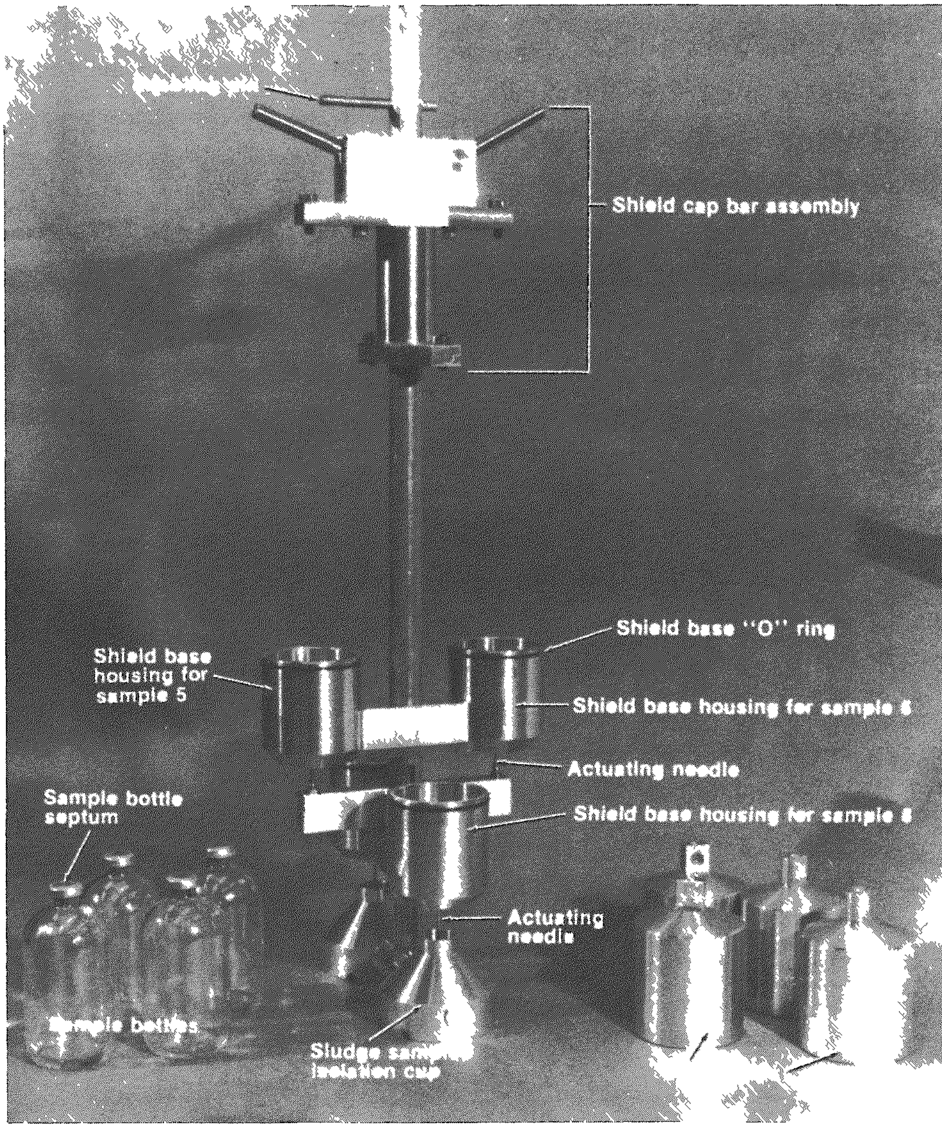
engages the outer shield base O-ring to complete the watertight anticontamination seal of the containment housing around each bottle. The shield caps are securely locked into position by a fast-acting shield cap bar ratchet assembly. The locking bar ratchet assembly permits rapid unlocking and removal of the shield caps to minimize personnel operating time and radiation exposures. The sludge sample isolation cup at the base of the WSSD traps an area of sludge on the basement floor, and maintains the actuating needle suction point as close to the floor as possible in order to ensure representative sampling.

