



**DUKE POWER**

January 22, 1990

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

Subject: McGuire Nuclear Station, Units 1 and 2  
Docket Nos. 50-369 and 50-370  
ASME Section XI Hydrostatic Testing Requirements  
Relief Request No. 89-02, Revision

Gentlemen:

By letter dated February 16, 1989, we requested relief from ASME Section XI hydrostatic testing requirements pertaining to modifications on the McGuire Nuclear Service Water system (see Attachment No. 1). The NRC staff approved our request by letter dated June 29, 1989 (see Attachment No. 2). Subsequent to your approval, and prior to our implementation of the modifications, changes to the modification plans (MG-12243, Unit 1 and MG-22243, Unit 2) were necessary.

In the original scope of the modifications, we planned to replace an existing valve with a new stainless steel (SS) valve of the same size (20 inch), and add a 12 inch length of SS pipe to the outlet side of the valve to mitigate the effects of erosion (see Attachment No. 1.) Our subsequent plans are to use a 16 inch SS valve, two 16 inch by 20 inch SS reducers, and a 12 inch SS pipe installed on the inlet side of the valve as well as the outlet side of the valve (see Attachment No. 3). Our decision to use the smaller sized valve is based on improved valve performance. Currently, when operating this system, the 20 inch valve is throttled at approximately 15% open. The 16 inch valve can be throttled open at greater than 15% reducing flow impingement on the outlet side of the valve, thereby reducing erosion.

We request that NRC staff approval of our original Relief Request be extended to include the changes to modifications MG-12243 and MG-22243. The original basis for our request for relief from hydrostatic testing is still valid. Hydrostatic testing is impractical due to the inadequacy of the test boundaries. The hydrostatic test boundary isolation valves include 36 inch, 20 inch, and 18 inch butterfly valves. These valves have a history of leakage and do not offer adequate isolation to permit a hydrostatic test.

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U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
January 22, 1990  
Page 2

In lieu of hydrostatic testing, all welds in the modification will be subjected to a dye penetrant or magnetic particle examination on root pass and finished weld. In addition, an in-service leak test will further verify the new connections do not leak.

As you know, our Unit 1 refueling outage was started early due to turbine problems. We had planned to start our Unit 1 outage in March 1990. Since this modification was planned for this outage, we request approval of this request by March 1, 1990.

Should there be any questions concerning this matter, please contact Steve LeRoy at (704) 373-6233.

Very truly yours,

*Hal B. Tucker*  
HBT

Hal B. Tucker

SEL508

Attachment

xc: Mr. S.D. Ebnetter  
Administrator, Region II  
U.S. Nuclear Regulatory Commission  
101 Marietta St., NW, Suite 2900  
Atlanta, GA 30323

Mr. Darl Hood, Project Manager  
U.S. Nuclear Regulatory Commission  
Office of Nuclear Reactor Regulation  
Washington, D.C. 20555

Mr. P.K. Van Doorn  
NRC Senior Resident Inspector  
McGuire Nuclear Station

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
January 22, 1990

Attachment No. 1



Duke Power Company  
P.O. Box 33198  
Charlotte, NC 28242

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
January 22, 1990  
ATTACHMENT NO. 1



**DUKE POWER**

February 16, 1989

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

Subject: McGuire Nuclear Station, Units 1 and 2  
Docket Nos. 50-369 and 50-370  
ASME Code Section XI Hydrostatic Testing Requirements  
Relief Request No. 89-02

Gentlemen:

Pursuant to 10 CFR 50.55a(g)(5)(iii), find attached the subject relief request that applies for exemption from ASME hydrostatic testing requirements as they pertain to modifications on the McGuire Nuclear Service Water system. There are a total of six modifications. The first modification is scheduled for implementation around July 1989; therefore, it is requested that NRC review and approval be obtained prior to that date.

Should there be any questions concerning this matter, please contact S.E. LeRoy at (704) 373-6233.

Very truly yours,

A handwritten signature in cursive script that reads "Hal B. Tucker".

Hal B. Tucker

SEL/relief3/sel

Attachment

xc: Mr. M.L. Ernst  
Deputy Regional Administrator, Region II  
U.S. Nuclear Regulatory Commission  
101 Marietta St., NW, Suite 2900  
Atlanta, GA 30323

Mr. Darl Hood  
U.S. Nuclear Regulatory Commission  
Office of Nuclear Reactor Regulation  
Washington, D.C. 20555

Mr. P.K. Van Doorn  
NRC Resident Inspector  
McGuire Nuclear Station

~~89022-30456~~ (14pp)

U.S. Nuclear Regulatory Commission  
February 16 1989

DUKE POWER COMPANY  
McGUIRE NUCLEAR STATION, UNITS 1  
REQUEST FOR RELIEF FROM ASME CODE SECTION XI REQUIREMENTS  
RELIEF REQUEST NO. 89-02

1. Component For Which Relief Is Requested:

A. Components:

- 1) Welds and flange connections on NSMs MG-12233 Rev.0 and MG-22233 Rev. 0, (see attachment 1).
- 2) Welds and flange connections on NSMs MG-12243 Rev.0 and MG-22243 Rev. 0, (see attachment 2).
- 3) Welds and flange connections on NSMs MG-22130 Rev.0, (see attachment 3).
- 4) Welds and flange connections on NSMs MG-52128 Rev.0, (see attachment 4).

These modifications are being installed as part of McGuire Nuclear Station's continuing effort to improve the reliability and maintainability of the Nuclear Service Water system. (See attachments 5-10 for flow diagrams.)

B. Function:

The Nuclear Service Water system (RN) is a nuclear safety related, Class C system that provides assured cooling water to various station heat exchangers during all phases of plant operation. In conjunction with Lake Norman and the Standby Nuclear Service Water Pond, the RN system is designed to assure cooling for normal plant operation, and to provide cooling for safe shutdown normally, or as a result of a postulated Loss of Coolant Accident. The purpose of each NSM listed above is discussed below:

- 1) NSM MG-12233 Rev. 0 and NSM MG-22233 Rev. 0 replace flow elements 1RNFE5370, 2RNFE5360, and 2RNFE5370 which provide flow indication for RN system to Component Cooling (KC) Heat Exchangers 1B, 2A, and 2B respectively.
- 2) NSM MG-12243 Rev. 0 and NSM MG-22243 Rev. 0 will replace valves 1RN-89A, 1RN-190B, 2RN-89A, and 2RN-190B which are 20 inch Fisher Butterfly valves used for flow regulation and isolation of RN system to KC Heat Exchangers.
- 3) NSM MG-22130 Rev. 0 will replace expansion joints 2RN4A and 2RN4B which are used to minimize pump suction casing loading on RN Pumps 2A and 2B respectively.

