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Docket Number 50-346

License Number NPF-3

Serial Number 2228

United States Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555

Gentlemen:

Subject: Removal of Special Process Controls from Soldering

In accordance with 10 CFR 50.54(a)(3), Toledo Edison hereby submits its plans regarding the removal of special process controls from soldering at the Davis-Besse Nuclear Power Station, Unit 1. This change, as indicated in the attached 10 CFR 50.54(a) review, has been identified as a reduction to the commitments identified in the Updated Safety Analysis Report (USAR) Chapter 17.2, Quality Assurance Program for Station Operation. Although this change has been identified as a reduction in commitment, the Quality Assurance Program continues to satisfy the criteria of 10 CFR 50, Appendix B.

If you have any questions regarding this proposal, please contact Mr. William T O'Connor, Manager - Regulatory Affairs, at (419) 249-2366.

Very truly yours,

*For D. Shelton*  
JMM/lxg

Attachments

cc: J. B. Martin, Regional Administrator, NRC Region III  
S. Stasek, NRC Region III, DB-1 Senior Resident Inspector  
G. West, Jr., DB-1 NRC/NRR Project Manager  
Utility Radiological Safety Board

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Operating Companies  
Cleveland Electric Illuminating  
Toledo Edison

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Listing of Submittal Contents

Attachment 2 Davis-Besse Unit 1 USAR 17.2, Quality Assurance Program  
for Station Operation, Pages Affected By Proposed Change

Attachment 3 Evaluation of Proposed Quality Assurance Program  
Reductions

specific inspection or test records is maintained when required by codes, standards or specifications.

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When materials are subdivided, the identification is transferred to each piece prior to subdividing.

When several parts are joined in fabrication, a list of parts and corresponding identification documents such as a work order, accompanies the assembly. This documentation included, as applicable, heat numbers, part numbers, serial numbers, material certifications and purchase order number to provide the basis for determining the acceptability of the assembly and its component parts.

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#### 17.2.8.3 Material Release

Materials or items issued from storage by Materials Management are documented. The Purchase Order Number is included with the information on the issue ticket and subsequently entered on the work order document to provide traceability between the material withdrawn and the material's receiving inspection records and associated quality documentation.

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At the time of material issuance, Materials Management personnel verify the correct identification on the material and that the identification is documented. This identification is again verified prior to usage.

#### 17.2.8.4 Marking

Physical markings, when used, are required to be clear, unambiguous, indelible and applied in a manner that will not affect the function of the item.

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#### 17.2.8.5 Nonconformances

In the event that the identification of a previously accepted item becomes lost or illegible, the item is considered nonconforming and is processed as described in Section 17.2.15.

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#### 17.2.9 SPECIAL PROCESS CONTROL

##### 17.2.9.1 Special Processes

Special processes used in the course of maintenance, modification, in-service inspection and testing are accomplished under controlled conditions, in accordance with specified requirements, by qualified personnel using approved and where applicable, qualified procedures.

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Special processes are those processes which are highly dependent on the control of the process or the skill of the operators, or both and in which the specified quality cannot be readily determined by inspection or test of the product. Special processes include but are not limited to heat treatment, chemical cleaning, metal joining, such as welding, brazing and soldering, application of protective coatings, and nondestructive examination.

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The Engineering Department has the responsibility for providing technical requirements for identified special processes and for reviewing special process procedures including the utilization and application of those Non-destructive Examination Procedures associated with ISI Program.

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The Nuclear Assurance Department has the responsibility for the control of Nondestructive Examination. This responsibility also includes assuring that special process are controlled in accordance with the Nuclear Quality Assurance Program, reviewing and concurring with all special process procedures and assuring that nondestructive examination procedures are approved by a NDE Level III examiner in the appropriate discipline.

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#### 17.2.9.2 Procedures

Implementing procedures define the methods for controlling and performing the special processes which include training, testing, qualification and certification requirements of personnel that perform or inspect special process operations; qualification of equipment and procedures used for special processes, and documentation of process results, procedures, personnel qualification and certification, and equipment qualifications. Codes, standards, specifications, or other special requirements applicable to the content and qualification of the process, equipment, and personnel are specified in approved procedures.

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If the special process is not covered by existing codes or standards, or the quality requirements exceed the codes or standards, the necessary qualification requirements are defined in the appropriate procedures.

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#### 17.2.9.3 Welding

Welding procedures are prepared and qualified by the Maintenance Section in accordance with the governing code. Quality Control personnel witness the welding, or brazing of the qualification coupon on a selected basis, i.e., establishing Hold Points.

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Each welder/brazer is qualified by the Maintenance Section in accordance with the requirements of the governing code. Quality Control personnel also witness the welder qualification process on a selected basis. Upon qualification, each welder is assigned a unique welding identification number.

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10 CFR 50.54 EVALUATION FOR UCN 91-066  
(EVALUATION OF PROPOSED QUALITY ASSURANCE PROGRAM REDUCTIONS)

PROPOSED CHANGES

The proposed changes to the Updated Safety Analysis Report (USAR) Chapter 17.2, Quality Assurance Program for Station Operations, are shown on the attached marked up page of Section 17.2.9.1.