After the WSSD is lowered into the proper position in the containment basement, an enabling pin is removed, and sample acquisition is initiated by plunger action. This action drives the actuating needles through the sample bottle septums, causing liquid or sludge samples to be rapidly forced into the evacuated bottles. When the WSSD is raised, the bottles retract from the needles and the self-sealing septum prevents any loss of sample material. The WSSD is raised from the basement to the 305-foot elevation, and technicians remove the shield caps. This exposes the sample bottles which,

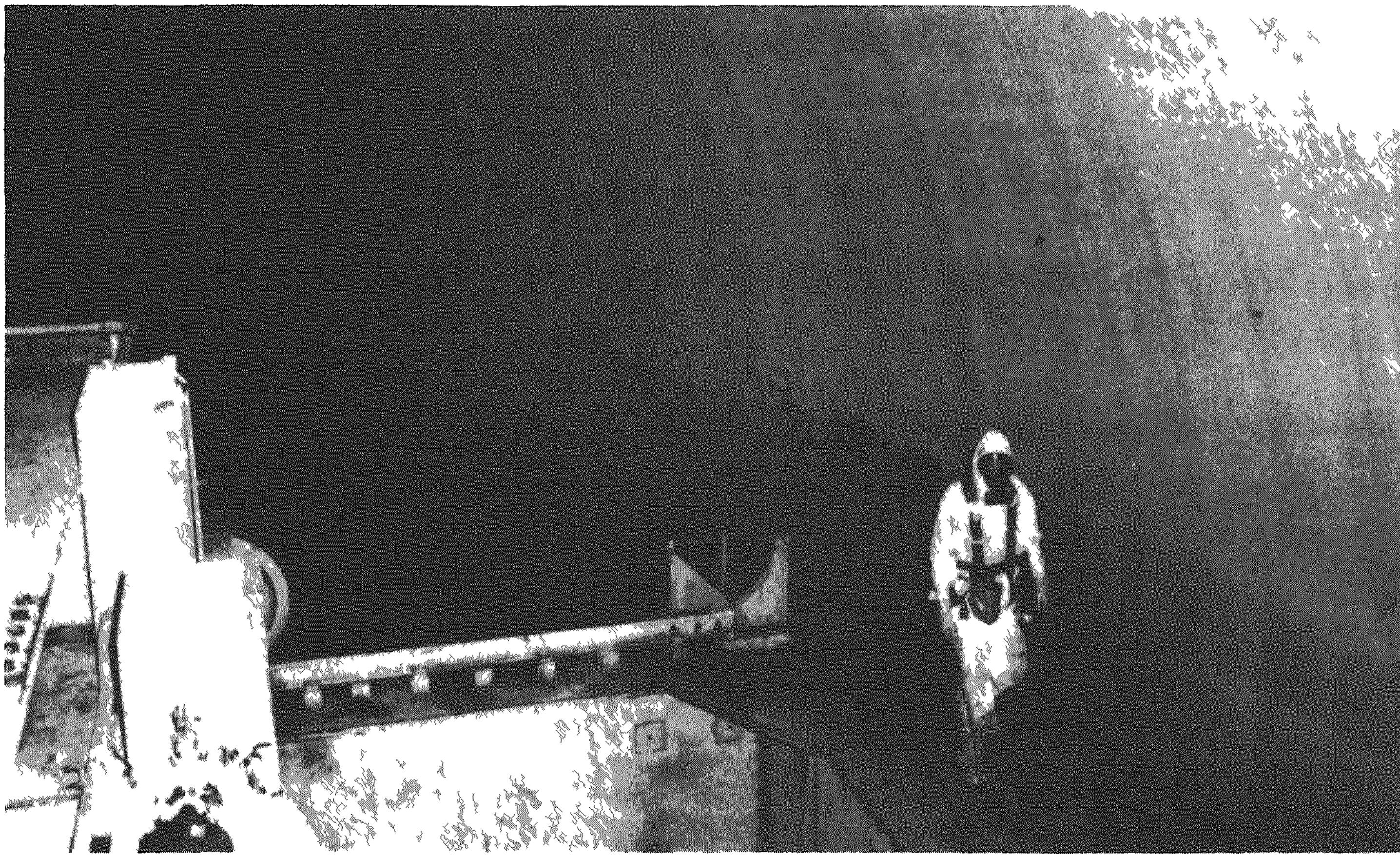


Lower Portion of the Water and Sump Sampling Device

Table 1. TMI-2 reactor building basement water sample analyses results[a]

