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SURFACE CHARACTERIZATION OF THE STEAM GENERATOR CHANNEL HEAD FOLLOWING MECHANICAL/ ELECTROPOLISHING AT MILLSTONE POINT UNIT 2

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MECHANICAL POLISHING; ELECTROPOLISHING

Principal Investigator:

John Perock
Westinghouse Electric Corporation
Nuclear Technology Division
Box 355
Pittsburgh, PA 15230-0355
U.S.A.
Phone: 412-374-5788

Project Manager:

Howard Ocken
Electric Power Research Institute
3412 Hillview Avenue
P.O. Box 10412
Palo Alto, CA 94303
U.S.A.
Phone: 415-855-2055

Objectives: The Surface Roughness Measurement Program for Millstone Point Unit 2 was developed to investigate the effects of mechanical polishing versus electropolishing with respect to surface roughness.

Comments: Under the auspices of EPRI, Westinghouse performed nondestructive surface roughness measurements on portions of the Millstone Point Unit 2 replacement steam generator channel heads. In preparation for service, Northeast Utilities performed pre-service surface conditioning of the replacement steam generator channel heads, namely, mechanical polishing/electropolishing. The results of this program will aid in determining whether a relationship exists between the surface roughness and activated corrosion product deposition.

Remarks/Potential for dose limitation: The data analysis of the surface roughness measurements performed at Millstone Point Unit 2 showed that the effectiveness of the electropolishing process on the divider plate was less than that on the channel head bowl and stay cylinder, which are weld overlay surfaces. This was due to the difference in the metallurgical surface structure of the weld overlay and the wrought 304L stainless steel divider plate. During electropolishing of the weld overlay surfaces, the ferrite stringers were preferentially removed as compared to the surrounding surface structure. In addition, the electropolishing process removed or reduced the larger asperities, i.e., metal folds and scratches, caused by the mechanical polishing. This resulted in a smoother surface with respect to the average roughness parameter, R_a . An evaluation of the roughness data showed that the electropolished weld overlay surfaces were smoother than the mechanically polished surfaces with a statistically significant confidence level ($\geq 99\%$).

References: Perock, J.D., "Surface Characterization of the Steam Generator Channel Head Following Mechanical/Electropolishing at Millstone Point Unit 2," *Radiation Field Control Seminar*, Electric Power Research Institute, Seattle, Washington, 1993.

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