10 CFR 21.21

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102-07995-BJR/MMD
Oct 31, 2019

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sirs:

Subject: **Palo Verde Nuclear Generating Station (PVNGS) Units 1, 2, and 3**
Docket No. STN 50-528, STN 50-529, and STN 50-530
License No. NPF 41, NPF 51, and NPF 74
Written Defect Notification for GE-Hitachi Stationary Primary Contact Finger Q0114C5382P002

Enclosed please find the written notification of a defect related to General Electric - Hitachi (GEH) Stationary Primary Contact Finger model number Q0114C5382P002. This report is being submitted pursuant to 10 CFR 21.21(d)(3).

Enclosure 1 contains the written notification of defect and Enclosure 2 contains information related to the Stationary Primary Contact Finger provided by GEH pursuant to 10 CFR 21.21(b).

In accordance with 10 CFR 50.4, copies of this notification are being forwarded to the NRC Regional Office, NRC Region IV and the Senior Resident Inspector.

No commitments are being made to the NRC by this letter.

If you have any questions or require additional information, please contact Matthew Kura, Regulatory Affairs Department Leader, at (623) 393-5379.

Sincerely,

BJR/MMD

Enclosure 1: Written Defect Notification for GE-Hitachi Stationary Primary Contact Finger Q0114C5382P002

Enclosure 2: GEH 10 CFR Part 21 Communication SC 19-01 R0 dated May 30, 2019

cc: S. A. Morris NRC Region IV, Regional Administrator
S. P. Lingam NRC NRR Project Manager for PVNGS
C. A. Peabody NRC Senior Resident Inspector for PVNGS

Enclosure 1

Written Defect Notification for GE-Hitachi Stationary Primary Contact Finger Q0114C5382P002

Enclosure 1
Written Defect Notification for GE-Hitachi Stationary Primary Contact Finger Q0114C5382P002

This document provides Arizona Public Service Company's (APS) written notification of a defect pursuant to 10 CFR 21.21(d)(3). APS verbally notified the NRC via Event Notification Report # 54309 on October 4, 2019.

On October 1, 2019, APS completed an evaluation of the information provided by General Electric - Hitachi (GEH) to APS pursuant to 10 CFR 21.21(b) and pertaining to Stationary Primary Contact Fingers, model number Q0114C5382P002. Previously on March 6, 2019, APS discovered some contact fingers that exhibited an unpolished finish unlike the typically polished finish provided on electrical contact surfaces. Because the unpolished finish did not represent a deviation related to an APS procurement document, the original screening determined this non-conformance was not a deviation and therefore the Part 21 process was exited. As part of the APS corrective action process, the questionable contact fingers were returned to GEH. Upon receipt, GEH entered their corrective action process and as a result, sent the communication stating that the unpolished finish did not comply with the critical characteristic pertaining to these surfaces.

Please find the information provided by GEH in Enclosure 2: GEH 10 CFR Part 21 Communication SC 19-01 R0 dated May 30, 2019. This communication was entered in the APS corrective action program.

(i) Name and address of the individual or individuals informing the Commission.

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(ii) Identification of the facility, the activity, or the basic component supplied for such facility or such activity within the United States which fails to comply or contains a defect.

Facility: Palo Verde Nuclear Generating Station (PVNGS) Units 1, 2, and 3
Docket No. STN 50-528, STN 50-529, and STN 50-530
License No. NPF 41, NPF 51, and NPF 74

Basic Component: GEH Stationary Primary Contact Finger Q0114C5382P002

(iii) Identification of the firm constructing the facility or supplying the basic component which fails to comply or contains a defect.

GEH Nuclear Energy
3901 Castle Hayne Rd
Wilmington, NC 28402-2819

(iv) Nature of the defect or failure to comply and the safety hazard which is created or could be created by such defect or failure to comply.

During overhaul activities of the medium voltage power (Magne-blast) circuit breakers (GEH model number AM-4.16-250-9 1200), some replacement contact fingers were identified as having contact surfaces with an unpolished finish.

These contact fingers are the primary current carrying device for the circuit breaker. The critical function of the circuit breaker is to either close and energize the circuit or open and shut off power to the circuit. The design function of the circuit breaker is to open and interrupt a full rated fault. At Palo Verde they are used in Class 1E 4160VAC / 1200 amp power applications that range from approximately 65 to 840 amps.

Enclosure 1
Written Defect Notification for GE-Hitachi Stationary Primary Contact Finger Q0114C5382P002

The subject condition, unpolished silver plating on the stationary contact surfaces, could potentially impact the operation of the breaker in two ways, premature wear of the contact surface and decreased contact surface area. In either of these situations, the design rating of the circuit breaker could be reduced due to the possible increase in heat at the contact surface if it is operated at or close to the breaker rating.