Sample Number:	1	3	6	8		
				Slurry	Supernate	Particulate
Nuclide	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/g solids)
^{54}Mn	ND[b]	ND	ND	>2E-04	NA[c]	ND
^{60}Co	>6E-04	>3E-03	>2E-03	>8E-04	NA	1.7 ± 0.2E+01
^{90}Sr	5.0 ± 0.2E+00	5.4 ± 0.2E+00	5.2 ± 0.2E+00	NA	NA	8 ± 2E+02
^{90}Sr	5.4 ± 0 5E+00	5.2 ± 0 5E+00	5.1 ± 0.5E+00	NA	5.3 ± 0.5E+00	7.8 ± 0.8E+02
^{106}Ru	ND	ND	ND	>4E-04	NA	ND
^{125}Sb	>3E-02	>3E-02	>3E-02	>5E-02	NA	4.5 ± 0.2E+02
^{129}I	5.5 ± 0.7E-06	5.4 ± 0.7E-05	3.8 ± 0.5E-06	NA	2.5 ± 0.5E-06	NA
^{134}Cs	1.85 ± 0.01E+01	1.84 ± 0.01E+01	1.86 ± 0 01E+01	1.87 ± 0.01E+01	NA	1.79 ± 0.04E+02
^{137}Cs	1.43 ± 0.01E+02	1.42 ± 0.01E+02	1.43 ± 0.01E+02	1.44 ± 0.01E+02	NA	1.29 ± 0.01E+03
^{144}Ce	ND	ND	ND	>8E-03	NA	7.6 ± 0.6E+01
	(μg/ml)	(μg/ml)	(μg/ml)	(μg/ml)	(μg/ml)	(mg/g solids)
^{235}U and ^{239}Pu	<1E-02	<1E-02	<1E-02	NA	NA	8.8 ± 0.9E-02
^{238}Pu	4 ± 1E-08	NA	NA	5 ± 1E-07	NA	5 ± 1E-07
^{239}Pu	2.2 ± 0.7E-04	NA	NA	2.6 ± 0.5E-03	NA	2.9 ± 0.6E-03

a. Concentrations as of 6-1-81.
b. ND = not detected.
c. NA = not analyzed.



The preliminary polar crane inspection was the first in a series of inspections to determine the general condition of the crane and to conduct overall area damage assessments and radiation surveys.

Preliminary Inspection of Polar Crane Complete

A four-man team performed the preliminary inspection of the TMI-2 reactor building polar crane during containment entry 13. The inspection included opening and inspecting the drive train and main hoist gear boxes, conducting motor winding resistance checks, performing visual inspections of the motors' internals through their inspection ports, and conducting overall area damage assessments and radiation surveys. This inspection was the first in a series of detailed inspections to determine the general condition of the crane and to provide early assessments of which components may require replacement.

The polar crane work is an essential part of the TMI-2 recovery and R&D efforts, since the crane is required to remove missile shields and the reactor vessel head. The two major areas of R&D interest include electrical and mechanical component survivability. The Technical Integration Office's Instrumentation and Electrical program will focus its efforts on determing the survivability of such components as limit switches, motors, loadcells, and control cabinets. The Electric Power Research Institute's Mechanical Components program will focus its efforts on determining the survivability of such components as reduction gears, cable drums, and wire rope. These efforts will not only provide the data necessary for GPU to determine the extent of reburbishment required, but will also contribute valuable information to overall understanding of the the reactor building environment during the accident.

Sample Taken

Continued from Page 3

free of external surface contamination, are loaded into lead-shielded shipping containers.

The WSSD was successfully used on May 14, 1981 during containment entry 10 to obtain eight TMI-2 containment basement water samples. The samples were shipped to the Idaho National Engineering Laboratory for analysis and archiving. Four samples were archived, and the preliminary analytical results of the other four are shown in the accompanying table.

