

PRM-50-118
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PUBLIC SUBMISSION

Docket: NRC-2019-0071

Measurement Standards Used at U.S. Nuclear Power Plants

Comment On: NRC-2019-0071-0004

Measurement Standards Used at U.S. Nuclear Power Plants; Petition for Rulemaking; Notice of Docketing and Request for Comment

Document: NRC-2019-0071-DRAFT-0009

Comment on FR Doc # 2019-09981

Submitter Information

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General Comment

Please consider the attached revision of this petition for rulemaking (PRM-50-118; NRC-2019-0071) submitted by me. Note that this is only to apply grammatical corrections, and a few minor clarifications of the original document; there are no changes to what is being requested.

Attachments

Revised after submission - Rulemaking concern submitted to NRC

Sirs and Madams,

Please see the attached document for my request to revise NRC rules for making measurements at Nuclear Power Plants in the USA.

Thank you,

Michael L. Taylor

PRM-50-118 PETITION

September 25, 2018

1 (i) From: Michael L. Taylor
PO Box 2563
Monroe, Mi. 48161
734-497-5692
miketaylor0001@gmail.com

1 (ii) N/A

To: Secretary of the Commission, Attention: Rulemakings and Adjudications Staff,
Subject: Request for revision of existing rules for making measurements at US Nuclear Power Plants

(Please note that each 2.802 Petition for rulemaking requirement for filing, is specifically noted and highlighted in red)

1 (iii) This letter is a petition for rule making under Nuclear Regulatory Commission 2.802 Petition for Rulemaking guidance, and it is a report of a safety concern regarding how measurements are being made at Nuclear Power Plants in the United States that do not use, or have Metrology Laboratories that are certified by accrediting organizations under the guidance of **1 (vii)** ISO/IEC 17025 or ANSI/NCSLI Z540.3^{*****} such as American Association for Laboratory Accreditation (A2LA), National Voluntary Laboratory Accreditation Program (NVLAP) or similar accrediting bodies that require use of Measurement Uncertainty determinations, such as those described in the Guide for the Expression of Uncertainty of Measurements (GUM) published by Working Group 1 of Joint Committee for Guides in Metrology (JCGM/WG 1), which is a branch of the Bureau International des Poids et Mesures (BIPM - translated as the International Bureau of Measurement in Sevres, France).
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1 (vi) According to these standards and scientific documents, measurements made without this guidance are subject to significant errors, since numerous factors that affect measurements are not being considered in the final result. These practices are not currently taking place mostly due to a lack of existing requirements for our Nuclear Plants. Perhaps the most important factor from among those that effect measurements made, and that currently are not being considered, are the ratios of the accuracies of the measurement standard instruments used, to that of the accuracies of the items being measured (UUT or Units under test). Currently many Nuclear Power Plants (Including Fermi 2) commonly use a 4:1 ratio^{***} as a requirement for many of the measurements that are being made. In cases where a 4:1 ratio^{***} is not obtainable, a comment is required to indicate that a less than 4:1 ratio measurement is taking place;* moreover the plant's UFSAR and other guidance, such as conduct manuals, even allow still more limited accuracy ratios where, as is the case of Fermi 2, (and Fermi 2's UFSAR guidance actually states this) often even a 1:1 ratio is acceptable. It is important to note that the currently required comment to provide acknowledgement, is simply

a comment, and that neither; evaluations of consequences, nor corrections, nor resolutions of the areas that are lacking, are now required. The use of low ratios of measurement standards, to units under test (UUT) will cause significant errors in measurements made! This is a known scientific and mathematical fact, and it is not debatable or arguable.

1 (vii)

This fact can be verified by review of the Guide for the Expression of Uncertainty of Measurements (GUM) published by Working Group 1 of Joint Committee for Guides in Metrology that is mentioned above. Often in cases of measurements where these factors are not considered, actual measurement values will be much different than what is read on the display of the instruments used. Consequently, current practices of making measurements often do not provide the accuracies that are expected, and are even required for the safe operation of a Nuclear Power Plant. As a result, since degraded measurements are currently being made and allowed, this is an actual unresolved safety question when “Q” measurements are being made. Some other factors that are not always being considered, nor are they always, per existing rules, required (especially during field measurements) are the environmental effects on measurements; e.g. the effects of ambient temperatures, ambient humidity, dust and dirt in the environment, and vibration, etc. This 2.802 rule change petition also requests that these factors be considered when (especially Q) measurements are made in Nuclear Power Plants.

1 (viii) N/A This petition is not directly related to, nor does it impact the natural environment.

