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IE-01

Illinois Power Company
Clinton Power Station
P.O. Box 678
Clinton, IL 61727
Tel 217 935-8881

ILLINOIS POWER

PRIORITY ROUTING

First		Second
RA	Nas	RC
DRA	Nas	EIC
DRP		SGA
DRS	Nas	OI
DNMS		PAO
DRMA		

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U-602764
4F.190
June 19, 1997

Docket No. 50-461

Mr. A. Bill Beach
Regional Administrator, Region III
U. S. Nuclear Regulatory Commission
801 Warrenville Road
Lisle, Illinois 60532-4351

Subject: Response to Questions Concerning Testing of Circuit Breakers at Clinton Power Station

Dear Mr. Beach:

This letter responds to Nuclear Regulatory Commission letter dated June 9, 1997, from James L. Caldwell to John G. Cook which contained questions pertaining to circuit breaker material condition issues at Clinton Power Station (CPS). This letter also responds to questions that were verbally asked by members of your staff during a meeting on June 13, 1997. These questions pertained to the circuit breaker testing program at CPS. The questions in the June 9, 1997 letter, which had previously been verbally provided to Illinois Power (IP), were answered and forwarded to you in IP letter U-602755, dated June 5, 1997. Answers to the questions from the June 13, 1997 meeting are contained in Attachment A to this letter with the exception of two questions. The question regarding the acceptability of the 10 amp ductor test, and the question regarding the acceptability of the 1000 volt megger test, have not been addressed because IP is waiting for information from the circuit breaker vendors. Responses to these questions are expected to be provided by June 27, 1997.

IP is also addressing several new issues concerning the material condition of ABB 480 volt circuit breakers. A review of the as-left test data from ABB refurbishments identified that three circuit breakers had as-left ductor test results that were slightly above the acceptance criteria for that test. A ductor test is used to verify proper contact resistance of primary contacts in the circuit breaker. Satisfactory ductor test results will be obtained for these circuit breakers as well as for each in-service ABB safety-related circuit breaker that has not been refurbished. This will be completed prior to startup from the current outage. During recent refurbishment activities on ABB 480

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volt circuit breakers, ABB identified a number of loose current transformer wire terminations. It was noted that although these connections were loose, the circuit breakers still functioned properly when tested. All in-service ABB safety-related circuit breakers that were refurbished prior to this condition being identified, as well as those that have yet to be refurbished, will be inspected for this condition and any loose connections identified will be tightened as appropriate. Additionally, during recent discussions with ABB it was discovered that they (ABB) are evaluating a potential problem with current transformer orientation on their circuit breakers. Safety-related circuit breakers that have been recently refurbished have been inspected for this condition. All safety-related in-service circuit breakers that were not checked for this condition during refurbishment of the circuit breaker will undergo polarity testing to identify the existence of this condition. Any discrepancies found during this testing will be corrected prior to startup from the current outage.

Two issues with General Electric (GE) Magne-Blast circuit breakers have also been discovered. First, a problem with the engagement of the contact blocks has been observed during racking-in of these circuit breakers. Proper contact engagement is required to be observed by personnel when racking-in these circuit breakers to ensure that the breakers are properly connected to the bus. Discussions with GE and utility experts have confirmed that this has been a problem with these circuit breakers and that the problem can usually be corrected by manually assisting the contact blocks to achieve proper contact engagement. This information will be incorporated into procedures or training as appropriate. A second problem with the GE Magne-Blast circuit breakers, concerning circuit breaker to circuit breaker cubicle alignment, is also being addressed. Proper alignment of the circuit breaker to the circuit breaker cubicle was not adequately verified for the GE Magne-Blast circuit breakers that had recently had maintenance performed on them. This was caused by a maintenance procedure change that deleted part of the alignment checks necessary to ensure circuit breaker to circuit breaker cubicle alignment. GE will assist IP in verifying the proper alignment of circuit breakers to the circuit breaker cubicles prior to startup from the current outage.

If you have any questions please contact me at (217) 935-8881 extension 3400.