- 4) NSM MG-52128 Rev. 0 will add piping and valves to allow RN system water to the Control Area HVAC/Chilled Water system (VC/YC) chiller to be discharged to the common 36 inch RN header between Unit 1 and Unit 2. This modification will aid RN system work on Unit 1.

C. ASME III Code Class:

Equivalent Class 3

D. Materials:

See attached drawings.

2. ASME Code Section XI Requirement That Has Been Determined To Be Impractical:

ASME Boiler and Pressure Vessel Section XI, 1980 Edition through Winter 1980 addenda, Article IWA-4400 and Article IWD-5000

3. Basis For Requesting Relief:

For the modifications listed, we have determined that hydrostatic testing is impracticable due to inadequate test boundaries. The hydrostatic test boundary isolation valves include 36 inch, 20 inch, and 18 inch butterfly valves which have a history of leakage. These valves do not offer adequate isolation to accomplish a hydrostatic test using conventional hydro equipment.

The RN system is a low pressure, low temperature system with a design pressure of no more than 135 PSIG and design temperature of no more than 150 degrees-F. Hydrostatic test pressure for the RN system is 110% of the design pressure or approximately 150 PSIG. NSM MG-22130 Rev. 0 involves an additional concern of over-pressurizing and damaging the bellows assembly of the expansion joints while attempting a hydro. The expansion joints have a design pressure of 35 PSIG. Hydrostatic test pressure for this section of piping would be 38.5 PSIG. The alternate testing offers less chance of pressure damage to the bellows assembly because inservice inspection pressure at the expansion joints would be approximately 1 to 5 PSIG.

4. Alternative Testing:

All welds will be subjected to a dye penetrant (PT) or a magnetic particle (MT) examination on the root pass and on the finished weld. An in-service leak test will also be performed at normal system pressure.



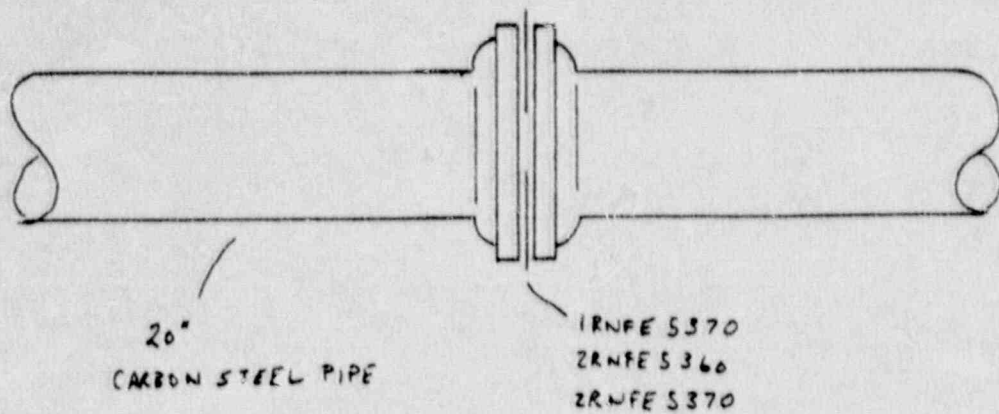
5. Why The Alternate Proposed Testing Will Provide An Acceptable Level Of Quality And Safety:

The ASME Code requires a dye penetrant (PT) or magnetic particle (MT) examination on the finished weld surface for greater than 4 inch NPS. We will have imposed an additional MT or PT on the root pass weld which will detect any defects in the root weld. The inservice leak inspection will verify the new flange connections do not leak. It is our position that the alternate testing is comparable to hydrostatic testing for finding defects in the welds and mechanical flange connections.

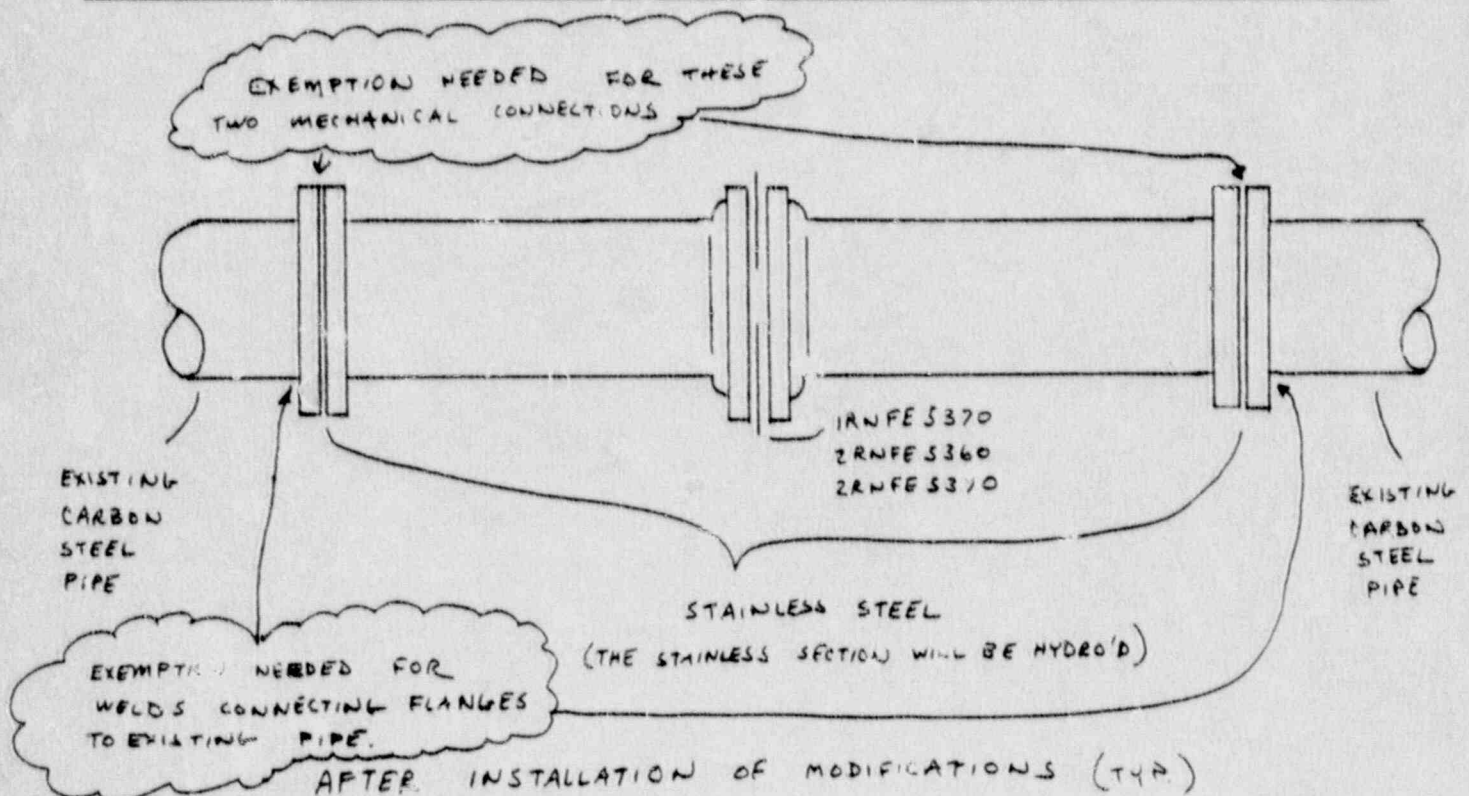
6. Implementation:

