

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8706290019 DOC. DATE: 87/06/22 NOTARIZED: NO DOCKET #
 FACIL: 50-331 Duane Arnold Energy Center, Iowa Electric Light & Pow 05000331
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 CREW, V. Iowa Electric Light & Power Co.
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 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 87-008-01: on 870325, remote shutdown panel installed in Jul 1985 contained welds not adequately qualified. Reported on 870325 as potential 10CFR21 issue. Caused by personnel error. Panels involved modified or rewelded. W/870622 ltr.

DISTRIBUTION CODE: IE22D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 6
 TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:

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INTERNAL:	ACRS MICHELSON	1 1	ACRS MOELLER	2 2
	AEOD/DOA	1 1	AEOD/DSP/ROAB	2 2
	AEOD/DSP/TPAB	1 1	DEDRO	1 1
	NRR/DEST/ADE	1 0	NRR/DEST/ADS	1 0
	NRR/DEST/CEB	1 1	NRR/DEST/ELB	1 1
	NRR/DEST/ICSB	1 1	NRR/DEST/MEB	1 1
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	NRR/DOEA/EAB	1 1	NRR/DREP/RAB	1 1
	NRR/DREP/RPB	2 2	NRR/PMAS/ILRB	1 1
	NRR/PMAS/FTSB	1 1	<u>REG FILE</u> 02	1 1
	RES DEPY GI	1 1	RGNS FILE 01	1 1
EXTERNAL:	EG&G GROH, M	5 5	H ST LOBBY WARD	1 1
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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Duane Arnold Energy Center (DAEC) DOCKET NUMBER (2) 050003311 OF 015 PAGE (3)

TITLE (4) Inadequate Welding Qualification on the Remote Shutdown Panel due to Personnel Error

EVENT DATE (5) 03/25/87 LER NUMBER (6) 008-01 REPORT DATE (7) 06/22/87 OTHER FACILITIES INVOLVED (8) None

OPERATING MODE (8) N THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11) 20.405(b) 20.405(c) 50.73(a)(2)(iv) 73.71(b) 20.405(a)(1)(i) 50.38(c)(1) 50.73(a)(2)(v) 73.71(c) 20.405(a)(1)(ii) 50.38(c)(2) 50.73(a)(2)(vii) OTHER (Specify in Abstract below end in Text, NRC Form 366A) 20.405(a)(1)(iii) 50.73(a)(2)(i) 50.73(a)(2)(viii)(A) 20.405(a)(1)(iv) 50.73(a)(2)(ii) 50.73(a)(2)(viii)(B) 20.405(a)(1)(v) 50.73(a)(2)(iii) 50.73(a)(2)(ix)

LICENSEE CONTACT FOR THIS LER (12) NAME Valerie Crew, Technical Support Engineer TELEPHONE NUMBER 319851-7433

Table with 12 columns: CAUSE, SYSTEM, COMPONENT, MANUF. TURER, REPORTABLE TO NPRDS, CAUSE, SYSTEM, COMPONENT, MANUF. TURER, REPORTABLE TO NPRDS. Row 1: A, J, L, P, L, F, 2, 0, 1, NO

SUPPLEMENTAL REPORT EXPECTED (14) YES (If yes, complete EXPECTED SUBMISSION DATE) X NO EXPECTED SUBMISSION DATE (15)

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16) On March 12, 1987 it was determined that the remote shutdown panel installed in July 1985 contained welds which were not adequately qualified. On March 25, 1987 it was internally reported as a potential 10 CFR 21 issue. This was discovered as a result of a Quality Assurance vendor surveillance concerning a subsequent fuse panel purchase. Also, the procurement documents for the two degraded voltage relay panels installed in the plant in 1979 did not specify welding requirements. Three errors contributed to the root cause of the 1985 event. 1. The Vendor failed to meet the contract requirements that the welding on the panel conform to American Welding Society (AWS) D1.1. 2. The responsible engineer mistakenly accepted documents that he believed were welding qualification documents. 3. During vendor audits, Quality Assurance accepted that proper welding procedures existed at the Vendor as a result of viewing vendor documents that were incorrect. As immediate corrective actions the panels involved were modified or rewelded to ensure the seismic qualification was met. The contracted engineering firm involved implemented several corrective actions to preclude a recurrence of this event. Iowa Electric has accomplished a thorough review of the procedures governing review of Vendor procurement documents, the design engineering and quality assurance procurement interface, and criteria provided for Vendor source inspection checklists. Additional procedures and revisions currently in process should prevent recurrence of this event. This is being reported pursuant to 10 CFR 50.73(a)(2)(v), and as a noncompliance on the part of Frank Electric pursuant to 10 CFR 21. LEZZ