Sincerely yours,

Wayne D. Romberg
Assistant Vice President

MRS/krk

Attachment

cc: James L. Caldwell, Deputy Regional Administrator, Region III
Geoffrey C. Wright, USNRC, Region III
Mark Ring, USNRC, Region III
NRC Senior Resident
Dave Zemel, IDNS Resident Inspector T-31Z

Response to NRC Circuit Breaker Questions

1. Provide a list of " critical non-safety related" circuit breakers , including their functions.

   Response: "Critical non-safety related" circuit breakers is a term used by the CPS Breaker Team for circuit breakers Illinois Power has deemed important to operating the plant. Attachment B to this letter contains the list of circuit breakers considered to be "critical non-safety-related".

2. Were all refurbished ABB 480 volt circuit breakers tested to the twenty-four criteria described in Illinois Power (IP) letter U-602755? If this was not the standard practice prior to that letter, what type of testing was performed previously?

   Response: No, not all of the ABB 480 volt circuit breakers were tested to the twenty-four criteria described in letter U-602755. There were twenty-one circuit breakers refurbished prior to the issuance of letter U-602755. Nine of the twenty-one refurbished circuit breakers received a trip device test and primary current injection functional test prior to the installation of the circuit breaker into an operational cubicle. This testing ensures that the circuit breaker meets the trip time criteria and satisfies five of the twenty-four criteria on the checklist. Maintenance procedure, CPS No. 8410.02 "480 Volt Power Circuit Breaker, Generic Procedure For," was performed on the remaining twelve of the twenty-one refurbished circuit breakers that did not receive the twenty-four criteria check. The maintenance procedure performed satisfies sixteen of the twenty-four steps in the checklist, and includes: trip device testing, ductor testing, meggering, tripper bar movement testing and general inspections such as wiring integrity, arc chute condition, contact condition and hardware checks.

3. There has been a 10 CFR Part 21 notification concerning wiring on current transformers in ABB 480 volt circuit breakers. What has IP done to ensure that circuit breakers that were refurbished prior to the discovery of this problem are not affected by this condition?

   Response: The circuit breakers that have been refurbished recently were checked for this condition. The remaining twenty-six in-service safety-related circuit breakers will be inspected for this condition, and any identified discrepancies will be corrected prior to startup from the current outage.

4. The NMAC standard for ductor testing of circuit breakers specifies a 100 amp ductor. Why does IP use a 10 amp ductor instead of the NMAC specified 100 amp ductor?

   Response: The response to this question will be provided in a future letter expected to be completed by June 27, 1997. (IP is awaiting vendor information.)

5. The NMAC standard for megger testing of circuit breakers specifies a 2500 volt megger. Why does IP use a 1000 volt megger instead of the NMAC specified 2500 volt megger?

   Response: The response to this question will be provided in a future letter expected to be completed by June 27, 1997. (IP is waiting vendor information.)

6. When were the last megger and ductor tests performed on the Westinghouse safety-related circuit breakers, and what were the results of those tests? Provide a list of circuit breakers and the results.

   Response: Attachment C to this letter contains the results of this testing.

7. Which of the items in the checklist for the Westinghouse model DHP safety-related circuit breakers were applied to the Westinghouse Model DVP circuit breakers? Provide a list of the items.

   Response: All of the items in the checklist were applied to the Westinghouse model DHP circuit breakers with the exception of the steps that perform the low voltage trip timing test. This test was conducted at nominal voltage (instead of low voltage) in accordance with the CPS Technical Specification timing requirements.