The following are the approximate dates for implementation of the modifications:

- a) NSM MG-12233 Rev. 0 - January 1, 1991
- b) NSM MG-22233 Rev. 0 - September 1, 1990
- c) NSM MG-12243 Rev. 0 - January 1, 1990
- d) NSM MG-22243 Rev. 0 - July 1, 1989
- e) NSM MG-22130 Rev. 0 - July 1, 1989
- f) NSM MG-52128 Rev. 0 - September 1, 1989

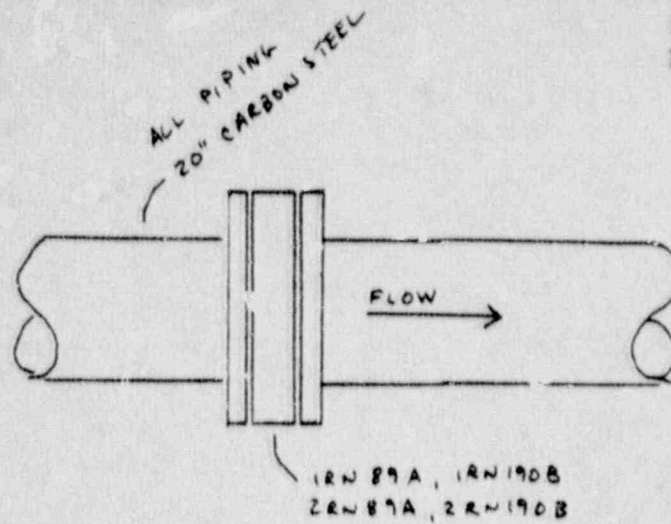


PRESENT PIPING CONFIGURATION (TYP)

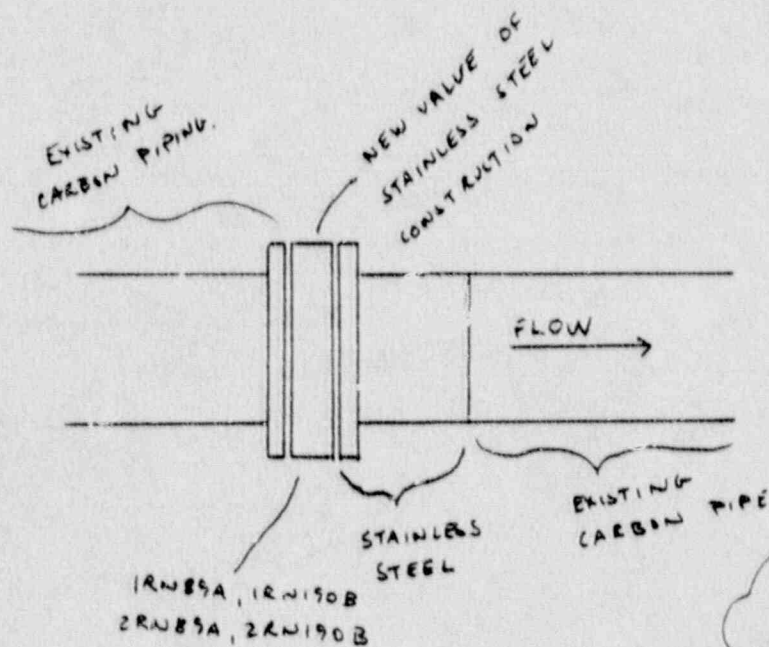


THIS DRAWING APPLIES TO NSM'S MG-12233 R.O. & MG-22233 R.O.





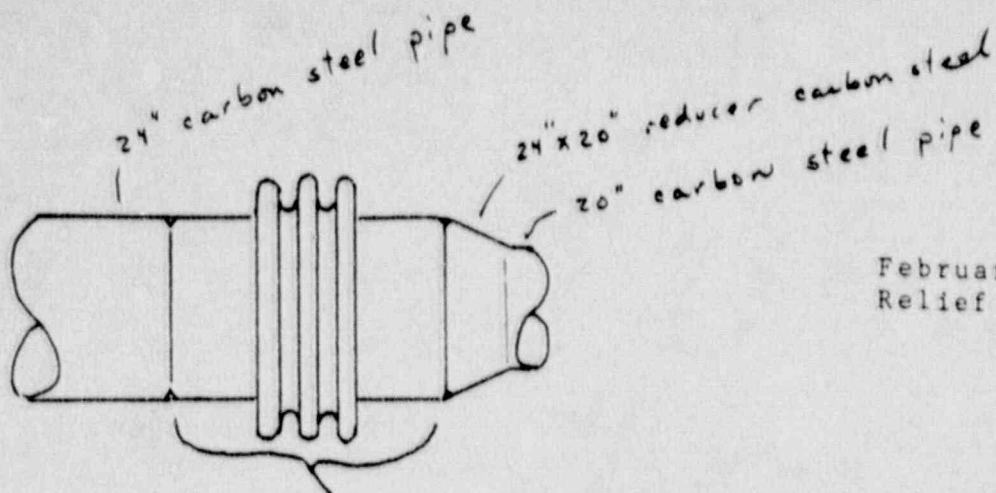
PRESENT PIPING CONFIGURATION (TYP)



EXEMPTION IS NEEDED  
FOR ALL WELDS AND  
FLANGE CONNECTIONS ASSOCIATED  
WITH THESE MODIFICATIONS.

