

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.8 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (7-4 P33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET WASHINGTON, DC 20503.

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TITLE (4)  
Failure of Division 2 Safety-Related Battery Charger Due to Deficient Supplier Soldered Connections

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
09	29	97	98	001	00	02	17	98	None	05000
									None	05000

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)			
6	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)
POWER LEVEL (10)	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(x)
000	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(iii)	73.71
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iv)	OTHER
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.38(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.38(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vi)	

LICENSEE CONTACT FOR THIS LER (12)  
M. D. Wagner, System Engineer  
TELEPHONE NUMBER (Include Area Code): (217) 935-8881, Extension 4071

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPPRS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPPRS
B	EJ	BYC	P319	Y					

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

EXPECTED SUBMISSION DATE (15) MONTH DAY YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

With the plant in COLD SHUTDOWN and no operable Alternating Current (AC) power sources, a safety-related battery charger failed to operate as expected. Operators received an alarm in the Main Control Room indicating low voltage on the Division 2 Direct Current (DC) bus. Indications also included zero amps output from the battery charger, and DC bus voltage stabilized at about 128 volts DC which is the expected voltage for a loss of the battery charger. The battery charger appeared to be stopping and starting itself "electronically"; the DC voltage and output current decreased to zero and then returned to normal. Several types of deficiencies were identified during troubleshooting. However, the cause of this event is attributed to deficient supplier workmanship in soldered wire connections at transformer T1A and fuse F-7 in the battery charger during manufacture. These issues were also applicable to the other safety-related battery chargers. The safety-related battery chargers have been reworked/repared. This event is also reportable under 10CFR21.

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DESCRIPTION OF EVENT

On September 29, 1997, the plant was in Mode 4 (COLD SHUTDOWN) for the sixth refueling outage (RF-6), and reactor [RCT] coolant temperature was being maintained within a band of 100 to 120 degrees Fahrenheit (F) and pressure was zero pounds per square inch. The three divisions of safety-related Alternating Current (AC) electrical power were inoperable due to degraded voltage and circuit breaker issues.

At about 1010 hours, the Division 2 safety-related battery charger (1DC07E) [BYC] failed to operate as expected. Operators received an alarm in the Main Control Room (MCR) indicating low voltage on the Division 2 Direct Current (DC) bus [BU][EJ]. Indications also included zero amperes output from the Division 2 battery charger, and DC bus voltage stabilized at about 128 Volts Direct Current (VDC) which is the expected voltage for a loss of the battery charger. Normal DC bus voltage is approximately 130 to 133 volts. An electrician dispatched to the Division 2 battery charger to investigate the problem noted that the battery charger appeared to be stopping and starting itself "electronically"; the battery charger DC output voltage decreased and the battery charger DC output current decreased to zero and then returned to normal. Maintenance Work Request (MWR) D78223 was initiated to investigate the failure of the Division 2 battery charger.

In response to the Division 2 battery charger failure, the Operations Shift Supervisor (SS) implemented the Required Actions of Technical Specification 3.8.5. "DC Sources - Shutdown," by placing a restraint against performing core alterations and movement of irradiated fuel assemblies in the primary and secondary containment and operations with a potential for draining the reactor, and ordering that actions be taken to restore required DC electrical power subsystems to operable status.

On October 4, 1997, during continued troubleshooting in accordance with MWR D78223, inadequate wire connections were identified throughout the Division 2 battery charger. Examples of inadequate wire connections included improper/loose soldered connections in the Silicon Controlled Rectifier (SCR) [SCR] firing circuit cards and on fuse F-7 [FU] in the SCR firing circuit. In addition, a broken wire was identified at transformer T1A [XFMR] and is suspected to have been hanging by a few wire strands at the soldered connection prior to the battery charger failure. Condition Report (CR) 1-97-10-090 was initiated to track an evaluation and resolution of these wire connection issues. Improperly soldered connections on the firing circuit cards and in various other locations were also found in the Division 1 safety-related battery charger.