Description of Change

Paragraph 17.2.9.1, Special Processes, page 17.2-31. The second sentence of the first paragraph reads:

"...Special processes include but are not limited to heat treatment, chemical cleaning, metal joining, such as welding, brazing and soldering, application or protective coatings, and nondestructive examination..."

This sentence will be revised to delete soldering and to change "application or.." to "application of..":

"...Special processes include but are not limited to heat treatment, chemical cleaning, metal joining, such as welding and brazing, application of protective coatings, and nondestructive examination..."

REASON FOR CHANGE

To clarify the guidance given in the USAR Section 17.2.9.1, pertaining to Special Process and to make the examples of Special Process in the USAR consistent with industry standards. The change of the word "or" to "of" will correct a typographical error made in Revision 5 of the USAR.

EFFECT OF CHANGE

This change reduces the Quality Assurance Program requirements contained in the Davis-Besse Updated Safety Analysis Report Quality Assurance Program Description, by deleting the requirement in 17.2.9.1 that soldering be treated as a special process.

Review of industry standards indicated that soldering is not usually considered a special process. Neither ANSI N45.2-1977 (incorporated by

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reference in Table 17.2-1) nor Criterion IX of 10CFR50 Appendix B mention soldering as a special process.

Although ANSI N45.2-1977 does not define "Special Process", Section 10, "Control of Special Processes" begins:

"...Measures shall be established and documented to assure that special processes, including welding, heat treating, cleaning, and non-destructive examination, are accomplished under controlled conditions in accordance with applicable codes, standards, specifications, criteria, and other special requirements, using qualified personnel and procedures..."

10 CFR 50 is similar to ANSI N45.2-1977, in that it provides a list of examples of special Processes, but does not define what a Special Process is. 10 CFR 50 contains the same the examples as ANSI N45.2-1977, except that cleaning is omitted.

USAR Section 17.2.9.1 contains both a definition of Special Processes and a list of examples. The list of examples differs from ANSI N45.2-1977 with respect to the following:

"chemical cleaning" vice "cleaning"

"metal joining, such as welding, brazing and soldering" vice "welding"

"application or [sic] protective coatings" (not listed in ANSI N45.2-1977)

Since the term "metal joining" is used, without reference to electrical connections, it is apparent that pipe soldering is intended by this paragraph. Davis-Besse does not use solder to join pipe or structural material which is important to safety, because mechanical soldering lacks the strength required by design. Specifications and sound engineering judgment preclude the use of soldering for metal unions for materials important to safety. Therefore, the soldering example is not applicable to Davis-Besse.

Since the available lists are inconclusive, this evaluation uses the USAR definition to show that soldering is absent some of the required attributes of a Special Process.

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The USAR contains the following definition:

"...Special processes are those processes which are highly dependent on the control of the process or the skill of the operators or both and in which the specified quality cannot be determined by inspection or test of the product..."

The quality of a soldered electrical connection can be readily determined by test or visual inspection, therefore electrical soldering is not a Special Process.

Industry standards and training manuals show that inspection and test are acceptable, appropriate, and in fact the usual methods of determining the quality of a soldered joint. Required solder joint quality is specified by Davis-Besse procedure DB-ME-09003, Soldering and Circuit Board Repair, and in the Davis-Besse training program by lesson plans and handouts. In both cases, the quality of soldered connections is verified by visual inspection of the joint. The training program emphasizes the concept of "WPI" (workpiece indicators), using visual observation both to control and to inspect the work. Examples of acceptance criteria used include the following:

- solder surface smooth, bright and shiny, with no evidence of pits, pinholes, or porosities
- surface is free of any lumps, remaining pockets of flux, or granular appearance
- good wetting action, evidenced by feathering out of solder to all joint surfaces
- concave solder fillets
- outline of individual wire strands visible
- no copper showing at the end of the wire
- with cup terminals,
  - all wire strands are in the cup
  - solder has flowed out to the edges of the milled faces
  - no solder has spilled over and down the sides of the cup, and there are no cracks or voids between the wire and the terminal
- terminal holes bridged over to prevent collection of contaminants

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After repair and visual inspection, but prior to returning an electronic component to service, the component is tested to ensure that it functions properly.

BASIS FOR CONCLUSION THAT CHANGES CONTINUE TO SATISFY THE CRITERIA OF  
10CFR50 APPENDIX B

Mechanical soldering is not performed on systems which are important to safety. The quality of soldered electrical connections can be readily determined by test or visual inspection. The USAR states that the product quality resulting from Special Processes cannot be determined by test or inspection. Therefore, soldering is not a Special Process, and no special program is needed to control soldering at Davis-Besse. The reference to soldering as a Special Process is therefore deleted.

References

American National Standards

- ANSI/IPC-A-610A-1990, Acceptability of Electronic Assemblies.
- ANSI/IPC-R-700C-1988, Suggested Guidelines for Modification, Rework, and Repair of Printed Boards and Assemblies.
- ANSI/ASME N45.2-1977 / ANSI/AIChE N46.2-1977, Quality Assurance Program Requirements for Nuclear Facilities.