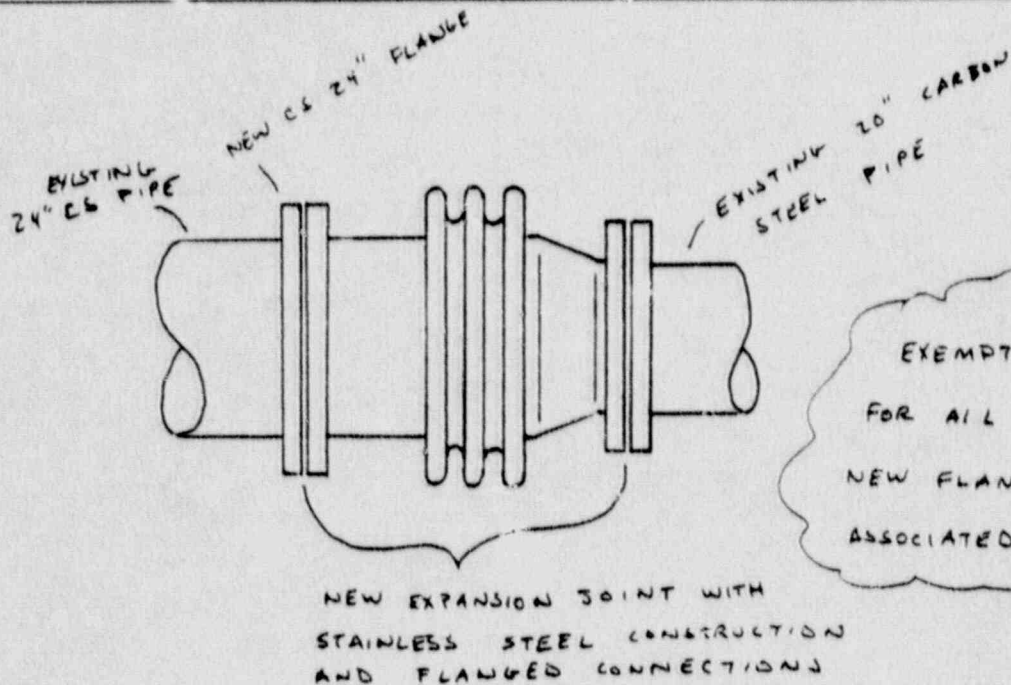
PIPING AFTER IMPLEMENTATION OF MODIFICATIONS (TYP)

THIS DRAWING APPLIES TO NSM'S MG-12243 Rv.0 + MG-22243 Rv.0



February 16, 1989  
Relief Request 89-02

### PRESENT CONFIGURATION



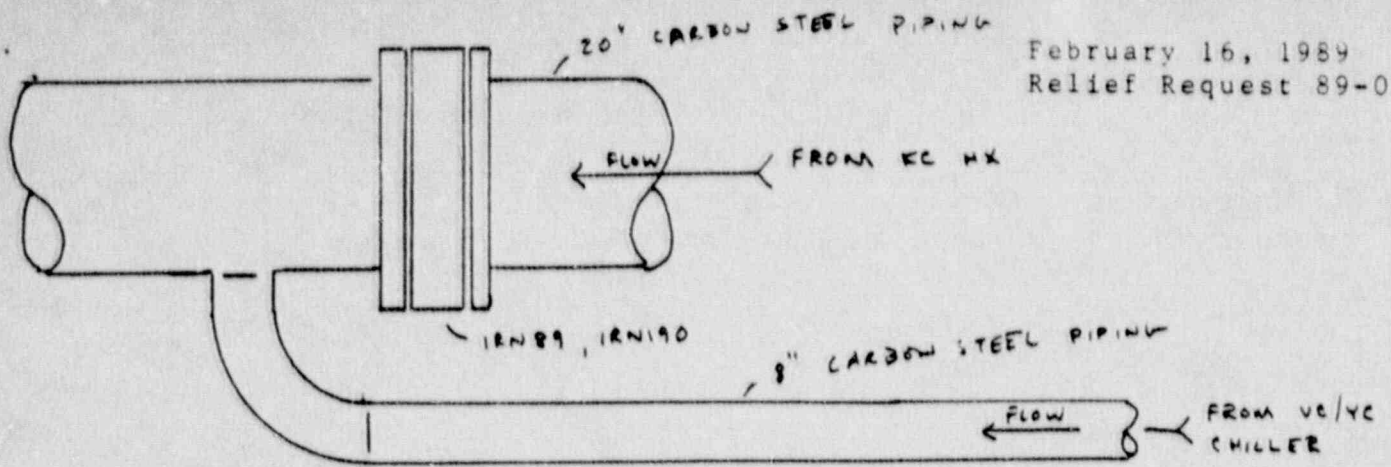
EXEMPTION IS NEEDED  
FOR ALL WELDS AND  
NEW FLANGE CONNECTIONS  
ASSOCIATED WITH THIS MOD.