Critical Non-Safety-Related Circuit Breakers

Location	Westinghouse DHP Breaker Application	Model
1AP04EA	UNIT SUBSTATION O (AND C) FEED BREAKER	75DHP500
1AP04EB	CIRC. WATER PUMP 1A FEED BREAKER	75DHP500
1AP04EC	6.9 KV BUS 1A MAIN FEED BREAKER	75DHP500
1AP04ED	CIRC. WATER PUMP 1C FEED BREAKER	75DHP500
1AP04EE	SPARE BREAKER FOR 6.9 KV BUSES	75DHP500
1AP04EF	6.9 KV BUS 1A RESERVE FEED BREAKER	75DHP500
1AP04EG	UNIT SUBSTATION 1H FEED BREAKER	75DHP500
1AP04EH	UNIT SUBSTATION 1F (AND 1J) FEED BREAKER	75DHP500
1AP04EJ	UNIT SUBSTATION 1L (AND 1D) FEED	75DHP500
1AP04EK	UNIT SUBSTATION E (AND M) FEED BREAKER	75DHP500
1AP05EB	UNIT SUBSTATION 1M (AND 1E) FEED	75DHP500
1AP05EC	UNIT SUBSTATION 1K (AND 1G) FEED	75DHP500
1AP05ED	UNIT SUBSTATION D (AND P) FEED BREAKER	75DHP500
1AP05EE	6.9 KV BUS 1B RESERVE FEED BREAKER	75DHP500
1AP05EF	FEED WATER PUMP 1C FEED BREAKER	75DHP500
1AP05EG	UNIT SUBSTATION F (AND N) FEED BREAKER	75DHP500
1AP05EH	6.9 KV BUS 1B MAIN FEED BREAKER	75DHP500
1AP05EJ	CIRC. WATER PUMP 1B FEED BREAKER	75DHP500
1AP05EK	UNIT SUBSTATION 1I FEED BREAKER	75DHP500
1AP06EA	CONDENSER VACUUM PUMP A FEED BREAKER	50DHP350
1AP06EB	L.F.M.G. SET 1A MOTOR FEED BREAKER (RR	50DHP350
1AP06EC	C.C. 1C FEED BREAKER	50DHP350
1AP06ED	C.D. 1C FEED BREAKER	50DHP350
1AP06EE	W.O. CHILLER C FEED BREAKER	50DHP350
1AP06EF	C.C. PUMP 1A FEED BREAKER	50DHP350
1AP06EG	SERVICE WATER PUMP 1C FEED BREAKER	50DHP350
1AP06EH	W.O. CHILLER A FEED BREAKER	50DHP350
1AP06EJ	UNIT SUBSTATION I (AND Q) FEED BREAKER	50DHP350
1AP06EK	4160 BUS 1A MAIN FEED BREAKER	50DHP350
1AP06EL	C.B. PUMP 1C FEED BREAKER	50DHP350
1AP06EM	4160 BUS 1A RESERVE FEED BREAKER	50DHP350
1AP06EN	SERVICE WATER PUMP 1A FEED BREAKER	50DHP350
1AP06EP	C.B. PUMP 1A FEED BREAKER	50DHP350
1AP06EQ	UNIT SUBSTATION G (AND K) FEED BREAKER	50DHP350
1AP06ER	C.D. PUMP 1A FEED BREAKER	50DHP350
1AP06ES	SERVICE AIR COMPRESSOR 0 FEED BREAKER	50DHP350
1AP06ET	ROD DRIVE PUMP 1A FEED BREAKER	50DHP350
1AP08EA	ROD DRIVE PUMP 1B FEED BREAKER	50DHP350
1AP08EB	SERVICE AIR COMPRESSOR 1 FEED BREAKER	50DHP350
1AP08EC	C.D. PUMP 1B FEED BREAKER	50DHP350
1AP08ED	UNIT SUBSTATION J (AND R) FEED BREAKER	50DHP350
1AP08EE	C.B. PUMP 1B FEED BREAKER	50DHP350
1AP08EF	SERVICE WATER PUMP 1B FEED BREAKER	50DHP350
1AP08EG	4160 BUS 1B RESERVE FEED BREAKER	50DHP350
1AP08EH	C.B. PUMP 1D FEED BREAKER	50DHP350
1AP08EJ	4160 BUS 1B MAIN FEED BREAKER	50DHP350
1AP08EK	UNIT SUBSTATION L (AND H) FEED BREAKER	50DHP350
1AP08EL	W.O. CHILLER B FEED BREAKER	50DHP350
1AP08EM	SERVICE AIR COMPRESSOR 2 FEED BREAKER	50DHP350
1AP08EN	C.C. 1B FEED BREAKER	50DHP350
1AP08EP	W.O. CHILLER D FEED BREAKER	50DHP350
1AP08EQ	C.D. 1D FEED BREAKER	50DHP350
1AP08ER	CONDENSER VACUUM PUMP A FEED BREAKER	50DHP350
1AP08ES	L.F.M.G. SET 1B MOTOR FEED BREAKER (RR	50DHP350
1AP08ET	W.O. CHILLER E FEED BREAKER	50DHP350
1RR01EB	RR BKR 5A, 60 HZ CONTROL BKR (NO PROT.	75DHP500
1RR02EB	RR BKR 5B, 60 HZ CONTROL BKR (NO PROT.	75DHP500