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On October 7, 1997, during continued troubleshooting of the Division 2 battery charger in accordance with MWR D78223, four additional deficiencies were noted. SCRs had an excessive amount of Wakefield Type 120 heat transfer compound applied to mounting surfaces. This condition can cause potential hot spots and long term degradation of the SCRs, thus long term degradation of the battery charger. SCR gate and cathode leads were not twisted; twisting the leads provides some immunity to noise. The force gauge used to determine the amount of force being applied to the SCRs was marginal. The SCRs require 2200 pounds of force, plus or minus 10 percent; however, the force gauge provides readings in 500 pound increments, with a maximum reading of 2000 pounds. Therefore, Maintenance technicians were installing replacement SCRs based on the minimum acceptable force rather than the middle of an acceptable force range. Improper force on SCRs may cause premature degradation of the SCRs, thereby creating the potential for the charger to not operate as designed. Soldered pins for SCR gate and cathode leads on firing circuit cards were loose. CR 1-97-10-123 was initiated to track an evaluation and resolution of these issues. These four issues were also found in the Divisions 1 and 4 (1DC08E) safety-related battery chargers.

On October 11, 1997, during continued troubleshooting of the Division 2 battery charger in accordance with MWR D78223 Illinois Power (IP) identified that replacement circuit cards obtained from stores were not the same as the installed circuit cards; the affected circuit cards included amplifier, firing, sense, and High Voltage Alarm (Shutdown) (DSHV) circuit cards. The spare safety-related battery charger (1DC11E) and a non-safety battery charger used for training purposes were found to have loose soldered terminations on the SCR firing circuit cards, similar to the deficiencies found in the Division 2 battery charger. CR 1-97-10-201 was initiated to track an evaluation and resolution of these issues. Engineering Change Notices (ECNs) 30302, 30609, and 30431 were issued to allow the use of the non-like-for-like cards. No battery charger failed or could fail as a result of the these dissimilar circuit cards.

On October 13, 1997, during continued troubleshooting of the Division 2 battery charger in accordance with MWR D78223, IP identified that the mounting screws supplied with replacement DC filtering capacitors (CAP) for electrical terminations were not the correct length for certain Clinton Power Station (CPS) applications and would not provide sufficient thread engagement to meet seismic qualification requirements. Screws with insufficient length also were found installed. This issue was also identified in the Divisions 1 and 4 safety-related battery chargers. CR 1-97-10-208 was initiated to track an evaluation and resolution of this issue. The affected battery chargers are considered to have been inoperable because they failed to meet seismic qualification requirements.

On October 15, 1997, during continued troubleshooting of the Division 2 battery charger in accordance with MWR D78223, IP noted 2 anomalies with the DSHV circuit card. The installed DSHV circuit card had an approximately 16-second time delay, however, the time delay for the replacement DSHV circuit card from stores was approximately 6 seconds. The purchase specification required a 30-second time delay. The reset voltage setpoint of the DSHV circuit card was too low to allow the DSHV circuit card to reset during a momentary voltage transient while the battery charger was in the equalize mode. These issues were also identified in the Divisions 1 and 4 safety-related battery chargers. CR 1-97-10-241 was initiated to track an evaluation and resolution of the DSHV circuit card issues.

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On December 4, 1997, at about 2018 hours, the Main Control Room received a Division 1 DC bus voltage alarm. The computer point for the Division 1 DC bus voltage indicated that bus voltage had drifted down 1.6 VDC to about 128.4 VDC. In response to the voltage drift, the Division 1 battery charger float voltage was adjusted to approximately 130 VDC and the alarm was cleared. The Division 1 battery charger (1DC06E) had been recently repaired under MWR D75956 and battery charger float voltage regulation was measured as 0.21 percent from no-load to full-load output current. The maximum expected voltage change was 0.28 VDC throughout this range. MWR D82189 was initiated to determine the cause of the drifting float voltage. CR 1-97-12-100 was initiated to track an evaluation and resolution of the float voltage drift problem.

