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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555
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Docket No. 50-482

MEMORANDUM FOR: Thomas M. Novak, Assistant Director
for Licensing
Division of Licensing

THRU: William V. Johnston, Assistant Director WVJ
Materials, Chemical & Environmental Technology
Division of Engineering

FROM: B. D. Liaw, Chief
Materials Engineering Branch
Division of Engineering

SUBJECT: EVALUATION OF NONDESTRUCTIVE TESTING METHODS APPROPRIATE TO STRUCTURAL STEEL WELDMENTS (WOLF CREEK)

The purpose of this memorandum is to summarize discussions on February 4, 1985, concerning the appropriateness of various nondestructive testing methods for structural steel weldments. These discussions were the result of concerns for the adequacy of the visual inspections through coatings of some of the structural steel weldments at Wolf Creek Generating Station. There are four commercially accepted nondestructive testing methods; two surface inspection methods (liquid penetrant and magnetic particle) and two volumetric (radiography and ultrasonic). The method or methods used in a given situation depend on many factors. Structural steel weldments are usually fillet welds, a major factor for determining the appropriate inspection method.

For radiography, the short, discontinuous lengths of welds and welds being located back-to-back, access and source locations make placing of the film very difficult. With fillet welds, their triangular cross section gives a very wide range of density to the film image such that it is difficult to interpret or assign meaning to an indication. For this reason, standards have not been developed for the radiography of fillet welds. Accordingly, radiography of structural steel weldments (fillet welds) is not performed. Ultrasonic testing has very similar limitations, and it is also not appropriate for fillet welds.

Making a choice of surface inspection method between liquid penetrant and magnetic particle involves several other considerations. That many of the welds at the Wolf Creek site have been coated makes the liquid penetrant method ineffective. The paint covers or fills the cracks and other type voids/defects such that the liquid penetrant method would not detect them.

Contact: D. Smith
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However, the paint does not affect the magnetic characteristics of the steel and defects detectible by magnetic particle would probably be detected. It is the only nondestructive method of inspection other than visual which would be effective for inspection of the rather small fillet welds normally seen in structural steel welding.

It must be cautioned that qualified procedures, equipment, personnel, etc. and agreed-upon standards of what are significant indications must be used for the inspections to be meaningful.

Original signed by
B. D. Liaw

B. D. Liaw, Chief
Materials Engineering Branch
Division of Engineering

cc: J. P. Knight
W. Johnston
E. Sullivan
S. Pawlicki
W. Hazelton
C. Y. Cheng
R. Klecker
D. Smith

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