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Duane Arnold Energy Center (DAEC)	05000331	87	008	01	02	OF	05

TEXT (If more space is required, use additional NRC Form 366A's) (17)

On March 12, 1987 it was internally reported that the remote shutdown panel installed in July 1985 contained welds which were not adequately qualified. This was discovered as a result of a Quality Assurance Vendor surveillance concerning a subsequent fuse panel purchase. The surveillance also identified two panels (in the vendor's shop) in the subsequent purchase which were not adequately qualified.

Investigation of this condition, initiated on March 25, 1987, indicated that the seismic qualification was indeterminate. As a result this condition was determined to be reportable pursuant to 10 CFR 50.73a(2)(v) as 'Any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to shut down the reactor and maintain it in a safe shutdown condition.'

The design package which installed this panel required a welding procedure and welder qualification be received by the responsible engineer before the panel was manufactured. These qualification documents were required to be reviewed upon receipt for compliance with American Welding Society AWS D1.1-82. Welding in accordance with AWS D1.1-82, and receipt of the qualification documents showing AWS D1.1-82 compliance were contract stipulations with the vendor. If the practices were in compliance with the welding specification, then permission to proceed with manufacturing would be given to the vendor.

Correct documentation from the Vendor was never received and therefore not reviewed. The panel fabrication proceeded without the proper documentation stipulated in the contract with the vendor. The panel was then manufactured using a GMAW (Gas-Metal-Arc-Welding) procedure which was not qualified per AWS D1.1.

This panel was received and installed without the welding qualification documents. The panel was declared operable on July 15, 1985. This is being reported pursuant to 10 CFR 50.73a(2)(v) as 'Any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to shut down the reactor and maintain it in a safe shutdown condition.'

Three errors contributed to be the root cause of this event.

1. The vendor, Frank Electric, failed to meet the contract stipulations that the welding on the panel had to conform to American Welding Society (AWS) D1.1. If using a GMAW welding process, AWS D1.1 requires a qualified procedure and a qualified welder trained on that procedure.

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TEXT (If more space is required, use additional NRC Form 308A's) (17)

Weld coupons are tested to qualify a procedure and welder/operator per AWS D1.1. Testing to qualify a procedure involves tensile tests, bend tests and volumetric tests (per AWS D1.1). In 1978 the vendor sent welding coupons to an independent test lab in an effort to qualify their procedure and welder/operator. The lab performed the correct tests to qualify the welder and sent the vendor a report. The vendor then took this report supplied for welder/operator and used it to qualify the welding procedure per AWS D1.1. Since the testing requirements for certifying a welder/operator and a procedure are different, the procedure cannot be qualified using the same type of tests. Additional tests must be performed. Therefore the vendor welding procedure had not been qualified to the AWS D1.1.

The vendor welding procedures did not meet AWS D1.1 standards. The vendor Fabrication Inspection Checklist stated that procedures and welders were qualified per the standard. Also, vendor quality control personnel verified in writing, on a fabrication checklist, that welding was performed per AWS D1.1. Therefore, we have reason to suspect that other licensees could also potentially be affected by this defect.

2. The second contributing error was on the part of the responsible engineer in charge of the design change package. The proper welding qualification documents were not received for review prior to manufacturing the panel, which was a requirement of the contract. The only document that was sent by the vendor was the welding inspection procedure. The panel fabrication proceeded without the proper documentation stipulated in the contract with the vendor. After installation the engineer also signed that documents required for panel installation were received and attached to the package.
3. The third contributing factor was an inadequate source inspection conducted by Iowa Electric Quality Assurance in 1984. The inspectors accepted that proper welding procedures and qualified welders existed at the Vendor after viewing the Vendor Quality Control documents. The source inspection, primarily for the electrical terminations, verified from the vendor's fabrication inspection checklist that welding was qualified to AWS D1.1. Those documents later proved to be incorrect.