APS concluded this condition, if installed, could result in the breaker failing to perform its safety function and thus could create a substantial safety hazard.

Please find additional details in Enclosure 2. The information was screened and determined to be associated with a potential defect on August 8, 2019.

(v) The date on which the information of such defect or failure to comply was obtained.

The evaluation that determined the deviation was a defect was completed on October 1, 2019, and listed officer was notified on October 4, 2019.

(vi) In the case of a basic component which contains a defect or fails to comply, the number and location of these components in use at, supplied for, being supplied for, or may be supplied for, manufactured, or being manufactured for one or more facilities or activities subject to the regulations in this part.

APS did not install the defective contact fingers into the plant and determined that this contact finger is used in 84 Magne-blast breakers at Palo Verde. None of the devices are known to contain a contact finger with an unpolished finish.

Please see additional information pertaining to GEH's extent of condition and potentially affected customers in Enclosure 2.

(vii) The corrective action which has been, is being, or will be taken; the name of the individual or organization responsible for the action; and the length of time that has been or will be taken to complete the action.

A total of 15 replacement contact fingers were identified as having an unpolished finish and were returned by PVNGS Supply Chain Services to GEH on May 1, 2019.

(viii) Any advice related to the defect or failure to comply about the facility, activity, or basic component that has been, is being, or will be given to purchasers or licensees.

Recommendations can be found in Enclosure 2.

(ix) In the case of an early site permit, the entities to whom an early site permit was transferred.

This event does not involve an early site permit.

Enclosure 2

GEH 10 CFR Part 21 Communication
SC 19-01 R0 dated May 30, 2019

HITACHI

10 CFR Part 21 Communication

SC 19-01 R0 **May 30, 2019**

PLM Spec 005N3154

To: **Arizona Public Service Company, Palo Verde Nuclear Generating**

Subject: **Stationary Primary Contact Finger, Q0114C5382P002**

[ ]	**Reportable Condition [21.21(d)]**	[ ]	**60 Day Interim Report [21.21(a)(2)]**
[X]	**Transfer of Information [21.21(b)]**	[X]	**Safety Information Communication**

Summary

On November 2, 2018 GEH shipped 43 pieces of safety related part number Q0114C5382P002, Stationary Primary Contact Finger, to APS Palo Verde. 15 of these parts were subsequently identified by APS as having a suspect finish on the contact surfaces.

Upon return of the parts to GEH, it was determined that the finish of the subject Contacts did not comply with the Critical Characteristic pertaining to these surfaces. GEH does not have sufficient information to determine if the subject condition would, or has, created a Substantial Safety Hazard or would have created a Technical Specification Safety Limit violation as it relates to the subject plant applications, as each of the Q0114C5382P002 Contacts identified were supplied for unspecified Safety Related applications. Additionally, GEH is unable to determine the number of shipped Contacts that are actually affected by this condition, nor the time required for the condition to adversely affect performance of the breaker. As such, GEH presents this document as a Transfer of Information in accordance with 10CFR Part 21.21(b) so that the staff at the identified plant(s) can determine if a Reportable Condition exists.

Please refer to the information contained in the communication and contact me if there are any questions on this information.

Background

Michelle P. Catts

Issued by:

Michelle Catts, Safety Evaluation Program Manager
GE Hitachi Nuclear Energy
3901 Castle Hayne Rd., Wilmington NC 28402
(910) 819-4491

Notice: This 10 CFR Part 21 Notification pertains only to the plants or facilities specifically indicated as being affected. GE Hitachi Nuclear Energy (GEH) has not considered or evaluated the applicability, if any, of this information to any plants or facilities other than those specifically indicated as being affected and for which GEH supplied the equipment or services addressed in the Notification. Determination of applicability of this information to a particular plant or facility, and the decision of whether or not to take action based on the Notification, are the responsibilities of the Owner of that plant or facility. This 10 CFR Part 21 Notification, its attachments and enclosures may contain proprietary information of GEH that is maintained in confidence by GEH and is subject to withholding from public disclosure under 10 CFR 2.390 and 9.17. Such GEH proprietary information is furnished in confidence solely for the purpose(s) stated in the attached transmittal letter; no other use, direct or indirect, of this GEH proprietary information is authorized, absent the prior written permission of GEH.

On November 2, 2018 GEH shipped 43 pieces of safety related part number Q0114C5382P002 Stationary Primary Contact Finger to APS Palo Verde to fulfill order number 500620990. APS reported that of the 43 provided, 15 had contact surfaces with a finish that was rough and unlike the typically smooth finish provided on electrical contact surfaces. Upon review of the photographs taken by APS, it was determined that these 15 parts were not acceptable and should be returned to GEH for replacement.