Each of the four samples analyzed was taken at a different level relative to the basement floor. Sample 1 was taken at 84-3/4 inches above the floor; sample 3 was taken at 47-3/4 inches; sample 6 at 5-3/8 inches; and sample 8 at the basement floor itself. Sample 8 contained solids as well as liquid, and both of these were analyzed in the study. The table contains data from nuclide analyses conducted for the gamma emitters (cesium-137 and -134), for the beta emitter (strontium-90), for the x-ray emitter (iodine-129), and for fissile material. In addition the presence of cerium-144, antimony-125, and cobalt-60 were observed and were quantitatively measured where possible. All data gathered in these analyses are currently undergoing further detailed analysis.

TMI Containment Entry Highlights

A total of eight successful containment entries have been completed since the last issue of the *Update*. Following are highlights of the key tasks performed during these entries:

Entry 6

This entry was conducted over a two-day period, February 3 and 4, 1981. Eight closed circuit TV cameras were installed; decontamination tests and photographic surveys of damage were conducted on the 347-foot elevation (see photo); radiation surveys were made; and various samples of paint chips and other material were obtained from the 347-foot elevation.

Entry 7

This entry was conducted over a three-day period, March 17, 18, and 19, 1981. Three one-liter samples and one 150-milliliter sample of the water in the containment building basement were obtained using a roto-flex pump. A zeolite column was installed and operated to obtain five gallons of processed effluent from the basement water for the Submerged Demineralizer System (SDS) development data (see SDS article, this issue). Detailed radiation and photographic surveys were conducted in the in-core instrumentation tunnel area to support the sump surface suction plan for the SDS. In addition, the first radiation surveys were conducted at the top of the CRDM service structure (see photo).

Entry 8

This entry was conducted on April 8, 1981. A photographic survey and a general reconnaissance of the area at the 305-foot elevation open stairwell were conducted. Closed circuit TV cameras numbers 4 and 7, which were installed in entry 6, were repositioned (see photo), and the power source for camera number 7 was changed.

Entry 9

This entry was conducted on April 30, 1981. The cover of penetration R-561 was removed in preparation for entry 10 decontamination testing. GPU's SDS sump pump was installed through the open stairwell, and a photographic history of the pump installation was made. A photographic survey of electrical penetrations R-504 and R-509 was made for the Instrumentation and Electrical program. A radiation survey of zeolite resin columns used in entry 7 was conducted. The scaffolding used to install the closed circuit TV cameras in entry 6 was dismantled.

Entry 10

This entry was conducted on May 14, 1981. Safety equipment was installed on accessible portions of the polar crane. Radiation and smear surveys were conducted on the control rod drive mechanism service structure internals. Entry team members obtained six water and two sludge samples from the containment basement using EG&G's Water and Sludge Sampling Device (see article, this issue). They also performed the first large-scale

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Technicians entering the TMI-2 containment building in one of a series of manned entries into the building.
(GPU Nuclear Photo by Don Shoemaker)

Entry Highlights

Continued from Page 5

decontamination experiment on the 305-foot elevation using an initial spray mist and a combination of low pressure and high pressure sprays. In addition, a post-decontamination experiment cleanup was performed.

Entry 11

This entry was conducted on May 28, 1981. Areas where large-scale decontamination experiments were conducted during entry 10 were protected from recontamination by using contamination control areas and procedures (see photo). Entry team members completed installation of polar crane safety equipment, transferred a portable gamma spectrometer into the reactor building, and obtained three floor scans on 305-foot elevation which included three area spectra and three background spectra. Technicians replaced radiation monitor HP-R-213 on the 347-foot elevation with a new instrument, and replaced the GAI-tronics paging telephones on the 305- and 347-foot elevations with new ones. The team members also performed radiation and photographic surveys of the pilot-operated relief valve and other general areas within the east D-ring (or biological shield) and connected SDS hoses to the R-626 penetration.

Entry 12

This entry was conducted on June 25, 1981. Closed circuit TV camera number 4 was replaced, and the connectors on camera number 7 were repaired. Entry team members performed maintenance and modification tasks on lighting panel LPR-3A and the GAI-tronics telephone system, they installed temporary lighting in the enclosed stairwell, and they performed smear surveys on the walls at the 305- and 347-foot elevations. Loose samples of peeling paint were obtained at the 305-foot elevation near core flood tank B, at an electrical box at the 347-foot elevation, and from the containment dome on the floor north of the open stairwell at the 347-foot elevation.