### PIPING CONFIGURATION AFTER MOD IS IMPLEMENTED

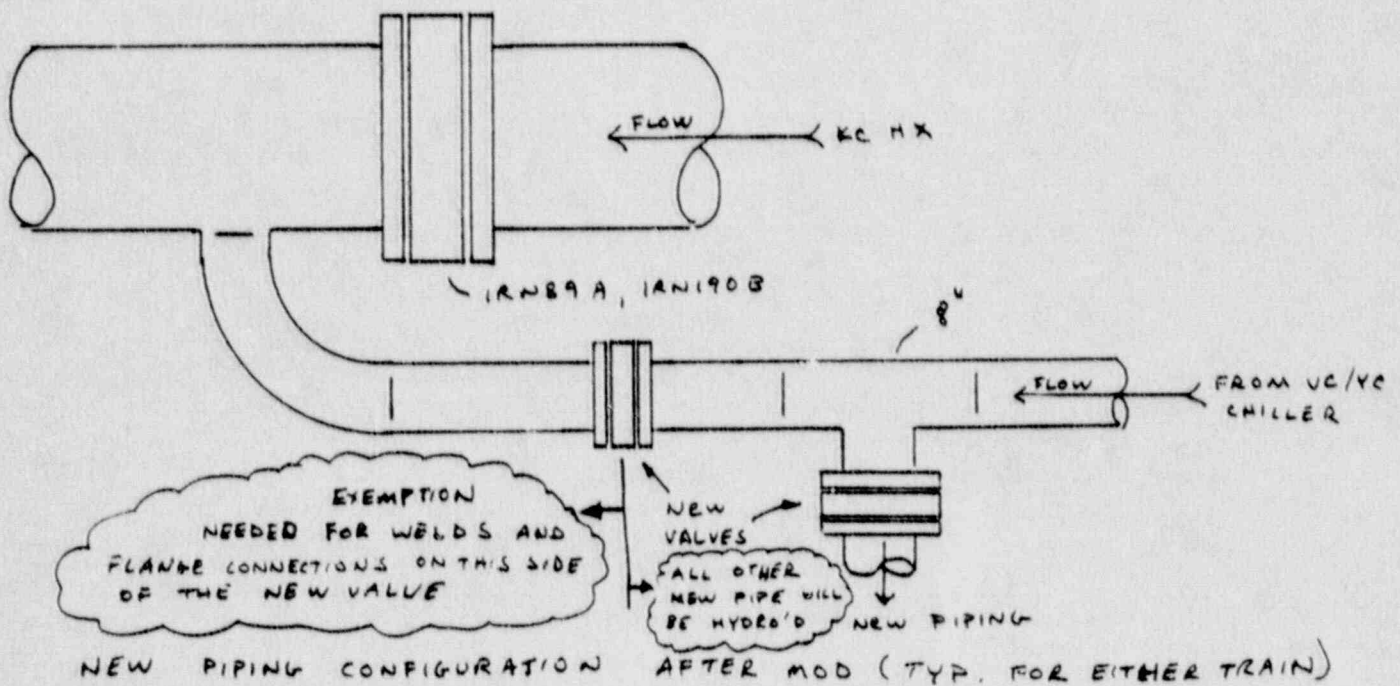
THIS DRAWING APPLIES TO NSM MG-2213D R.0

ATTACHMENT 3

February 16, 1989  
Relief Request 89-02



PRESENT PIPING CONFIGURATION (TYP. FOR EITHER TRAIN)

