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FEEDWATER IRON CRUD REDUCTION FOR CHINSHAN NUCLEAR POWER STATION

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Objectives: This paper describes the operating history of Chishan Nuclear Power Station and the methods of iron crud identification and reduction used there.

Comments: Chinshan Nuclear Power Station consists of twin 636 megawatt BWRs located about 40 km north of Taipei. They were put into commercial operation in 1978 and 1979. In 1985, aluminum brass condenser tubing was replaced with titanium tubing. The iron crud concentration subsequently rose from less than 1 ppb to higher than 2 ppb. This increase was attributed to the retubing. Crud samples were taken from the condensate pump discharge header, condensate demineralizer influent, common condensate demineralizer effluent, and the feedwater pump outlet. The iron content and other elemental concentration were analyzed using X-Ray diffraction. Crud particle size was determined using scanning electron microscope (SEM) and particle size analyzer.

Remarks/Potential for dose limitation: The investigators concluded that the following improvement measures should be proposed:

- additional prefiltering
- increase the cation to anion volume ratio from 2:3 to 1:1 or 2:1
- decrease the shutdown rate (soft shutdown)
- dry lay up during shutdown period
- recirculation wet lay up
- condenser hot well cleaning
- start up recirculation
- condensate demineralizer performance improvement
- improve backwash procedure
- investigate the height of resin bed
- proper control of dissolved oxygen in feedwater
- material replacement

References: Wen, T.J. et al, "Feedwater Iron Crud Reduction for Chinshan Nuclear Power Station," *Water Chemistry of Nuclear Reactor Systems 6*, Vol. 1, pp. 57-62, British Nuclear Energy Society, London, 1992.

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