Actions taken to prevent recurrence are as follows:

Design Engineering and Quality Assurance administrative control procedures, implemented just prior to discovery of this problem, address the technical review of vendor documents and design interfaces. These procedures require a technical review and Quality Assurance review of safety related vendor packages prior to issuance.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

Iowa Electric thoroughly reviewed these procedures and recommended the necessary revisions to preclude a similar occurrence. The quality assurance procedure governing source inspections has been revised to include acceptance criteria (including critical characteristics), as identified by Design Engineering, into the checklist. The procedures governing review of Vendor procurement documents will be strengthened in the area of multi-disciplinary technical review when required.

The checklists established by Quality Assurance for project specific audits will be reviewed with responsible engineers to insure that items of concern are being addressed in future vendor audits.

As the responsible design organization was a contracted engineering firm, Design Engineering reemphasized to the contracted engineering firm the importance of procedural adherence and participation in the Quality Assurance audit process. Further, Iowa Electric required the contracted engineering firm to review this incident and respond with appropriate corrective actions.

The contracted engineering firm responded to Iowa Electric's request for a review and appropriate changes to preclude such an event in the future. The firm will conduct training classes on "reviewing Vendor submittals" and "Supplier Document Processing". Additional emphasis will be added to the audit checklist to verify documentation received is correct and complete. Emphasis will also be placed on checklists for review of supplier's submittals against specific requirements. Additionally, 'special processes' (i.e., welding, soldering, painting, etc.) document submittals will be reviewed by specialists in these areas.

In response to this event, a thorough review was performed on all source inspections Quality Assurance has performed since 1975. During this review it was discovered that the package which installed the two degraded voltage relay panels in 1979, did not request or contain any weld specifications or qualification documents. Without the weld qualification documents, the validity of the seismic analysis was indeterminate.

The root cause of this event was personnel error on the part of the responsible design engineer. The utility employee did not specify welding requirements in the design package.

The degraded voltage relay panels were inspected by a welding engineer. The appropriate welding requirements were identified and the panels were rewelded with Shielded-Metal-Arc-Welding (SMAW) per AWS D.1.3. The seismic qualification requirements were then valid. A review of previous purchase orders with Frank Electric was performed. It was determined that all safety related panels purchased from Frank Electric had been identified and reworked prior to the review (namely the remote shutdown panel and the two degraded voltage relay panels).

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TEXT (If more space is required, use additional NRC Form 306A's) (17)

The degraded bus voltage relays sense essential bus voltage and prevent damage to safety related equipment due to a degraded voltage condition. Actuation of these relays cause the Emergency Diesel Generators (EIGS EK) to start and the supply breakers to the busses to open, causing total decay of the bus voltage. Engineering judgement indicates that the degraded voltage relays would have performed their safety function during a seismic event.

The remote shutdown panels provide the capability for plant shutdown from outside the main control room in the event that the control room becomes uninhabitable. Updated Final Safety Analysis Report Chapter 7.4.2.2.1 states "The central remote shutdown panel, including all safety-related instrumentation mounted on it, is designed to withstand the safe shutdown earthquake with no loss of safety functions."

With the original welding documents and the inspections performed on the original welds it is indeterminate whether the remote shutdown panel would have withstood the safe shutdown earthquake with no loss of safety functions.

Currently, the plant is in a refuel outage, and the remote shutdown panel is not required. The panel was inspected by a welding engineer. The appropriate welding requirements were identified and the panels were reinforced with support brackets. This action exceeded the seismic requirements for the panel. Therefore, the seismic integrity of the remote shutdown panel is no longer in question.

This is being reported pursuant to 10 CFR 50.73a(2)(v) as 'Any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to shut down the reactor and maintain it in a safe shutdown condition.' On April 11, 1987 an evaluation concluded that this condition is reportable as a noncompliance on the part of Frank Electric Corporation, PO Box 69, York, Pennsylvania 17405, pursuant to 10 CFR 21. Verbal notification to the Region III Administrator was made on April 13, 1987.

Iowa Electric Light and Power Company

June 22, 1987
DAEC-87-0749

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

Subject: Duane Arnold Energy Center
Docket No. 50-331
Op. License DPR-49
Licensee Event Report No. 87-016

Gentlemen:

In accordance with 10 CFR 50.73 please find attached a copy of the subject revised Licensee Event Report.

Very truly yours,

 6/22/87

Rick L. Hannen
Plant Superintendent - Nuclear

RLH/VJC/go

Attachment - LER 87-008 Rev 1

cc: Mr. A. Bert Davis
Regional Administrator
Region III
U. S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, IL 60137

NRC Resident Inspector - DAEC

File A-118a

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