Location	ABB K-Line Breaker Application	Model
0AP43E-3B	480V BUS C MAIN FEED BREAKER	K-1600S
0AP43E-3C	CROSS TIE BKR 480V BUS C & D	K-1600S
0AP43E-4A	RADWASTE BLDG MCC A FEED BREAKER	K-600S
0AP43E-4B	RADWASTE BLDG MCC C FEED BREAKER	K-600S
0AP43E-4C	RADWASTE BLDG MCC E FEED BREAKER	K-600S
0AP43E-4D	RADWASTE BLDG MCC G FEED BREAKER	K-600S
0AP43E-5A	RADWASTE BLDG MCC I FEED BREAKER	K-600S
0AP43E-5B	RADWASTE BLDG MCC K FEED BREAKER	K-600S
0AP43E-5C	RADWASTE BLDG MCC M FEED BREAKER	K-600S
0AP44E-3B	480V BUS D MAIN FEED BREAKER	K-1600S
0AP44E-4A	RADWASTE BLDG MCC B FEED BREAKER	K-600S
0AP44E-4B	RADWASTE BLDG MCC D FEED BREAKER	K-600S
0AP44E-4C	RADWASTE BLDG MCC F FEED BREAKER	K-600S
0AP44E-4D	RADWASTE BLDG MCC H FEED BREAKER	K-600S
0AP44E-5A	RADWASTE BLDG MCC J FEED BREAKER	K-600S
0AP44E-5B	RADWASTE BLDG MCC L FEED BREAKER	K-600S
0AP44E-5C	RADWASTE BLDG MCC N FEED BREAKER	K-600S
0AP52E-3B	480V BUS K MAIN FEED BREAKER	K-1600S
0AP52E-5C	CCP SUPPLY AIR FAN 1A	K-600S
0AP52E-5D	CCP EXHAUST FAN 1A	K-600S
0AP53E-3B	480V BUS L MAIN FEED BREAKER	K-1600S
0AP53E-5C	CCP SUPPLY AIR FAN 1B	K-600S
0AP53E-5D	CCP EXHAUST FAN 1B	K-600S
0AP91E-3B	480V BUS O MAIN FEED BREAKER	K-1600S
0AP91E-3C	CROSS TIE BKR 480V BUS O & P	K-1600S
0AP91E-4C	CONTROL BLDG MCC A MAIN FEED BREAKER	K-600S
0AP91E-4D	CONTROL BLDG MCC C MAIN FEED BREAKER	K-600S
0AP92E-3B	480V BUS P MAIN FEED BREAKER	K-1600S
0AP92E-4C	CONTROL BLDG MCC B MAIN FEED BREAKER	K-600S
0AP92E-4D	CONTROL BLDG MCC D MAIN FEED BREAKER	K-600S
1AP14E-3B	480V BUS 1D MAIN FEED	K-1600S
1AP14E-3C	CROSS TIE BREAKER 480V BUS 1D & 1E	K-1600S
1AP14E-4B	125V DC BATTERY CHARGER 1E SUPPLY	K-600S
1AP14E-4C	SCREEN HOUSE MCC 1A FEED BREAKER	K-600S
1AP15E-3B	480V BUS 1E MAIN FEED	K-1600S
1AP15E-3C	125V DC BATTERY CHARGER 1F SUPPLY	K-600S
1AP15E-4C	SCREEN HOUSE MCC 1B FEED BREAKER	K-600S
1AP16E-3B	480V BUS 1F MAIN FEED	K-1600S
1AP16E-4A	PLANT CHILLED WATER PUMP A	K-600S
1AP16E-4B	PLANT CHILLED WATER PUMP C	K-600S
1AP16E-4D	TURBINE BLDG VENT EXH FAN 1A	K-600S
1AP17E-3B	480V BUS 1G MAIN FEED BREAKER	K-1600S
1AP17E-4A	PLANT CHILLED WATER PUMP B	K-600S
1AP17E-4B	PLANT CHILLED WATER PUMP D	K-600S
1AP17E-4D	TURBINE BLDG VENT EXH FAN 1B	K-600S
1AP17E-6A	PLANT CHILLED WATER PUMP E	K-600S
1AP18E-3B	480V BUS 1H MAIN FEED BREAKER	K-1600S
1AP18E-3C	CROSS TIE BKR 480V BUS 1H & 1I	K-1600S
1AP18E-4B	TURBINE BLDG MCC 1A FEED BREAKER	K-600S
1AP18E-4C	TURBINE BLDG MCC 1C FEED BREAKER	K-600S
1AP18E-4D	TURBINE BLDG MCC 1E FEED BREAKER	K-600S
1AP18E-5B	TURBINE BLDG MCC 1G FEED BREAKER	K-600S
1AP18E-5C	TURBINE BLDG MCC 1I FEED BREAKER	K-600S
1AP18E-5D	TURBINE BLDG MCC 1K FEED BREAKER	K-600S
1AP19E-3B	480V BUS 1I MAIN FEED	K-1600S
1AP19E-4B	TURBINE BLDG MCC 1B FEED BREAKER	K-600S