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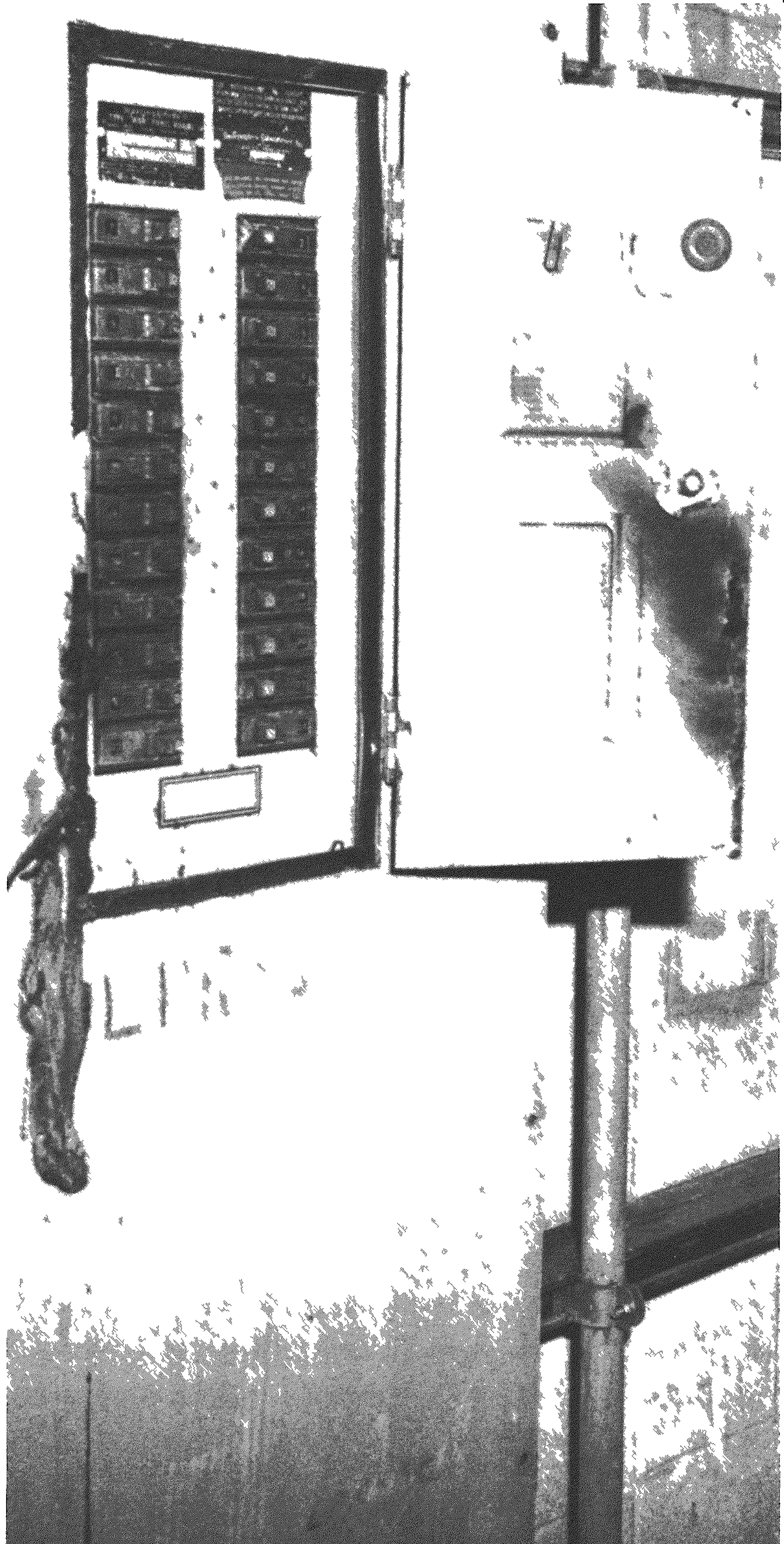