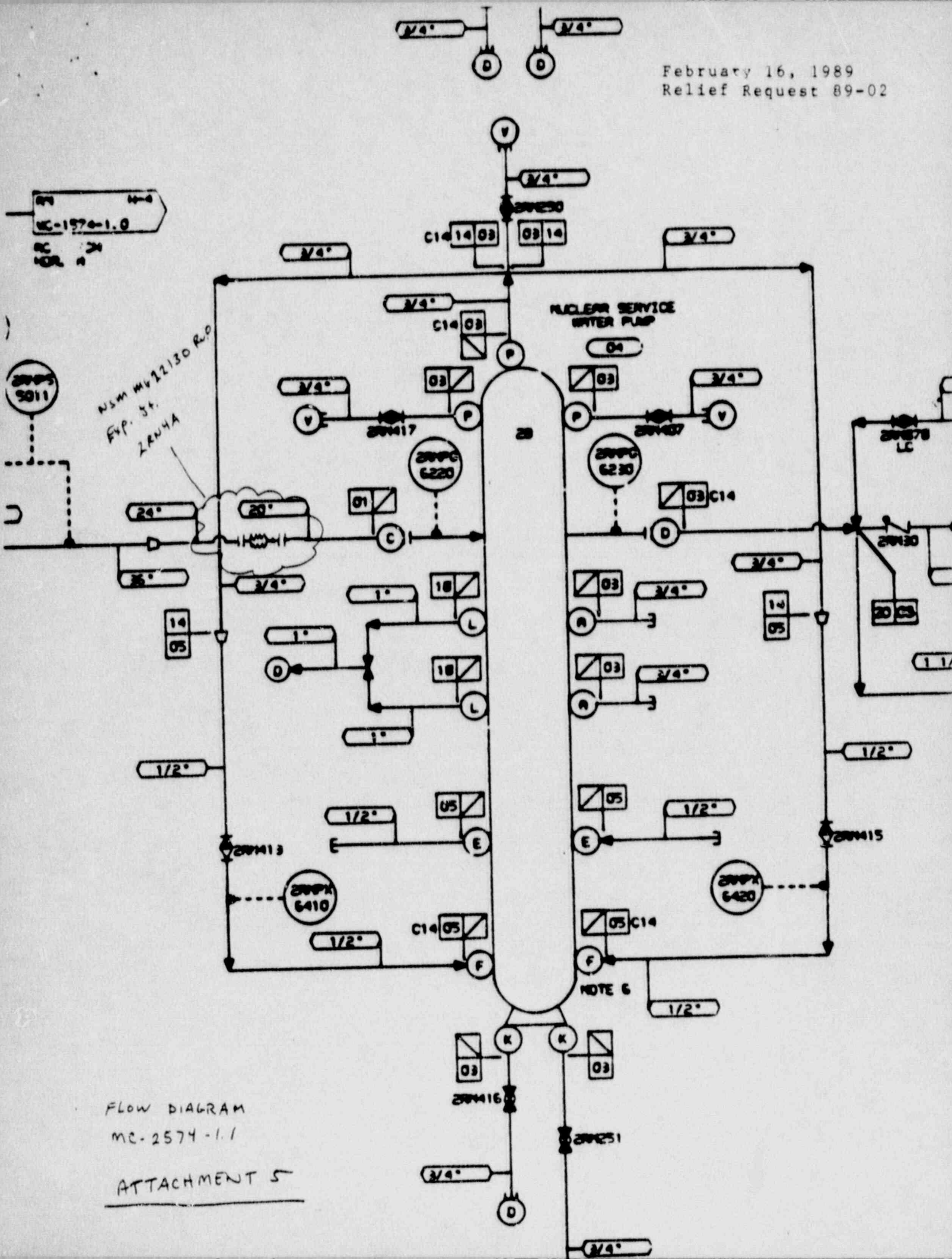


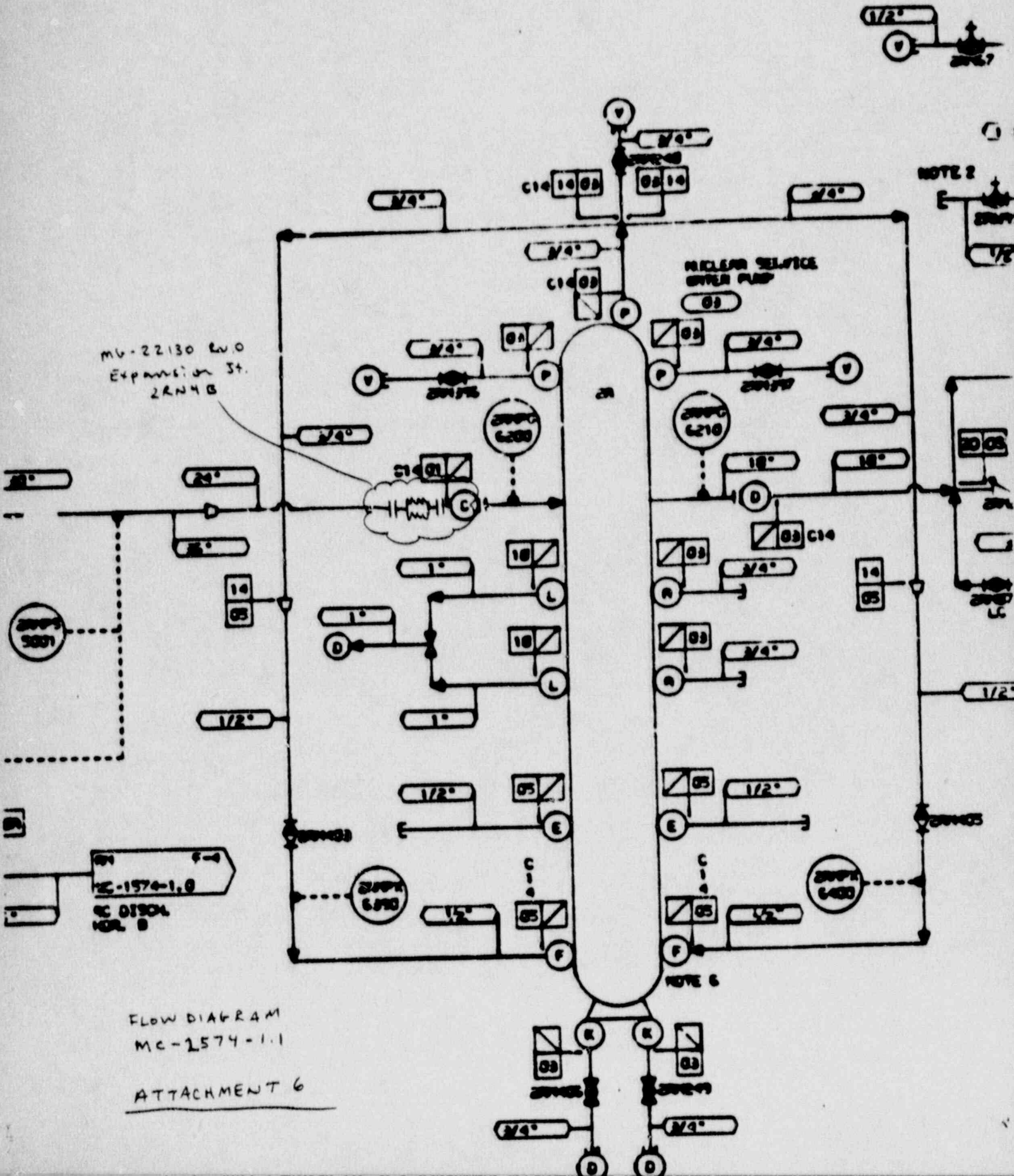
NEW PIPING CONFIGURATION AFTER MOD (TYP. FOR EITHER TRAIN)