Location	ABB K-Line Breaker Application	Model
AP19E-4C	TURBINE BLDG MCC 1D FEED BREAKER	K-600S
1AP19E-4D	TURBINE BLDG MCC 1F FEED BREAKER	K-600S
1AP19E-5B	TURBINE BLDG MCC 1H FEED BREAKER	K-600S
1AP19E-5C	TURBINE BLDG MCC 1J FEED BREAKER	K-600S
1AP19E-5D	TURBINE BLDG MCC 1L FEED BREAKER	K-600S
1AP20E-3B	480V BUS 1J MAIN FEED	K-1600S
1AP20E-4A	TURBINE BLDG VENT SUPPLY FAN 1A	K-600S
1AP20E-4D	EHC FLUID PUMP 1A	K-600S
1AP20E-5A	STATOR COOLING WATER PUMP 1A	K-600S
1AP20E-5D	TURBINE BLDG CCW PUMP 1A	K-600S
1AP20E-6C	CONDENSATE TRANSFER PUMP A	K-600S
1AP20E-6D	CONDENSATE TRANSFER PUMP C	K-600S
1AP20E-7D	RX FEED PUMP TURB AUX OIL PUMP	K-600S
1AP21E-3B	480V BUS 1K MAIN FEED	K-1600S
1AP21E-4A	TURBINE BLDG VENT SUPPLY FAN 1B	K-600S
1AP21E-4D	EHC FLUID PUMP 1B	K-600S
1AP21E-5A	STATOR COOLING WATER PUMP 1B	K-600S
1AP21E-5D	TURBINE BLDG CCW PUMP 1B	K-600S
1AP21E-6D	CONDENSATE TRANSFER PUMP B	K-600S
1AP24E-3B	480V BUS 1L MAIN FEED	K-1600S
1AP24E-3C	TIE BKR 480V BUS 1L & 1M	K-1600S
1AP24E-4A	AUXILIARY BLDG MCC 1D FEED BREAKER	K-600S
1AP24E-4B	AUXILIARY BLDG MCC 1F FEED BREAKER	K-600S
1AP24E-4C	CONTROL BLDG MCC 1A FEED BREAKER	K-600S
1AP24E-4D	CONTROL BLDG MCC 1C FEED BREAKER	K-600S
1AP24E-5B	AUXILIARY BLDG MCC 1H FEED BREAKER	K-600S
1AP25E-3B	480V BUS 1M MAIN FEED	K-1600S
1AP25E-4A	AUXILIARY BLDG MCC 1E FEED BREAKER	K-600S
1AP25E-4B	AUXILIARY BLDG MCC 1G FEED BREAKER	K-600S
1AP25E-4C	CONTROL BLDG MCC 1B FEED BREAKER	K-600S
1AP25E-4D	CONTROL BLDG MCC 1D FEED BREAKER	K-600S
1AP25E-5B	AUXILIARY BLDG MCC 1I MAIN FEED	K-600S