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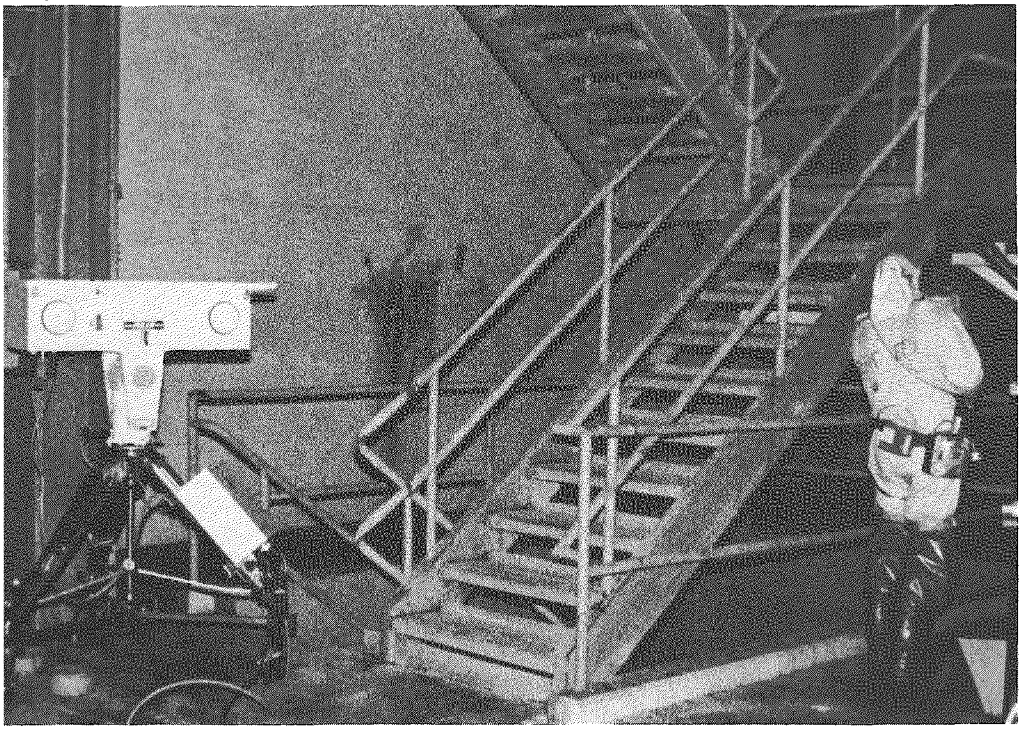

Closed circuit television camera number 4 at open stairwell on the 305-foot elevation. *(TIO Photo Entry 8)*

Physics technician performing the first radiation survey on the top of the control rod drive mechanism service structure. *(TIO Photo Entry 7)*

lighting panel LPR-3C on
levation.
to Entry 6)

Technicians remove outer set of protective shoe covers at contamination control area on the 305-foot elevation. *(TIO Photo Entry 11)*

Entry Highlights
Continued from Page 7

Entry 13
This entry was conducted on July 1, 1981. This entry was made to perform radiation surveys and to complete the polar crane inspection which had to be aborted during entry 12 due to problems with personnel airlock no. 2.

Entry 14
This entry was conducted on July 23, 1981. Closed circuit TV camera number 2 was replaced and connectors on camera number 8 were repaired. Team members obtained a 150-milliliter sample of the water under personnel airlock number 1 and a sample of the white crystal accumulation on the floor of the 347-foot elevation by the in-core instrumentation seal table. Water samples from the neutron shield tanks could not be obtained because the tanks are empty. Photographic surveys were taken of the air coolers and some selected instruments. Beta and gamma radiation and smear surveys were conducted on the reactor vessel service structure and the refueling pool floor. Entry team members removed core flood tank transducers CF1-PT4 and CF2-LT4 for analysis and installed a continuous air monitor and an area radiation monitor. In addition, Radiological Engineer Della Loggia became the first woman to enter the TMI-2 containment since the accident.

Entry 15
This entry was conducted on August 27, 1981. Spectra from scans of the floor on the 305-foot elevation were obtained by gamma spectrometry. Overhead beta and gamma and smear surveys on core flood tanks 1A and 1B and on platforms on the east side of the reactor building were also obtained. In addition, a remote radiation survey of the deep end of the refuel pool, a smear survey on the mezzanine, and a survey around the open stairwell were also obtained. One entry team inspected the steam generator cleaning line and obtained several photographs of the area. Another team replaced closed circuit TV camera number 8 with a new camera box and installed new wires and a control box on camera number 5. Reactor building nitrogen pressure alarm switch NM-PS-1454 was replaced, and flow transmitter MU-10-FT1 was removed. The last entry team performed air cooler inspections and took photographs of the motors. They also obtained some thermocouple readings.

