



B&W NUCLEAR TECHNOLOGIES

JHT/92-207  
September 23, 1992

3315 Old Forest Road  
P.O. Box 10935  
Lynchburg, VA 24506-0935  
Telephone: 804-385-2000  
Telecopy: 804-385-3663

Document Control Desk  
U. S. Nuclear Regulatory Commission  
Washington, DC 20555

Subject: Potential Safety Issue Regarding Operational Amplifiers

Reference: Letter to NRC Document Control Desk from J. H. Taylor  
(JHT/92-198), dated September 17, 1992; same subject.

Gentlemen:

In the referenced letter, B&W Nuclear Technologies advised of an issue that may have safety implications. Three attachments were mentioned in this letter as background, but were inadvertently omitted. We are, therefore, transmitting the following attachments at this time.

1. Letter from Bailey Controls Company, dated May 4, 1992.
2. "Attachment A"
3. "Attachment B"

Please include the above three attachments with our letter of September 17, 1992.

If you have any questions concerning this matter, please contact me at 804/385-2817 or Dave Mars at 804/385-2852.

Very truly yours,

*J. H. Taylor/bcc*

J. H. Taylor, Manager  
Licensing Services

JHT/bcc

cc: w/Attachments

- W. M. Sample, Duke Power Company
- E. C. Caba, Toledo Edison Company
- R. C. Widell, Florida Power Corporation
- M. W. Laggart, GPU Nuclear Corporation
- C. R. Gaines, Entergy Operations, Inc.
- B. S. Schofield, Tennessee Valley Authority
- L. C. Oakes, Washington Public Power Supply System
- E. E. Mahoney, Bailey Controls Company
- F. C. Sillag, Bailey Controls Company

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## Bailey Controls Company

29801 Euclid Avenue • Wickliffe, Ohio 44092 U.S.A.  
Phone: (216) 585-8500 • Telex: 980621 • Fax: (216) 943-4609

**Bailey.**

4 May, 1992

Babcock & Wilcox  
3315 Old Forrest Road  
Lynchburgh, VA 24506

Attention: Mr. C. W. Pryor

Subject: Safety Concern Report SCR-065

Dear Sir:

A potential deviation associated with some 88 series modules manufactured by Bailey Controls Co. has been identified.

Safety Concern Report (SCR-065) explains the potential deviation and the recommended corrective action. It concerns operational amplifiers which may have been used in modules originally supplied to Babcock & Wilcox for several plants.

Since this potential deviation may exist in some modules built or repaired since 1983, it requires inspection of the modules followed by corrective action as appropriate. This possible condition should be reviewed for impact on safety of plant operations. Due to our limited knowledge of the total application, Bailey Controls Co. has not notified the NRC of this potential deviation.

You are advised that this notification discharges Bailey's obligation with respect to our Quality Assurance procedures and 10CFR21.

Sincerely,  
BAILEY CONTROLS COMPANY

*E. E. Mahoney*  
E. E. Mahoney  
Director, Quality Assurance

J. R. BOHART  
MAY 11 1992

Attachment

SAFETY CONCERN REPORT

SCR-065  
Original

4 May 1992

In compliance with our Quality Assurance Program, we are notifying you of a potential deviation associated with operational amplifiers used in some 88\_ series modules. A potential deviation is a departure from technical requirements set forth in Bailey specifications which results in a reduction of the prescribed functional capability of equipment previously supplied as a basic component. This notification should facilitate the discharge of your obligations as you deem necessary.

Several modules use a particular operational amplifier to drive the output load. Operational amplifiers manufactured by National Semiconductor as part number LH0044CH may not be capable of driving the full rated load of the modules under all operating conditions. It is possible that a module may perform satisfactorily in bench or system tests, but perform marginally under conditions of full load and elevated temperature. One module was found by factory test to be incapable of reaching 100% output at the maximum rated load. Circuit analysis indicates that this condition may exist in other modules. You should evaluate the significance of this possible condition in the operation of your facility and take appropriate action.

It is recommended that circuit board assemblies contained in modules on the attached list be inspected for presence of the National Semiconductor LH0044CH part. It is recommended that modules found to contain this part be returned to Bailey Controls Co. for replacement and retest.

Prior to 1984, an operational amplifier made by Burr-Brown (BB) was used. In 1984 and later, operational amplifiers made by either National Semiconductor (= or NS) or Precision Monolithics Inc. (PMI) may have been used in new modules or repairs. Parts made by Burr-Brown or Precision Monolithics Inc. are not of concern since they are rated to drive the full load under all conditions. Modules not on the attached list are not of concern.

You are advised that this notification discharges Bailey's obligation to report safety concerns with respect to our Quality Assurance procedures and 10CFR21.