On January 16, 1998, an evaluation of these issues concluded that the inadequate soldered connection issues in the T1A transformer and the F-7 fuse resulted in a failure of the Division 2 battery charger while it was performing its safety function and caused the Division 2 safety-related battery charger to be inoperable. The other deficient soldered connections and the inadequate capacitor screw lengths had the potential to cause the loss of the Divisions 1, 2, and 4 safety-related battery chargers during a seismic event. The DSMV circuit card time delay and reset voltage setpoint deviation could have led operators to an incorrect conclusion that a loss of a safety-related battery charger during a momentary voltage excursion was initiated by a fault in the charger, thereby delaying restoration of the charger and extending the duration of the event. The combination of the inappropriate time delay and reset voltage setpoints had the potential to cause a loss of the safety function of the battery chargers. Therefore, IP determined that these issues should be reported under the provisions of 10CFR50.73.

No automatic or manually initiated safety system responses were necessary to place the plant in a safe and stable condition. This event was not affected by other inoperable equipment or components.

CAUSE OF EVENT

The cause of the Division 2 battery charger failure is attributed to deficient supplier workmanship in soldered wire connections at transformer T1A and fuse F-7 during manufacture of the Division 2 safety-related battery charger. The following discussion provides the causes for the various equipment deficiencies noted during this event.

The broken wire at transformer T1A was inspected and a few ends of the wire strands appeared bright in appearance. The majority of strand ends were tarnished, indicating that only a few strands were providing continuity, and there might have been high resistance at the termination prior to the Division 2 battery charger failure on September 29, 1997. The broken wire at transformer T1A appears to have been the result of a deficiency caused by the battery charger supplier prior to initial installation at CPS. The wire at fuse F-7 had been tinned into a J-hook; however, it was not soldered to its connection. The connection at fuse F-7 swiveled, providing intermittent continuity. The cause of this inadequate connection is attributed to deficient workmanship in soldering by the battery charger supplier prior to initial installation at CPS.

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Evaluation of the wire strand ends suggests that the wire connection from transformer T1A, which provides a signal to the SCR firing circuit cards, broke on September 29, 1997, and combined with an intermittent open circuit at fuse F-7 to cause this event. Testing at CPS using the training battery charger supports this theory; the testing was able to re-create the conditions which caused an output response identical to the condition observed during the failure of the Division 2 battery charger on September 29, 1997. With both faults inserted, the charger appeared to shut down as the battery (BTRY) maintained DC bus voltage at approximately 128 VDC and supplied the DC loads. Once the intermittent fault on fuse F-7 was made up, the charger ramped up to the preset level of approximately 132 VDC. To an observer the charger would appear to be restarting itself and charging the battery while supplying the bus loads. The testing was observed by an independent third party, Static Power Conversion Systems, who confirmed the theory.

Investigation revealed that Maintenance personnel incorrectly applied excessive heat transfer compound to the Divisions 1, 2, and 4, and spare safety-related battery chargers and failed to twist SCR gate and cathode leads during previous maintenance activities. The cause of these issues is attributed to the lack of guidance for applying heat transfer compound and twisting leads.

The force gauge used to determine the required amount of force applied to SCRs reads a maximum of 2000 pounds in 500 pound increments. The SCRs are a sandwich-type design mounted between two heat sinks and require 2200 pounds plus or minus 10 percent (1980 to 2420 pounds) of force. Per discussion with the battery charger supplier, the SCR assemblies are tightened to 2000 pounds on the bench prior to installation into the battery charger, allowing technicians to look directly at the force gauge indicator, thereby reducing parallax error. The actual force value applied to the SCRs is subject to the installer's interpolation of the force gauge indicator device. During field installation, the SCR can be mounted to the heat sink, which is already assembled into the charger, thus increasing the potential for parallax error due to the line-of-sight required to verify the indication. An alternate method for assembling of the SCRs has been identified that does not use the force gauge, but instead uses a bolt rotation method. While there is some inaccuracy in the bolt rotation method, it is judged to be more accurate than the force gauge method, making it a more desirable method.