Entry 16
This entry was conducted on September 24, 1981. Two teams photographed various penetrations and inventoried the defueling tools in the building. One of the teams inspected the air cooler fan motors, removed three fan motor covers, and obtained one resistance temperature device reading. The third, team obtained a sump water sludge sample at the open stairwell using EG&G's Water and Sludge Sampling Device (see article, this issue). The fourth team performed containment characterization surveys on the 347-foot elevation.

Department of Energy Ships EPICOR II Resin Canister To Research Facility

An EPICOR II resin canister from a contaminated-water treatment system at TMI-2 was shipped to Battelle Columbus Labs (BCL) in West Jefferson, Ohio on May 19, 1981. The Department of Energy (DOE) coordinated the shipment of the resin canister to the Ohio research facility.

The canister, a prefilter referred to as the PF-16 liner, is one of a total of more than 50 highly loaded EPICOR II liners used in processing contaminated water in the auxiliary building at the damaged Unit 2 reactor. DOE will sponsor research to determine the condition of the highly loaded resins and liners after they have been stored for long periods. The selected liner was used March 3 and 4, 1980 to process 8250 gallons of contaminated water from the auxiliary building. The PF-16 is one of the most highly radioactive resin liners used in the EPICOR II system, with a loading of approximately 1300 curies of cesium-137 and strontium-90.

Loading the EPICOR II resin canister for shipping.

Researchers at BCL have begun a variety of tests on the liner. These tests include resin sampling analysis, gas and liquid sampling analysis, visual examination of the liner, and various other studies of its chemical and radiological makeup. The tests will continue over several months; analytical results on these studies will be published in future issues of the *Update* as data become available.

BCL analysis of the PF-16 liner will contribute to the development of technology for storing, processing, and disposing of contaminated resin liners. Some specific goals of the program include acquisition of data for:

- Developing short-term storage requirements for such liners
- Developing storage canisters and disposal requirements for permanent burial
- Determining the effects of long-term storage on these resins and canisters
- Developing other options for processing the resins

The PF-16 liner was shipped to Battelle in a high integrity shielded cask mounted on a low-boy tractor trailer (see photo). The liner is 48 inches in diameter and 60 inches high, and contains approximately 32 cubic feet of ion exchange media. It was shipped in a licensed type B cask, 92 inches high and 85 inches in diameter. The cask walls consist of two one-inch layers of steel separated by three and one half inches of lead. The cask was designed to resist extreme environmental stresses such as fire and immersion in water.

Although the PF-16 liner was the first highly loaded resin canister to leave the island since the 1979 accident, General Public Utilities (GPU) shipped 22 low level radioactive resin canisters from the EPICOR II system to a burial site in Hanford, Washington between April 22 and June 28, 1981. The last canister shipment arrived in Hanford on June 30, 1981. The radiation levels of these shipments were lower than those of routine low level wastes from other nuclear power plants.

PF-16 liner leaving TMI for characterization at Battelle Columbus Labs. *(GPU Nuclear Photo)*

TMI-2 GEND Reports Available to the Public

In the continuing effort to distribute information about the TMI-2 cleanup and recovery effort to the nuclear industry, twelve reports on various aspects of the Technical Information and Examination Programs (TI&EP) have been published. A brief description of each of these reports is offered below, along with the formal report title, its number, and its date of publication. These reports are available from the Technical Information Center, U.S. Department of Energy, Oak Ridge, Tennessee 37830.

GEND Planning Report. GEND 001, published October 1980. The report describes overall plans for the Technical Information and Examination Programs as established by the GEND group: General Public Utilities, the Electric Power Research Institute, the Nuclear Regulatory Commission, and the Department of Energy.

Facility Decontamination Technology Workshop' November 27-29, 1979, Hershey, Pennsylvania. GEND 002, published October 1980. This report provides a record of decontamination and dose reduction activities at other facilities. The report is in the form of published proceedings of the decontamination technology workshop.