*E. E. Mahoney*  
E. E. Mahoney  
Director, Quality Assurance

List of Affected Modules & Assemblies  
PROSC #065

<u>MODULE</u>	<u>Module Part #</u>	<u>Assembly</u>	<u>Assembly Part #</u>
Auctioneer	6626435A*	Auctioneer Output Stage	6626430A1 6626432A1
Buffer Amplifier	6621670BE*****	Prime Output	6621676F1
Log. Amplifier	6622280A* 6622280C* 6622280J*	Output Stage	6622374A1
Linear Amplifier	6621720A**1 6621720A**1* 6621720J*- 6621720R*	Fine Gain & Output	6621711F1
	6621720A**2 6621720A**2* 6621720J**2 6621720R**2	Fine Gain & Output	6621711A2
aled Diff. Amp.	6628873A*****	Input Stage Output Stage	6628864E1 6628866A1
inal Converter	6623737B1 thru B4	0-100 MV Amp. Output Buffer	6623732C1 6623734A1
	6623737A1 thru A4	Output Buffer	6623734A1
	6623737? thru A8	0-100 MV Amp. Output Buffer	6623732C1 6623734A2
Summer	6627755A1*** 6627755C1***	Output Summer Output	6627752A1 6627750C1 6627752A1
Signal Converter	6629453A*** 6629453A*****	Output Buffer	6623734A1
Signal Converter	6633987A*	Output Buffer	6633990A1
Universal Test	6635140A*	Isolation Board	6635146A1
Univ. Auctioneer	6635150A**	Isolation Board	6635146A1

Note: Asterisks (\*) in the part suffix indicate that characters in these positions are not significant.

Safety Concern Report (SCR-065) Modules (\*)

<u>Qty.</u>	<u>Description</u>	<u>BCCo P/N</u>	<u>BWNS P/N</u>	<u>Contract No.</u>	<u>Date</u>	<u>Customer</u>	<u>Customer PO No.</u>	<u>Type</u>	<u>Class</u>
2	Auctioneer	6626435A2	1006716-001	788-7473080	3/23/90	AP&L/ANO-1	217914	Order	Safety
1	Log Amp	6622280C2	1104245-001	788-7612025	4/11/89	GPUN/TMI-1	T.P. 077014	Repair	Safety (1)
1	Linear Amp	6621720J101	1104237-001	788-268041	5/02/84	GPUN/TMI-1	112132	Order	Safety
1	Linear Amp	6621720J101	1104237-001	788-7612073	12/18/90	GPUN/TMI-1	0100104	Repair	Safety (1)
1	Linear Amp	6621720J111	1104238-001	788-7472168	10/31/91	FPC/CR-3	F771134D	Repair	Safety (1)
2	Linear Amp	6621720J211	1210035-001	788-7472168	10/31/91	FPC/CR-3	F771134D	Repair	Safety (1)
1	Linear Amp	6621720R1H	1006148-001	788-268136	9/22/86	GPUN/TMI-1	T.P. 039513	Order	Safety
1	Linear Amp	6621720R1H	1006148-001	788-268163	3/03/87	GPUN/TMI-1	T.P. 051032	Order	Safety
1	0-100MV Amp	6623732C1	1006971-004	788-268130	8/21/86	GPUN/TMI-1	T.P. 043201	Order	Non-Safety
1	Sig. Cond. (Temp)	6623737B1	1006972-001	788-268139	10/28/86	GPUN/TMI-1	T.P. 040681	Repair	Safety (1)
2	Sig. Cond. (Temp)	6623737B2	1006971-001	788-7612025	4/11/89	GPUN/TMI-1	T.P. 077014	Repair	Safety (1)(2)

(\*) According to BWNS/NPC records, the Modules/Assemblies listed above are the only ones effected by SCR-065.

(1) BWNS records indicate that the questionable OP-AMP was not replaced as part of the repair effort.

(2) One Signal Conditioner Module had an operational Amplifier (PC4-IC1) replaced as part of repair effort.

ATTACHMENT A

MODULES SUPPLIED BY NUCLEAR PARTS CENTER

5/29/92



# ATTACHMENT B

## List of Affected Modules & Assemblies for Bellefonte 1 & 2

Module	Module Part #	Assembly	Assembly Part #
Auctioneer	6620435A*	Auctioneer Output Stage	6626430A1 6626432A1
Buffer Amplifier	6621670BE*****	Prime Output	6621676F1
Log. Amplifier	6622280A* 6622280C* 6622280J*	Output Stage	6622374A1
LINEAR near Amplifier	6621720J**1	Fine Gain & Output	6621711F1
Scaled Diff. Amp.	6628873A*****	Input Stage Output Stage	6628864E1 6628866A1
Summer	6627755C1***	Summer Output	6622750C1 6627752A1
Signal Converter	6629453A*** 6629453A****	Output Buffer	6623734A1

No. of MODULES (1)

RPS	PAC	ESFAS
	3	
6		
	2	
8		
4	4	3
4		
18		

Note: Asterisks (\*) in the part suffix indicate that characters in these positions are not significant.

(1) PER UNIT