Investigation into improper/loose soldered wire connections identified that loose terminal post connections are attributed to the application of heat to the posts while soldering the internal field wires to the firing board. The battery charger supplier acknowledged that the terminal posts are susceptible to loosening when soldering the internal field connections. The battery charger supplier re-applies solder to the reverse end of the terminal post, as required, to replace any solder lost into the hollow terminal at the terminal base when connecting the wiring. The guidance on soldering this type of connection was not previously available to Maintenance personnel performing the soldering.

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An inspection of the spare safety-related battery charger (1DC11E) identified loose soldered terminations on the SCR firing circuit card. The investigation of the cause of the loose terminations identified that Clinton Power Station (CPS) maintenance personnel soldered these deficient connections while installing the SCR firing circuit card during a previous maintenance activity. This deficiency probably would have caused a loss of function of the spare safety-related battery charger during a seismic event, if the spare charger had been installed without correcting the deficiency.

Electrical termination mounting screws supplied with replacement DC filtering capacitors were not the correct length and thus provided insufficient thread engagement. Replacement capacitor kits come with screws for applications that have crimped lug terminations. CPS applications are a bus bar configuration which uses flat and star washers and requires a longer screw for proper thread engagement. During previous maintenance activities CPS electrical maintenance personnel did not recognize that the replacement screws were dissimilar. The vendor manual did not identify the length of screws needed for the CPS application where the termination was made to a bus bar.

Investigation of the time delays in the installed DSHV circuit cards identified that they were approximately 16 seconds. The original CPS purchase specification required 30 second time delays. The new replacement DSHV circuit cards had time delays of approximately 6 seconds. The battery charger supplier provided time delays that were not in accordance with the purchase specification.

The inappropriate reset voltage setpoint for the DSKV circuit card was prescribed by Sargent & Lundy for the safety-related battery chargers, and was in effect since original installation.

The cause of the Division 1 battery charger voltage drift is attributed to a recently installed SCR firing circuit card. The SCR firing circuit card has been replaced and the deficient card has been returned to the vendor for "failure analysis."

## CORRECTIVE ACTION

Inspections of the Divisions 1, 2, and 4 safety-related battery chargers are complete and these chargers have been reworked/repared in accordance with MWKs D75956, D78223, and D75957, respectively. The spare safety-related battery charger has been inspected for deficiencies, and MWR D75960 has been initiated to track repair of identified deficiencies. No inadequate solder connections were identified in the Division 4 battery charger.

The inadequate soldered wire connections on the SCR firing cards, the broken wire at transformer T1A, and the inadequately soldered wire connection at fuse F-7 in the Division 2 battery charger were reworked under MWR D78223.

The battery charger supplier has provided guidance for correctly applying heat transfer compound and twisting SCR gate and cathode leads. This information has been incorporated into vendor manual K2989-0001.

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An alternate method for installing SCRs using the bolt rotation method has been added to vendor manual K2989-0001.

The SCR firing circuit card terminal posts for the Division 2 battery charger were re-soldered to ensure the as-left connections were adequate. The soldering technique for field wiring to SCR firing circuit card terminal posts will be added to vendor manual K2989-0001.

Instructions have been added to vendor manual K2989-0001 identifying the correct size screws for the electrical termination mounting of DC filtering capacitors to bus bar connections.

Engineering Change Notice (ECN) 30431 was issued to change the time delay in the DSEV circuit card to 10-15 seconds and raise the reset voltage setpoint from 132 volts to 135 volts. Replacement cards meeting the time delay and reset voltage setpoint requirements have been installed in the Divisions 1, 2, and 4 safety-related battery chargers. CPS is evaluating control and issuance of the circuit cards.