2 (i) & 2 (ii) Reasons why Rulemaking is the preferred solution:

Rulemaking is the preferred route to resolve this safety concern since only a rule will ensure that adequate training is conducted, that procedures and conduct manuals correctly reflect, and bring attention to this very important concern. New rules also will verify that necessary actions that would ensure good measurements, are taken. A rule requiring laboratory accreditation would implement correct measurement practices as a normal and required operation for metrology laboratories in the nuclear power industry. Licensing may be unnecessary or inappropriate, however if the use of correct measurement practices were made a requirement for a plant to continue operation under its license, perhaps licensing could be a part of the solution. Issuance of an order would at best be only a temporary solution. No other state or federal agencies have adequate authority to implement a solution to this problem, so rulemaking per the NRC is most likely the best route to resolve this matter. The Nuclear Regulatory Commission has this authority per US Nuclear Regulatory Commission Regulations: Title 10 Code of Federal Regulations, which states that the NRC is the US government agency that has been appointed to regulate safety in operations of Nuclear Power generating stations; and this most certainly is a nuclear safety issue.

2(iii) N/A Michael L. Taylor is the sole, and is therefore the lead petitioner

1 (iv) Industries and organizations that are currently using these practices:

The use of Measurement Uncertainty principles and required accreditations of metrology laboratories is common and accepted practice in numerous industries, such as airlines, automotive, medical, military, National Aeronautics and Space Administration (NASA), test equipment manufacturers, and many others. A review of accreditations listed on the websites of A2LA (<https://portal.a2la.org/search/>) and NVLAP (<https://www-s.nist.gov/niws/index.cfm?event=directory.search#no-back>) will provide an extensive list of organizations who routinely use and require measurement practices, such as those referred to herein. It is important to note that these are normal and required practices for each of these industries. The fact that an organization such as the US Nuclear industry does not require this level of safety and assurance is, at the very minimum, surprising. Neither internal power plant QA nor documents and standards currently in use for inspections and audits adequately

address these concerns. This is mostly due to the fact that rules simply do not exist that make this a requirement.

1 (v) The following is a list of proposed solutions:

1. Require all internal metrology/calibration laboratories in US Nuclear Power Plant Metrology Labs to become accredited, under guidance of the standards ISO/IEC 17025 or ANSI/NCSLI Z540.3 by an accrediting organization as American Association for Laboratory Accreditation (A2LA), National Voluntary Laboratory Accreditation Program (NVLAP) or similar accrediting bodies.

2. Require training of all personnel that make measurements at Nuclear Power Plants (including those made in Metrology, Chemistry and other laboratories, and also all, especially those that are Q, field measurements that are made) and their management, to ensure they each have a clear understanding of the effects of measurement standard to unit under test ratios on measurements that are made, and also all other factors that affect the results of measurements made.*****

*Note 1: This 2.802 Rulemaking petition is the result of a review of the Fermi Nuclear Power Plant under Allegation No. RIII-18-A-0001. The report of this review's closure letter provided by the NRC is also attached to this letter for reference. The attached allegation closure letter did not find fault regarding this concern; simply because rules do not exist that require it. NRC personnel recommended that a change in rules be requested due to this lack of requirements.

**Note 2: Currently most US Nuclear Plants require use of measurement uncertainty (e.g. NVLAP or A2LA accreditation) for all of its outside vendors who provide calibration services to the plant; however no such requirements exist for measurements made by internal plant employees and organizations.

***Note 3: This concern is not restricted to high accuracy measurements, such as those performed in laboratories; even low accuracy field measurements are impacted; especially when a less than a 4:1 (UUT to Measurement Standard) ratio is being utilized!

****Note 4: To completely address this safety concern, percent of tolerance is an area where special attention must always be provided. Even in cases where a 4:1 ratio exists, when percent of tolerance of a measurement is greater than 75%, expected accuracy will be affected! Furthermore and as a further example; in cases where a 2:1 ratio exists, all readings greater than 50% of tolerance are suspect, and these therefore will have a high potential failure probability. Certainly in cases where a less than 2:1 ratio measurement is made, even further concerns exist.

*****Note 5: Some measurement instruments do account for temperature, humidity, vibration and other environmental impacts, though this is not true in all cases! In cases where this does not occur, there should be requirements to consider these effects.

*****Note 6: Many US Nuclear Power Plants metrology laboratories are accredited under ISO/IEC 17025 or ANSI/NCSLI Z540.3; such as Exelon, Energy Northwest, etc.; this is either a voluntary action on their part, or it is due to commercial requirements, etc.; in such cases further actions are likely unnecessary.

