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6170 Egret Court, Benicia, CA 94510
P: (707) 746-5870 – F: (707) 746-8664
www.mistrasgroup.com

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TO:
NRC Operation Center

FROM:
Donald Smith

COMPANY:

DATE:
11/10/2023

FAX NUMBER:
(301) 816-5151

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TELEPHONE NUMBER:

SENDER'S REFERENCE NUMBER:

RE:

Follow-up report to the 10 CFR Part 21 Interim Report dated 10/20/2023.

URGENT FOR REVIEW PLEASE COMMENT PLEASE REPLY PLEASE RECYCLE

NOTES/COMMENTS:

Reference NOV 99902109/2023-201-02

Please direct any questions to Donald Smith @ (630) 418-7301



November 10, 2023

To: U.S. Nuclear Regulatory Commission

ATTN: Document Control Desk, Washington, DC 20555-0001

Re: 10 CFR Part 21 Follow-up Report

INITIAL EVALUATION

MISTRAS Group, Inc. completed an evaluation of a nonconformance regarding the calibration of acoustic emissions systems. This communication is being provided to update the Commission on the company's evaluation results of the completed 10 CFR Part 21 evaluation. These systems are used for acoustic emission testing of reactor head and internals lift rigs and for other various applications. The nonconformance involves the (a) failure to secure regular calibration by the manufacturer or other approved source as required by the applicable procedures and (b) creation and submission of falsified calibration records to nuclear utilities as part of the final reporting package.

This nonconformance was self-identified during a Nuclear Procurement Issues Corporation (NUPIC) audit. Since this audit, MISTRAS has been conducting an internal investigation. MISTRAS has identified two individuals who have acknowledged misrepresenting certain calibration records. Neither individual is currently working for the company. MISTRAS is fully cooperating with NRC regulators and investigators on this matter. Note that significant efforts have been made to ensure that each affected utility has been directly contacted and notified of the nonconformance as it related to their sites.

The falsified documents extend only to records of annual system calibrations for acoustic emission "Samos" and "DiSP" instruments. The evaluation found no evidence of the falsification of records associated with the onsite performance verifications and where necessary, the data from these instruments was verified. Also, there is no evidence of the falsification of the AE Sensor Characterization Certificates.

The calibration nonconformance has been evaluated in accordance with 10 CFR Part 21 and MISTRAS procedure 100-QC-017.1, Reporting of Defects and Noncompliance In Accordance with 10 CFR Part 21 and 10CFR50.55(e), to determine if this may result in potential (latent) defects in safety related equipment. After consultation with industry and subject matter experts, it is believed with reasonable assurance that the nature of the calibration deficiency would not likely result in any undetected defects in a safety-related component. Our understanding is based on the below information.

The lift rigs are typically inspected every 10 years using an acoustic emission testing procedure during scheduled outages. The lift rigs are then used to lift the reactor heads and internals during refueling cycles. The lift rig inspection relies on the acoustic emission instrument monitoring sensors strategically mounted to the lift rig. The sensors are "listening" for acoustic emission radiating from the surrounding metal caused by the rapid release of localized stress energy. The piezoelectric sensors convert the acoustic emission to an electronic signal that is represented digitally on the instrument's display.

Based on discussions with AE Level III personnel, review of documentation, and consultation with the licensees, it is believed with reasonable assurance that the lift rigs inspections were not inherently invalid. The effectiveness of the signal process was verified prior to every inspection through multiple methods, such as a "lead break" check whereby a known emission is elucidated, and it is verified that each sensor captured the expected output. This check, which is considered industry standard for these devices and required according to procedure prior conducting the inspection, would detect any material discrepancies with the instrument. Additional performance verification methods such as the Automatic Sensor Tests (AST) and Center Punch are also identified in the AE procedures as acceptable alternatives. Evidence that the applicable checks/performance verifications are performed, both prior to, during and after a lift rig inspection, appears in equipment data, checklists, and affirmations. Typical language from the AE Procedures used:

"System Performance Check: Establish sensor mounting/coupling sensitivity using standard lead break and/or center punch test and/or automatic sensor test (AST) techniques to check all sensor locations. The sensitivity on all sensors must be within ± 6 dB from the average of all sensors."

FURTHER EVALUATION OF LIFT RIG INSPECTIONS

There are a few instances where the lead break results deviated from this ± 6 dB from average and were identified in the applicable report. Three of these lifts identify sensors that do not meet the ± 6 dB requirement on the high end (one sensor per lift). This would suggest that these sensors would be more sensitive and would not negatively affect the inspection. The evaluation of the other 2 lift rig inspections data shows sensors outside of the ± 6 dB requirement on the low end. Sensors that fail to meet the ± 6 dB requirement on the low end may indicate that this sensor does not have the sensitivity necessary to adequately identify an acoustic emission event at the desired level of significance. The level of significance is proportional to the sensitivity level (or dB level). The reports also identify successful completion of an AST (Automatic Sensor Test) and CP (Centerpunch) test in accordance with the applicable test procedures.

In these instances, the site was contacted and was provided with the data associated with the performance verifications. The performance of these tests was confirmed by review of the recorded instrument data retrieved from AE computers. This data shows the AST and Centerpunch tests meet the procedural requirements. As two of the three optional performance verification checks were undertaken successfully, it is reasonable to believe that the deviance with the Pencil Lead Breaks for the sensor identified above would not challenge the integrity of the AE inspection and invalidate the test results.

EVALUATION OF INSPECTIONS PERFORMED ON OTHER COMPONENTS

MISTRAS has also performed AE inspections of components other than lift rigs, including transformers, valves, and tanks. After conducting a review of available records pertaining to such tests, MISTRAS has not identified any other nonconformances that would create the potential for a substantial safety hazard as defined in 10 CFR Part 21.

MISTRAS did identify two additional inspections that utilized AE equipment operating under a falsified calibration certificate, a yoke inspection at Oconee in 2020 and a valve inspection at Watts Bar in 2011. Subsequent inspections have been performed of the Watts Bar valve utilizing properly calibrated equipment. The Oconee yoke inspection was previously disclosed and evaluated as part of the lift rig evaluation because it performs the same function as a lift rig. Many of the other components are tested in accordance with the applicable procedures that do not require a periodic manufacturer's calibration of the AE equipment. As a result, for several such inspections the exact piece of AE equipment used for the inspection was not recorded, however this is not considered a nonconformance as there is no apparent deviation from the approved procedure. Based on the foregoing, MISTRAS believes with reasonable certainty that the nonconformances described herein do not present the potential for a substantial safety hazard.

CONCLUSION

MISTRAS has thoroughly evaluated the deviations identified herein in accordance with 10 CFR Part 21 and determined that the deviations would not have likely created or failed to detect a defect as defined in 10 CFR Part 21.

Several preventive actions have been and are continuing to be implemented to enhance internal controls to ensure no further nonconformances occur. MISTRAS is continuing to evaluate all work performed in this space and commits to providing an update to utilities if other material nonconformances are found.

Sincerely,



11/10/2023

Donald D. Smith
Quality Assurance Director
MISTRAS Group, Inc.
(630) 418-7301
donald.d.smith@mistrasgroup.com