Impacted Safety Function

Part number Q0114C5382P002, Stationary Primary Contact, is the primary current carrying device for the AM medium voltage power circuit breaker. The critical function of the circuit breaker is to either close and energize the circuit or open and shut off power to the circuit. The design function of the circuit breaker is to open and interrupt a full rated fault.

The subject condition, unpolished silver plating on the stationary contact surfaces, could potentially impact the operation of the breaker in two ways. In either of these situations, the design rating of the circuit breaker could be reduced due to the possible increase in heat at the contact surface if it is operated at or close to the breaker rating. This would be a concern if all the stationary contacts in this condition were on the same phase or all phases. Depending on the rating of the breaker, there may be 12 to 24 of these contact fingers per phase. The potential concerns are:

• Premature wear of the contact surface – over a period, with repeated operation of the breaker, this unpolished surface could lead to premature wear of the mating Moving Primary Contacts and/or the Contact Supports. This will not be an issue on most circuit breakers installed at nuclear plants due to the low number of annual operations (typically less than 50 cycles a year). The effect would be much more pronounced on high-use circuit breakers.

This concern is further lessened when the contacts are properly installed. The contact support should be coated with D6A15A1 (Mobil 28 grease) prior to installing the contact finger. The lubrication will protect both surfaces from premature wear. It is also possible that over time, the wiping action of the contacts will polish this rough surface and decrease any negative effects.

• Decreased contact surface area – the contact area will be reduced due to air gaps formed between the high surface peaks of the unpolished surfaces. The effect of this concern is limited by the force on the contact by the contact springs and the main contacts when the circuit breaker is closed and is at the correct wipe. Acceptable contact surface can be verified by performing contact resistance measurement on a closed-circuit breaker. If the contact resistance measurement is acceptable then the contact surface is acceptable.

Extent of Condition

To determine the extent of condition (EoC), all GEH procurement and fulfillment history was analyzed over the last 10 years. This part is a low volume item for GEH and therefore there are few customer orders, each having a discrete purchase order to the manufacturer. Additionally, all inventory of this part at both GEH Wilmington and Philadelphia were inspected for this non-conformance.

Inventory reviewed in Philadelphia consisted of 37 total parts, all procured in 2015. GEH Wilmington inventory consisted of only 2 pieces which were procured in 2012. In all cases, no defects or deficiencies were found regarding surface finish.

In discussing the quality concern with the manufacturer, it was learned that there was a change in the sub-tier supplier in November of 2015. Any Contacts received by GEH after this change in the supply chain will fall into the suspect population. It should also be noted that it is not believed that 100% of the parts in this EoC have the deficiency.

Since November of 2015, only 2 safety related orders have shipped – both orders shipped to APS. The following safety related orders represent the extent of condition:

• APS purchase order 500616865 – quantity 6 pieces, shipped by GEH on 5/3/2018.

• APS purchase order 500620990 – quantity 43 pieces, shipped by GEH on 11/2/2018. The deficiency was discovered by APS upon receipt and subsequent installation activities related to this order.

Conclusions

Based on the evaluation of the subject condition, GEH does not have sufficient information to determine if the condition would, or has, created a Substantial Safety Hazard or would have created a Technical Specification Safety Limit violation as it relates to the subject plant. Each of the Q0114C5382P002 Stationary Primary Contact Fingers identified in the EoC were supplied for unspecified Safety Related applications. Additionally, the applicability of the potential defects to the subject population of parts cannot be fully determined. As such, GEH concludes that a Transfer of Information in accordance with 10CFR Part 21.21(b) should be issued to all potentially affected customer(s), as defined herein, so that the staff at the identified plant(s) can determine if a Reportable Condition exists.

Recommendation

GEH recommends that any Contact Fingers from the affected population that have not been placed into service be returned to GEH for replacement. RMA 5002879 has already been issued to return the 15 non-conforming parts purchased on APS PO 500620990.

Although this condition would not result in an immediate breaker failure, GEH would advise the customer to consider removing any contacts included in the EoC that have been installed so that they can be returned for inspection. It is expected, given the low probability of breaker failure, that overall plant risk is minimized by performing these replacements during normally-scheduled maintenance windows.

Attachment 1 – Recent GE Hitachi Nuclear Energy 10 CFR Part 21 Communications

The following is a list of recent 10 CFR Part 21 communications that GE Hitachi Nuclear Energy (GEH) has provided to affected licensees as Reportable Conditions (RC), Transfers of Information (TI), 60-Day Interim Reports (60 Day) or Safety Information Communications (SC).

Number	Ref.	Subject	Date
SC 19-01	PRC 19-01	Stationary Primary Contact Finger, Q0114C5382P002	5/30/2019