

**BNL ALARA CENTER****Processes and Practices Related to Occupational Dose**

ID: 41

**REACTOR VESSEL HEAD SHIELD****Keywords:** RADIATION SHIELDING; REACTOR VESSEL; SHIELDING; REACTOR HEAD SHIELD; RV HEAD SHIELD**Description:**

A major portion of dose expended to refuel a pressurized water reactor occurs during head removal and replacement, primarily associated with stud tensioning and detensioning. Dose from these operations range from 30-70 man-rem/refueling. Temporary and permanent reactor vessel head shields have been developed to reduce the dose rates in the cavity. Temporary reactor head shields are in use at Trojan, Zion, Indian Point 2, Connecticut Yankee, Crystal River, Farley and others. They have saved 20-30 man-rem/refueling. Permanent reactor head shields have been installed at Surry 1 & 2 and North Anna 1 & 2. It has been estimated that each shield will save about 43 man-rem/refueling.

**References and Selected Abstracts:**

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2. Wagner, D. et al., "Evaluation of a Permanent Reactor Vessel Head Shield," Radiation Protection Management, January/February 1988, pp. 49-53.
3. Institute of Nuclear Power Operations, "Reactor Vessel Head Shield" REN/OEN-02, December 1981 (INPO, 1100 Circle 75 Parkway, Atlanta, GA 30339).
4. Northard, S., "Less Man-Rems at Prairie Island," Nuclear Engineering International, April 1986, p. 52.