The battery charger deficiencies identified during this event were determined to potentially affect other safety-related equipment supplied by the same manufacturer, including the Divisions 1, 2, and 4 Nuclear Systems Protection System regulating bypass transformers (1RPO1E, 1RPO2E, 1RPO4E), the Divisions 1, 2, and 3 regulating transformers (OIP54EB, OIP55EB, 1IP7EE), and the A and B Reactor Protection System (RPS) bypass regulating transformer (1C71S005A, 1C71S005B). In addition, two non-safety switchyard battery chargers and two non-safety balance of plant battery chargers were identified as potentially affected by these issues. IP will also inspect and rework/repair, as necessary, this equipment. The Division 3 safety-related battery charger (1E22-001E) was supplied by a different supplier and has not exhibited similar evidence of degradation; however, YP will perform an inspection of this charger for deficiencies similar to those found in the Division 2 battery charger.

## ANALYSIS OF EVENT

This event is reportable under the provisions of 10CFR50.73(a)(2)(ii)(B) due to the plant being in a condition that was not in accordance with the design basis.

An assessment of the safety consequences and implications of this event concludes that this event had potential safety significance. The inadequate soldered connection issues resulted in a failure of the Division 2 battery charger while it was performing its safety function.

The improper heat transfer compound application and/or lack of SCR lead twisting has not caused a direct charger failure. No past or present conditions of improper heat transfer compound application or SCR gate and cathode lead twisting have presented a challenge to the chargers in performing their safety function. However, there was a potential for the loss of charger function in the future due to long-term heat degradation of SCRs and power diodes or unwanted noise introduction if these conditions had continued uncorrected.

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An inspection of the spare safety-related battery charger (1DC11E) identified loose soldered terminations on the firing circuit card. This deficiency probably would have caused a loss of function of the spare safety-related battery charger during a seismic event, if installed uncorrected. The spare safety-related battery charger had been previously installed as the Division 2 safety-related battery charger until 1995.

The inadequate thread engagement of mounting screws for the electrical terminations of the DC filtering capacitors had the potential to cause the loss of the Divisions 1, 2, and 4 safety-related battery chargers during a seismic event.

The reset voltage setpoint provided by Sargent & Lundy (132 VDC) for the DSHV circuit card was lower than the nominal 135 VDC equalizing potential operation of the battery chargers. The loss of a safety-related battery charger would occur during a momentary voltage excursion above 138 VDC, even if the excursion were temporary, because the reset setpoint would never be reached while the charger is operating at equalizing potential. This condition could lead operators to an incorrect conclusion that the event was initiated by a fault in the charger, thereby delaying restoration of the charger and extending the duration of the event. The combination of inappropriate time delay and reset voltage setpoints had the potential to cause a loss of the safety function of the battery chargers if it had continued uncorrected.

The Division 1 battery charger was not considered to be operable at the time the SCR firing circuit card caused the bus voltage drift on December 4, 1997. However, the Division 1 battery charger could have been declared operable (with the deficient circuit card installed) prior to the voltage transient, and if so, the deficient SCR firing circuit card would have caused a loss of the Division 1 battery charger.

During normal operation, the DC loads are powered from the battery chargers (primary source) with the batteries (secondary source) in a "float-charge" configuration on the system. A loss of either power source does not interrupt power flow to the DC bus. The battery chargers have sufficient capacity to operate all non-accident shutdown loads assuming the battery is not available. In the case of a loss of normal power to the battery charger, the DC loads are automatically powered from the Engineered Safety Feature (ESF) batteries. The batteries are sized to supply shutdown loads for a minimum of four hours without the chargers operating. Any abnormal voltage and current conditions of the battery charger are alarmed in the MCR.

The most limiting transient for the DC system is the Station Blackout event which assumes that all AC power is lost, including the battery chargers. When the battery chargers fail to operate during a Station Blackout event, the ESF batteries provide power until the emergency diesel generators become available.

**ADDITIONAL INFORMATION**

During this event, the Division 2 battery charger failed to perform its function. The Divisions 1, 2, and 4, and spare safety-related battery chargers are Model 35C-130-300 supplied by Power Conversion Products, Inc. The DSHV reset voltage setpoint was provided by Sargent & Lundy.