TMI-2 Information and Examination Program Technical Integration Office Annual Report. GEND 003, published February 1981. The annual progress report discusses activities conducted under the DOE portion of the TI&EP during FY-1980.

Interim Status Report on Personnel Dosimetry. GEND 004, published June 1981. Dosimetry studies documented in this report surveyed available dosimeter systems, set up a prototype system, and compared the prototype with the commercial systems.

Characterization of the Three Mile Island Unit 2 Reactor Building Atmosphere Prior to the Reactor Building Purge. GEND 005, published May 1980. Samples of the TMI-2 containment atmosphere taken prior to the krypton-85 venting were analyzed for radionuclide concentrations and for gaseous molecular components. The sampling procedures, analysis methods, and results are summarized in this report.

Three Mile Island Unit 2 Core Status Summary: A Basis for Tool Development for Reactor Disassembly and Defueling. GEND 007, published May 1981. The report summarizes TMI-2 core damage analytical assessments performed by reconstructing the sequence of events, by estimating the amount of hydrogen generation, and by evaluating the amount of fission products released.

Report on Citizens Radiation Monitoring Program. GEND 008, published July 1981. The Citizens Radiation Monitoring Program developed a system for citizens to independently measure radiation levels in and around their communities. The report describes the program and its results.

Measurements of I-129 and Radioactive Particulate Concentrations in the TMI-2 Containment Atmosphere During and After the Venting. GEND 009, published April 1981. The report discusses the equilibrium concentration and species distribution during and after the reactor building krypton-85 venting. Concentrations of iodine-129, krypton-85, cesium-134, cesium-137, and strontium-90 were measured during the venting operation and are reported here.

In-Vessel Inspection Before Head Removal (Conceptual Development). GEND 010 PHASE I, published August 1981. This first phase of a three-part report deals with conceptual development of the core inspection project. Concepts are described for internal inspection of the reactor vessel and fuel assemblies prior to removal of the reactor vessel head.

In-Vessel Inspection Before Head Removal (Tooling and Systems Design). GEND 010 PHASE II, published July 1981. This Phase II report discusses designs of the concept, procedures, and tooling descriptions presented in the Phase I report. Preliminary procedures for beginning the work are also presented.

Canister Design Considerations for Packaging TMI-2 Damaged Fuel and Debris. GEND 011, published October 1981. This document reviews requirements and provides design concepts for a standardized canister for packaging damaged fuel and core debris.

TMI-2 Reactor Building Purge—Kr-85 Venting. GEND 013, published March 1981. A comprehensive technical report is presented on the total effort involved in decontaminating the reactor building atmosphere by venting the contained krypton-85 to the environment.

Accountability Study for TMI-2 Fuel. GEND 016, published May 1981. The Accountability Study considers problems of identifying, measuring, and accounting for TMI-2 fuel in its present condition and as it is removed from the core and examined. The study identifies methods which will provide a material balance equal to the pre-accident balance.

Technical Integration Office Reorganized

The Technical Integration Office at DOE's Three Mile Island Site Office has been reorganized to accomodate the expanded research effort of the program over the next several years. The program has been separated into two major areas of activity: the Data Acquisition Program and the Waste Immobilization and Reactor Evaluation Program. Both of these programs fall under the overall title of the TMI-2 Technical Information and Examination Programs, or TI&EP.

Data Acquisition Program activities will include the Configuration and Document Control Center, the Instrumentation and Electrical Program,

Continued on next page

the Radiation and Environment Program, the Off-Site Core Examination Program, and the Radwaste Technology Development Program. The Waste Immobilization Program will conduct zeolite and resin disposition studies; and the Reactor Evaluation Program will conduct core damage assessment, reactor disassembly studies, and fuel and core storage and disposal research and development. The reorganization became effective October 1, 1981 with the start of the new fiscal year.

TMI Unit-2 Technical Information & Examination Program

The *TI&EP Update* is issued by the EG&G Idaho, Inc., Configuration and Document Control Center at Three Mile Island under contract DE-AM07-76IDO1570 to the Department of Energy, P.O. Box 88, Middletown, PA 17057. Telephone 717 948-1050 or FTS 590-1050.

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TMI Unit-2 Technical Information & Examination Program

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