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TO: Chief, Rules and Directives Branch
Division of Admistration
U.S. Nuclear Regulatory Commission
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USNRC

FROM: Lanson R. Rogers
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SUBJECT: GENERIC LETTER 2003-XX; POTENTIAL IMPACT OF DEBRIS BLOCKAGE ON EMERGENCY RECIRCULATION DURING DESIGN BASIS ACCIDENTS AT PRESSURIZED WATER REACTORS
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In response to the NRC's request for public comments re: the subject safety issue, I am offering the following information as a citizen concerned with the health and safety of the public, having worked as a project engineer at the Tennessee Valley Authority (TVA) for approximately 15 years with most of that directly involved with operating nuclear power plants, and more specifically with safety-related protective coatings (paint).

Background

In order to establish my credibility and my qualifications for adding my comments to this document, my personal involvement in some of the issues and factors directly involved with debris-producing coatings should be important to the NRC, and others.
I first became involved with nuclear coatings around 1978 as a modifications outage engineer at TVA's Browns Ferry Nuclear Plant. When torus coatings (paint) were found to be blistered during the first refueling outage after the infamous fire in Unit 1, I was involved in the resolution of that recoating and subsequent recoatings in the other units. I eventually became involved in all nuclear coating activities at TVA, and served as TVA's Nuclear Coatings Engineer for about 10 years, taking early retirement around 1990 to enter private business.

I attended several of the ASTM D-33 Committee meetings as TVA's nuclear power plant representative, along with others from TVA from other divisions, around 1980 and the early 1980's. To show the infancy of the nuclear coatings industry at that time, I was the only attendee at the D-33 meeting for several years who had ever actually worked inside an operating nuclear power plant. For several meetings, I felt that my input was vital, in that it gave the committee their only insight into the internal operations of nuclear plants.

This background information is important in that it places historical perspective on the beginning of the nuclear industry and how paint and the importance of painting

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requirements was brought into play when both nuclear power and nuclear coatings were relatively young and without the benefit of years of experience as influence. While most licensees would buy into the D-33 documents to some degree, it was blindly, and in many cases too late, as construction was well under way, and a retro-fit would have been necessary, at least in part, in order to fully comply with all requirements, as they were presented in ANSI, and later ASTM documents. The result has been very confusing to both the plants, the NRC, and others, and has been well documented with coating failures, modifications to sump screens, license agreement changes, Generic Letters, parametric studies, and other attempts to bring some reasonably safe approach to this very complicated issue. GSI-191 is the culmination of these efforts into one document in an attempt to bring closure not only to the coatings issue(s), but to other sources of debris which probably followed similar evolutionary paths.

One unique dissimilarity that nuclear coatings may have with other debris is its known propensity to degrade with age, exposure to ultraviolet light, and accelerated degradation to long term low level radiation exposure. The ASTM D-33 committee was well aware of this in the late 1970's and early 1980's, though there was no scientifically proven measure of the degree to which these coatings would degrade. When qualification requirements for safety-related coatings were established around 1974, it was only an attempt to screen the manufacturers and to eliminate those with little or no quality control capabilities, as well as to try to find the most durable and most resistant-to-harsh-environment paints, and included very severe temperature extremes and high radiation exposure as a part of that screening. It was the committee's best attempt at selecting the best paints for the nuclear plants' containment surfaces; while trying to establish procedures and controls to assure that they would stay intact during DBA/LOCA conditions. There were many discussions about setting time limits on this qualification process, realizing that one qualification test would not guarantee lifetime assurance of performance for a coating system. Time limits of 10 and 15 years were discussed, and no agreement was ever reached, primarily because of lack of operating experience. Any time limit would have been at best guessing at future performance, or lack thereof, and limits were discussed, agreement never reached, and none were ever set.

EXECUTIVE SUMMARY

Nuclear power plants, and certainly anything safety-related in nuclear power plants deserves to be handled with the latest in technology. In this case, safety-related paint has not taken advantage of the technological advances for many years. In-situ testing was developed and demonstrated to the NRC and other interested parties in 1998, specifically to be used to evaluate safety-related coatings in nuclear power plants. In-situ testing can now be used to not only evaluate the performance of these coatings (DBA/LOCA), it can be used to quantify the amounts of debris, as well as identify the characteristics of such debris as to size, shape, thickness, density, number of coats, and more. Every plant can evaluate any, and all unidentified, excessively aged, unqualified, or simply uncertain of

the condition coatings. Further, current technology would track and warn other plants with any dangerous, or particularly debris-causing paint systems. Within a short period of such evaluation and tracking, the NRC would know exactly what condition, coating-wise, all licensees' plants were in, and on a daily basis, with the click of a mouse. If these, or any coatings, are in fact safety related, they should immediately be treated as such. If not, they should immediately be de-classified as normal architectural coatings, and the plants ECCS should be prepared to handle the entire volume of containment coatings in one DBA/LOCA event. There are no other choices which assure safe operation of ECCS.

FURTHER

This generic letter makes it very clear that sump clogging and other flow path restrictions within the ECCS flowpath is a credible concern and potential safety issue for PWR's, and that the debris from coatings and other sources should be evaluated by the licensees in order to confirm their plant-specific compliance with NRC regulations. While most plants are aware of potential debris from coatings, they have taken credit in the past for qualification of safety-related coatings, and have only considered a small portion of them to become waterborne, and in fact the majority of the containment coatings have been assumed to remain attached to the concrete/steel surfaces; as they perhaps did in the parametric study presented by the NRC. If GSI-191 is to be properly addressed, no credit should be taken for any paint that has been in place for more than 10 years. The potential for large volumes of coating debris should be considered, along with the other sources of debris, and methodology for that management should ensure that ECCS performance to all criteria necessary for safe shut-down are not compromised. Certainly the three scenarios as presented in the NRC discussion should be addressed with all aged coatings to be considered to be waterborne in various debris forms, from fine particles to larger chips and flakes. A quantification of the amounts of debris would be ideal, since plants' existing documentation should provide that for Level 1 coatings. This process is even more critical since plants' licenses are now being extended past thirty years, and coatings simply cannot be allowed to continue to remain in place, untested, indefinitely. If GSI-191 is to be closed, with successful impact on the future safety from potential debris impairment of ECCS, quantification and tracking must be a part of future operations.

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