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IP previously reported LER 97-015 which discussed the inappropriate use of solder flux and poor workmanship during rework of MCR neon indicator light sockets.

For further information regarding this event, contact M. D. Wagner Plant Engineering, at (217) 935-8881, extension 4071.

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On January 16, 1998, an evaluation of these issues concluded that the inadequate soldered wire connection issues caused the Division 2 battery charger to fail while it was performing its safety function. On January 28, 1998, IP completed the evaluation of the battery charger deviations and concluded that these issues should be reported under the provisions of 10CFR21 (reference IP letter U-602920). The basis for the reportable conclusion is that some of the solder issues, and the DSHV time delay and reset voltage setpoint circuit card issues, were supplier deviations that left uncorrected could have caused a loss of the safety function of the Division 2 battery charger.

IP is providing the following information in accordance with 10CFR21.21(d)(4). Initial notification of this matter will be provided by facsimile of this letter to the NRC Operations Center in accordance with 10CFR21.21(d)(3) within two days of the date the responsible officer signs this letter.

- (i) Walter G. MacFarland, Chief Nuclear Officer of IP, Clinton Power Station, Highway 54, 6 Miles East, Clinton, Illinois, 61727, is informing the Nuclear Regulatory Commission of a condition reportable under the provisions of 10CFR, Part 21.
- (ii) The basic component involved in this condition is the Division 2 safety-related battery charger, manufacturer Model 3SC-130-300, and the DSHV circuit card, model DSHV120T2-01.
- (iii) The Division 2 safety-related battery charger and the DSHV circuit card were supplied to Clinton Power Station by Power Conversion Products. The DSHV circuit card reset voltage setpoint was provided by Sargent & Lundy.
- (iv) During troubleshooting of the September 29, 1997, Division 2 battery charger failure, IP identified inadequate soldered connections throughout the Division 2 battery charger. Examples of inadequate wire connections included improper/loose soldered connections in the Silicon Controlled Rectifier (SCR) firing circuit cards and on fuse F-7 in the SCR firing circuit, and a broken wire at transformer T1A hanging by a few strands at the soldered connection. In addition, IP noted 2 anomalies with the DSHV circuit card. The time delay for the installed DSHV circuit card was approximately 16 seconds, the time delay for the replacement DSHV circuit card was approximately 6 seconds, and the purchase specification required a 30-second time delay. The reset voltage setpoint of the DSHV circuit card was too low to allow the DSHV circuit card to reset during a momentary voltage transient while the battery charger was in the equalize mode.

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The identified solder connection deficiencies caused the Division 2 battery charger to fail to perform its safety function on September 29, 1997.

During a momentary voltage excursion above 138 VDC, a loss of the Division 2 safety-related battery charger would occur, even if the excursion were temporary, because the reset setpoint would never be reached while charger is operating at equalizing potential. This condition could lead operators to an incorrect conclusion that the event was initiated by a fault in the charger, thereby delaying restoration of the charger and extending the duration of the event. The combination of the inappropriate time delay and reset voltage setpoints had the potential to cause a loss of the safety function of the battery chargers if it had continued uncorrected.

- (v) The inadequate solder connections were identified on October 4, 1997, and determined to be potentially reportable under the provisions of 10CFR21. The DSHV circuit card deficiencies were identified on October 15, 1997, and determined potentially reportable under the provisions of 10CFR21. IP notified the NRC in a letter U-602876 dated December 3, 1997, that the investigation of these issues was not complete, and additional time was needed for completion. IP notified the NRC in a letter U-602920 dated January 28, 1998, that this condition was reportable under the provisions of 10CFR21 and 10CFR50.73.
- (vi) CPS has four safety-related battery chargers having the affected model number, the Divisions 1, 2, and 4, battery charger, and the safety-related spare battery charger. IP is not aware of other facilities that could be affected by this deficiency.
- (vii) The corrective action that IP is taking for these issues is identified in the CORRECTIVE ACTION portion of this report.
- (viii) IP has no advice for other purchasers or licensees regarding this issue.