



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555-0001

March 25, 1994

Mr. Stanley P. Johnson
Chief Executive Officer
The Johnson Gage Company
534 Cottage Grove Road
Bloomfield, CT 06002

Dear Mr. Johnson:

I am responding to your letter of March 8, 1994, to Chairman Selin concerning the use of certain equipment for identifying dimensionally nonconforming fasteners in the nuclear power industry. We are quite familiar with the controversy surrounding the use of System 21 for thread gauging as a means of identifying dimensionally nonconforming fasteners. Although System 22 verifies additional thread characteristics such as the pitch diameter, the NRC staff does not consider System 21 or the use of go-no-go gauges to be inappropriate ("flawed") for accepting certain fastener threads based on the following discussion.

Because of an increase in the number of bolting failures during the 1970s, the U.S. Nuclear Regulatory Commission (NRC) established a generic safety issue on bolting in 1982 to study the potential safety implication of these failures. The scope of Generic Safety Issue (GSI) 29, "Bolting Degradation or Failure in Nuclear Power Plants," included all safety-related bolts, studs, embedments, machine/cap screws, other special threaded fasteners, and all their associated nuts and washers. The Atomic Industrial Forum (AIF), the Metals Properties Council (MPC), and the Electric Power Research Institute (EPRI) conducted major studies on bolting. As a result, EPRI issued a number of documents addressing NRC's concerns about bolting. Further, the NRC conducted two independent assessments of the probable risk of bolting failures in nuclear power plants. Both assessments indicated that the probability of a core meltdown caused by a bolting failure was low because of the highly redundant design of bolted connections and because the bolted connection would leak and the leakage would be detected before the connection completely failed. The NRC staff published NUREG-1339, "Resolution of Generic Safety Issue 29: Bolting Degradation or Failure in Nuclear Power Plants," in June 1990, which documented the staff review of studies by AIF, MPC, and EPRI and recommended the closure of GSI 29. On October 17, 1991, the NRC staff officially closed GSI 29 by issuing Generic Letter 91-17, "Bolting Degradation or Failure in Nuclear Power Plants."

The NRC has resolved this issue without having developed any new requirements, because of industry's initiatives in this area. It was found that the primary causes of these failures were stress corrosion cracking of overly hard fasteners, boric acid corrosion of steel fasteners, and metal fatigue. There is no evidence to indicate that the failures were directly attributable to dimensionally nonconforming fasteners.

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PDR COMMS NRCC
CORRESPONDENCE PDR

March 25, 1994

Notwithstanding the closure of the generic safety issue on bolting, the NRC staff continues to be vigilant regarding any bolting problems. Through regulatory requirements in Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR), the NRC requires that each licensee establish a quality assurance program to ensure that items, such as fasteners used in safety-related applications, conform to applicable specifications. The NRC conducts periodic inspections of licensees to ensure that they are effectively implementing their quality assurance programs. Part 21, "Reporting of Defects and Noncompliance," of 10 CFR requires the reporting of defective items to the NRC. The NRC then assures that other nuclear facilities that may have also received the defective items are informed. The NRC staff has reviewed the Part 21 submittals since 1990 and has not identified any bolting failures directly attributable to dimensionally nonconforming fastener threads.

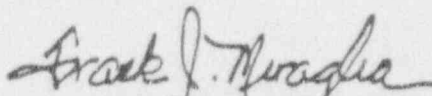
In addition, nuclear power plant licensees are required to report any safety-significant problems including fastener failures to the NRC in licensee event reports (LERs). The staff has reviewed LERs submitted since the mid-1980s and has not found any reports of fastener failures that could be attributed to dimensionally nonconforming fastener threads, giving additional credence to the conclusion that this is not a safety concern.

The NRC staff is examining the relative merits of System 21 and System 22 for the gauging of fastener threads. Its preliminary conclusions indicate that, although System 22 may be an improvement over System 21, there is no sufficient basis to make its use a requirement for NRC licensees. The staff has also reviewed the documents you provided in your letter and notes that the referenced military standards and much of the correspondence from the National Institute of Standards and Technology address safety issues associated with the acceptance of Class 3 (interference fit) fastener threads using the System 21 plug and ring/go-no-go methods. The use of Class 3 fasteners in the commercial nuclear industry is minimal, and we know of no safety issues associated with their use.

In summary, the NRC staff has not found evidence that failures due to dimensionally nonconforming fasteners are occurring and therefore, does not consider it to be a safety concern.

I hope this letter adequately addresses your concern.

Sincerely,



William F. Russell, Director
Office of Nuclear Reactor Regulation

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Mr. Richard H.F. Jackson

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Please feel free to call me at 504-2722 if you have any questions on the meeting objectives. I look forward to meeting you next week.

Sincerely,

Original signed by

Brian W. Sheron, Director
Division of Engineering
Office of Nuclear Reactor Regulation

Enclosures:
As stated