Results of Last Westinghouse Megger and Ductor Tests

Breaker	Date	Megger test data	Ductor test data (range of the lowest to highest ductor test readings recorded)	Ductor Acceptance Criteria
1AP04EL*	5/12/97	all > 2000 Mohms	28 - 31 μohms	< 66 μohms
1AP05EA*	5/19/97	all > 2000 Mohms	26 - 45 μohms	< 66 μohms
1AP07EA	10/11/93	all > 2000 Mohms	8 - 13 μohms	< 13.2 μohms
1AP07EB	8/26/93	all > 2000 Mohms	12 - 13 μohms	< 13.2 μohms
1AP07EC	2/4/89	all > 2000 Mohms	7 - 13 μohms	< 13.2 μohms
1AP07ED	10/11/93	all > 2000 Mohms	10 - 13 μohms	< 13.2 μohms
1AP07EE	1-5-93	all > 2000 Mohms	8 - 11 μohms	< 13.2 μohms
1AP07EF	12-5-95	all > 2000 Mohms	12 μohms	< 13.2 μohms
1AP07EG	3/26/96	all > 2000 Mohms	11 - 12 μohms	< 13.2 μohms
1AP07EH	4/3/95	all > 2000 Mohms	6 - 12 μohms	< 13.2 μohms
1AP07EJ	10/6/93	all > 2000 Mohms	10 - 13 μohms	< 13.2 μohms
1AP07EK	7/20/93	all > 2000 Mohms	11 - 13 μohms	< 13.2 μohms
1AP09EA	12/30/96	all > 2000 Mohms	10.5 - 11.5 μohms	< 13.2 μohms
1AP09EB	12/30/96	all > 2000 Mohms	11.5 - 12 μohms	< 13.2 μohms
1AP09EC	12/29/96	all > 2000 Mohms	10 μohms	< 13.2 μohms
1AP09ED	8/26/92	all > 2000 Mohms	5 - 12 μohms	< 13.2 μohms
1AP09EE	8/8/91	all > 2000 Mohms	8 - 12 μohms	< 13.2 μohms
1AP09EF	4/30/96	all > 2000 Mohms	12 μohms	< 13.2 μohms
1AP09EG	12/9/90	all > 2000 Mohms	8 - 12 μohms	< 13.2 μohms
1AP09EH	12/29/96	all > 2000 Mohms	9 - 11 μohms	< 13.2 μohms
1AP09EJ	1/12/95	all > 2000 Mohms	9 to 13 μohms	< 13.2 μohms
1AP09EK	8/3/95	all > 2000 Mohms	9 - 12 μohms	< 13.2 μohms
1RR01EA*	5/16/97	all > 2000 Mohms	30 - 45 μohms	< 66 μohms
1RR01ED*	3/7/92	all > 2000 Mohms	9 - 17 μohms	< 18.4/21.6 μohms
1RR02EA*	5/19/97	all > 2000 Mohms	24 - 35 μohms	< 66 μohms
1RR02ED*	3/5/92	all > 2000 Mohms	8 - 18 μohms	< 18.4/21.6 μohms

* 6900 V Breakers. All others are 4160 V

The acceptance criteria for a megger test on a 4160 volt circuit breaker is > 6 Mohms. The acceptance criteria for a megger test on a 6900 volt circuit breaker is > 8 Mohms.