Sincerely yours,

Michael L. Taylor

1

From: Mike Taylor <miketaylor0001@gmail.com>
Sent: Thursday, January 24, 2019 9:35 PM
To: Chang, Helen
Subject: [External_Sender] Re: Request for a revision of existing rules for making measurements at Nuclear Power facilities
Attachments: 180001 Acknowledgement Letter.pdf; Request for Rules under NRC 2.802 w/specified requirements.pdf

Helen,

Re our telephone conversation earlier today regarding a document that was referred to in my Request for Rules under NRC 2.802 (180001 Acknowledgement Letter), however omitted in my original e-mail to Cindy Bladey dated 10/26/2018. Please find this document attached here, along with a copy of my original request for rules change under 10.CFR 2.206. I understand that sending this now will not delay progress in the NRC's review of this request. I am awaiting further information regarding the results of this NRC review.

Thank you,
Michael L. Taylor
Mr. Michael L. Taylor

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE RD STE 210
LISLE IL 60532-4352
February 8, 2018
mtaylor001@charter.net
SUBJECT: ALLEGATION NO. RIII-18-A-0001

Dear Mr. Taylor:

This letter refers to your e-mail to me, Jim Heller, U.S. Nuclear Regulatory Commission (NRC) Region III, Office Allegation Coordinator, on January 11, 2018; several exchanged e-mails between you and me; and your phone call with me and Irfan Khan, NRC Region III Reactor Inspector in the Division of Reactor Safety, on January 30, 2018. During these communications you expressed concerns related to activities at the Fermi Power Plant. You are concerned the licensee is: (1) performing on-site calibration of measurement and test equipment (M& TE) with acceptance criteria that do not account for the accuracy of the reference standard used to calibrate the M& TE; and (2) not performing on-site calibration of M& TE to the same standard that is specified when equipment is sent to off-site vendors for calibration.

Enclosure 1 to this letter documents your concerns as we understand them. If we have misunderstood or mischaracterized your concerns as described in the enclosure, please contact one of the Region III Office Allegation Coordinators at the address provided below.

The NRC brochure, "Reporting Safety Concerns to the NRC," is accessible from the NRC web site at <http://www.nrc.gov/reading-rm/doc-collections/nuregs/brochures/br0240/>. The brochure contains information that you may find helpful in understanding our process for review of safety concerns. It includes an important discussion of the NRC's identity protection policy and limitations at page 4.

I discussed our identity protection program with you on January 30, 2018. You indicated that you (1) did object to having your identity released, and (2) did not object to having the concerns provided to the licensee. We will provide the concerns to the licensee with a request for information and an evaluation to be performed by an individual who is independent of the concerns. In evaluating the concerns, we intend to take all reasonable efforts not to disclose your identity as the source of the concerns. The NRC Region III technical staff will evaluate the licensee's response to determine the next step in our evaluation. After we complete our evaluation, you will be provided the results.

M. Taylor 2 File No. RIII-18-A-0001

Thank you for notifying us of your concerns. If you have any questions, please contact Paul Pelke, Sarah Bakhsh or me. You can contact us by: (1) writing to the U.S. Nuclear Regulatory Commission, Region III, 2443 Warrenville Road, Suite 210, Lisle, Illinois 60532-4352; (2) calling the NRC Region III switchboard toll free at (800) 522-3025; or (3) sending an e-mail to our common e-mail address which is Allegations.RegionIII@nrc.gov. Your cooperation is appreciated.

Sincerely,



James Heller

Senior Allegation Coordinator

Enclosure:

Summary of Concerns

File No. RIII-18-A-0001

Summary of Concerns

Our current understanding of your concerns is summarized below. If you have any additional or clarifying information related to these concerns, please contact one of the Region III Office Allegation Coordinators at the addresses or telephone number provided in the letter.

Concern 1:

You are concerned that the licensee is performing onsite calibration of measurement and test equipment (M& TE) with acceptance criteria that does not account for the accuracy of the reference standard used to calibrate the M& TE. For example, a torque wrench that has an overall tolerance of $\pm 4\%$ would have an acceptance criteria of $\pm 4\%$ in the calibration procedure. You believe the acceptance criteria should be lower than $\pm 4\%$, taking into account the uncertainty associated with the calibration standard. This concern applies to other types of M&TE (e.g. , voltmeters, gauges, etc.) calibrated onsite at Fermi.

Concern 2:

You are concerned that the licensee is not performing onsite calibration of M&TE to the same standard that is specified when equipment is sent to off-site vendors for calibration. Specifically, the licensee ensures that vendors are in compliance with ANSI/NCSLI 2540.1 and/or ISO/IEC 17025. However, calibrations performed onsite follow site-specific procedures and do not follow any industry standard.

Enclosure