THIS DRAWING APPLIES TO NSM MG-52128 R.U.D  
ATTACHMENT 4

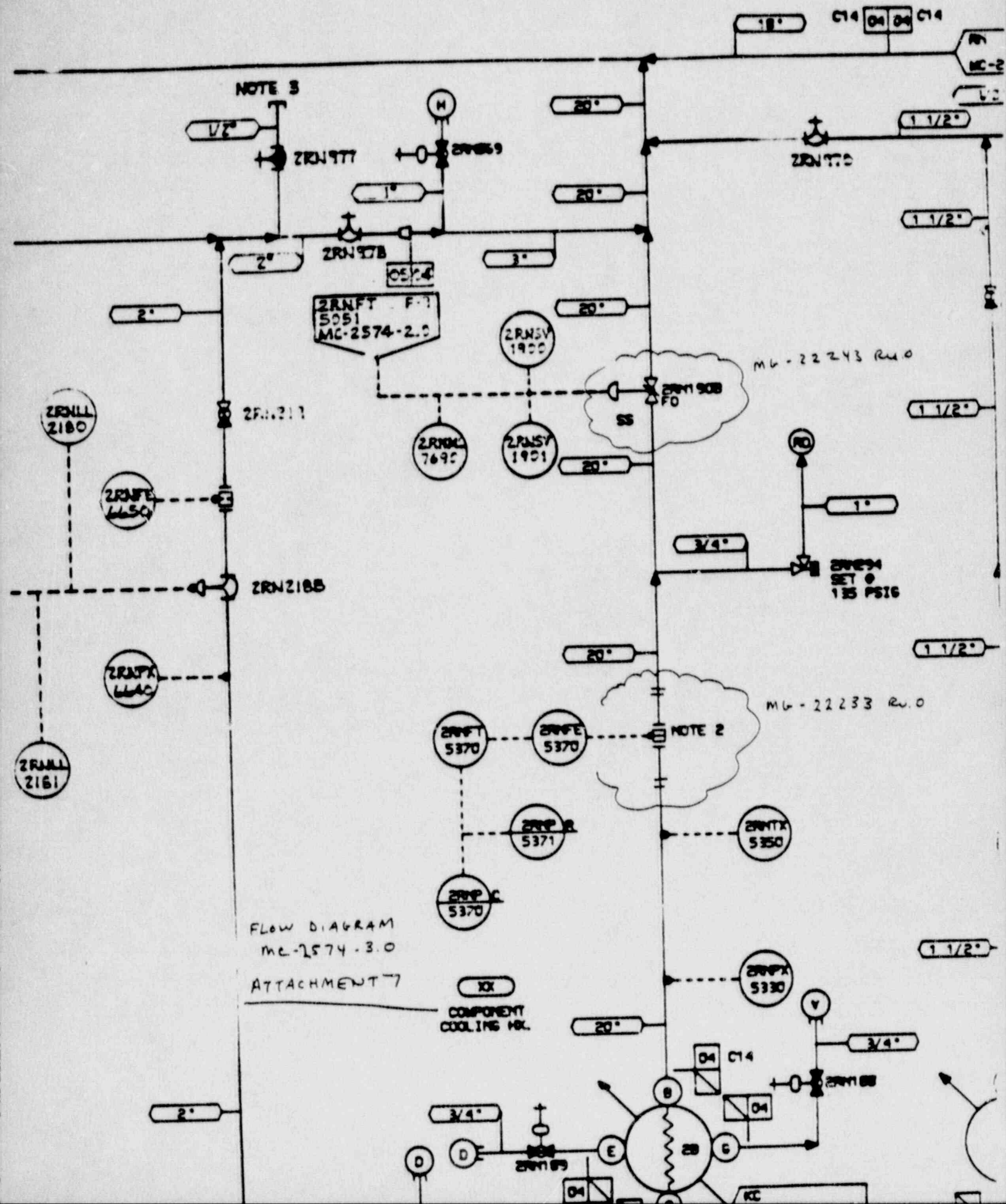


February 16, 1989  
Relief Request 89-02



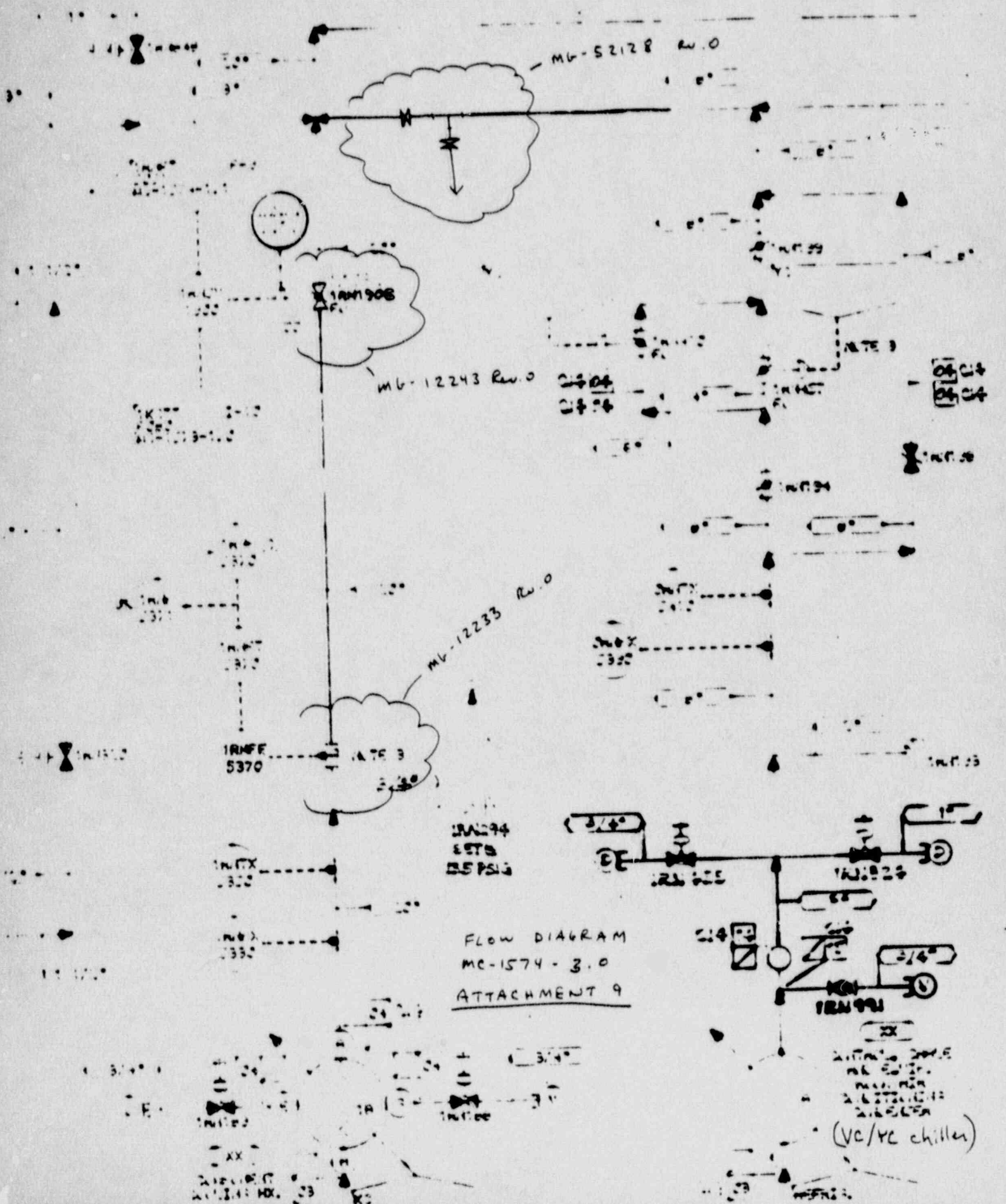


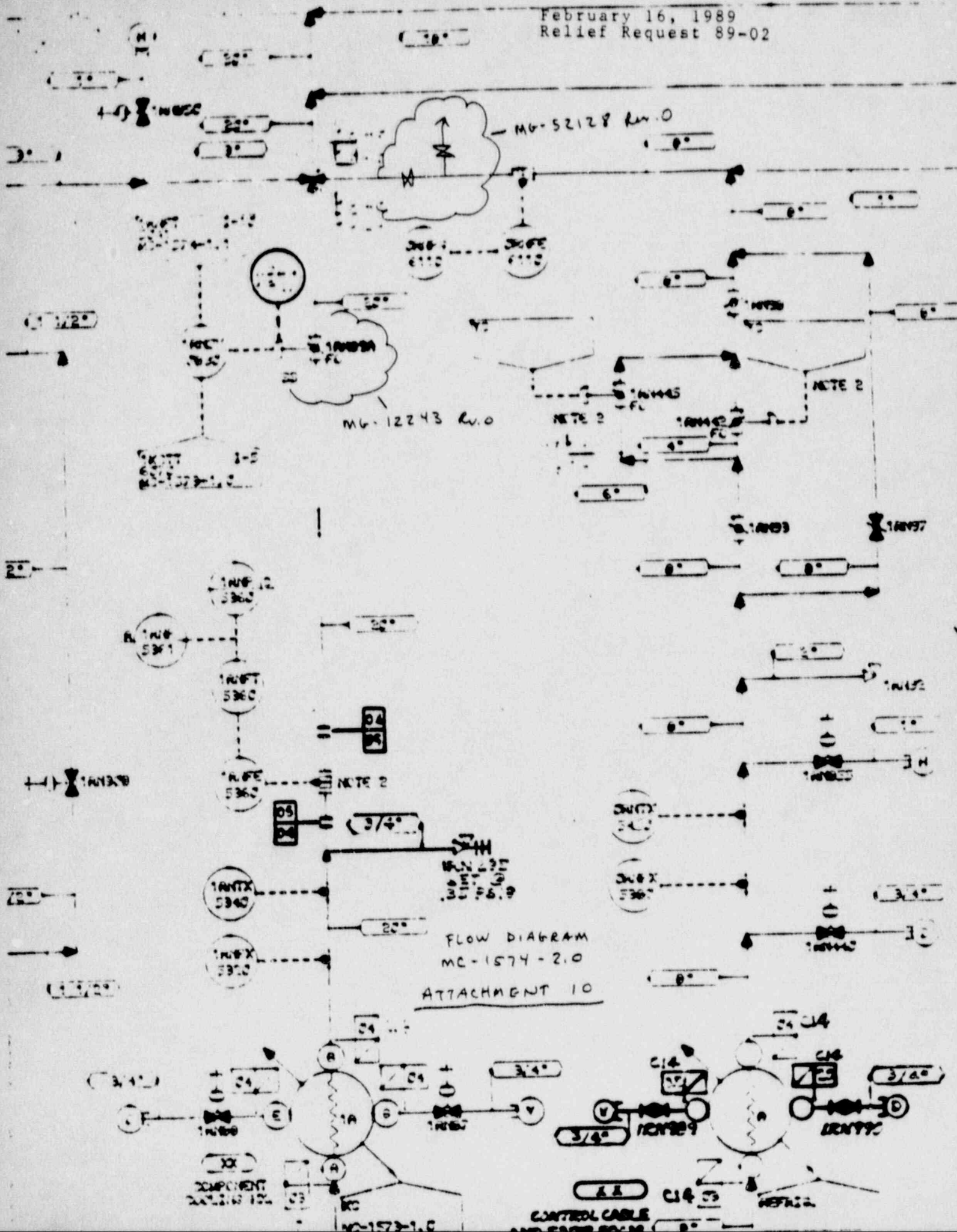
February 16, 1989  
Relief Request 89-02













U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
January 22, 1990

Attachment No. 2



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

June 29, 1989

Docket Nos. 50-369  
50-370

Mr. H. B. Tucker, Vice President  
Nuclear Production Department  
Duke Power Company  
422 South Church Street  
Charlotte, North Carolina 28242

Dear Mr. Tucker:

SUBJECT: RELIEF FOR HYDROSTATIC TESTING AFTER NUCLEAR SERVICE WATER SYSTEM  
MODIFICATIONS - MCGUIRE NUCLEAR STATION, UNITS 1 AND 2, RELIEF  
REQUESTS 88-05 AND 89-02 (TAC 68972, 68973, 72215 and 72216)

By letters dated June 27, 1988, and February 16, 1989, you requested relief from the hydrostatic pressure testing requirement of Section XI of the ASME Boiler and Pressure Vessel Code, 1980 Edition through Winter 1980 Addenda, IWA-4400 and IWB-5000. The requests (Nos. 88-05 and 89-02, respectively) are associated with modifications to the Nuclear Service Water System for McGuire Nuclear Station, Units 1 and 2. Specifically, the modifications are those identified by your following nuclear station modification (NSM) numbers:

NSM MG-12233, Revision 0	NSM MG-52128, Revision 0
NSM MG-22233, Revision 0	NSM MG-12107, Revision 0
NSM MG-12243, Revision 0	NSM MG-22107, Revision 0
NSM MG-22243, Revision 0	NSM MG-12129, Revision 0
NSM MC-22130, Revision 0	NSM MG-22129, Revision 0

