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U.S.A. **H-223**

PERMANENT SHIELDING DESIGN AND INSTALLATION FOR DRESDEN UNIT 2

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Objectives: To develop and install permanent shielding for high dose rate components of Dresden unit 2.

At the beginning a feasibility study was carried out. One objective was to find a suitable permanent shielding material. Coated lead sheets, water shields, lead wool blankets and lead shadow shields were the kinds of shielding material available. Among these none was found to be suitable. This lead to development of Shielded Metallic Reflective Insulation (SMRI).

A pilot project was carried out. The reactor recirculation (RR) piping, a large contributor to drywell dose rates, was selected to be shielded. Hot spots were to be shielded during the pilot project, seismic qualification of SMRI was to be performed and SMRI material was to be qualified.

During phase 2 the chemical decontamination of RR were below expectation so the scope of SMRI shielding was increased.

Comments: Advantages of SMRI are:

1. Most effective shielding material available e.g provides twice the shielding of temporary lead blankets.

2. Very large dose rate reduction - from 1.5 rem to 150 mrem on end caps; 500 mrem to 100 mrem on risers.

3. More thermally efficient than MRI, constructed of heavier gauge stainless steel, more rugged and dent resistant than MRI.

4. Seismically qualified; has a professional appearance.

5. Permanent shielding so saves exposure even during forced outages, avoids installing large amounts of temporary shielding so saves outage time, eliminates labor expense and probability of personal injury during outages.

6. Saves the expense of 11 analyses per outage for temporary shielding packages.

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Disadvantages are:

1. Relatively high initial cost.

2. Relatively high installation dose - 35 person-rem.

3. SMRI material is heavy - 60 to 120 lbs per piece.

Remarks: Estimated exposure savings are 50 person-rem per outage. 10 person-rem per outage were eliminated by avoidance of installation and removal of temporary shielding.

Future plans are:

1. Install SMRI on Dresden Unit 3 recirculation system.

2. Install SMRI on following systems at LaSalle:
   - RR and RHR systems for units 1 and 2
   - On bottom head drain piping
   - On RWCU piping
   - On wetwell penetrations

In summary the investment expense for SMRI can be recovered in one outage through:

- Person-rem savings
- Outage time savings
- Expense savings by not installing temporary shielding

References: Olson, D., and P. Hamby, "Permanent Shielding Design and Installation at Dresden Unit 2," Proceedings, EPRI Radiation Field Control and Chemical Decontamination Seminar, Tampa, Florida, November 6, 1995, available from Electric Power Research Institute, EPRI Distribution Center, P.O. Box 23205, Pleasant Hill, CA 94523.

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