In lieu of the required hydrostatic test, you proposed non-destructive examination consisting of dye penetrant or magnetic particle examination of the welds and inservice leak tests.

The staff agrees that the specific requirements of Section XI of the ASME Boiler and Pressure Vessel Code, 1980 Edition through Winter 1980 Addenda, are impractical in these cases, so that relief from the inservice hydrostatic tests required by Section XI is justified. Your alternative non-destructive examination and inservice leak testing will provide an acceptable level of structural integrity. Our Safety Evaluation is enclosed.

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Mr. H. B. Tucker

- 2 -

June 29, 1989

Accordingly, relief from the hydrostatic test requirements is granted for McGuire Units 1 and 2 as requested, pursuant to 10 CFR 50.55a(g)(6)(i). This relief is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

Sincerely,

A handwritten signature in cursive script, appearing to read "DB Matthews".

David B. Matthews, Director  
Project Directorate II-3  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Enclosure:  
As stated

cc w/encl:  
See next page



cc:

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County Manager of Mecklenburg County  
720 East Fourth Street  
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Mr. J. S. Warren  
Duke Power Company  
Nuclear Production Department  
P. O. Box 33189  
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Bishop, Cook, Purcell and Reynolds  
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Senior Resident Inspector  
c/o U.S. Nuclear Regulatory Commission  
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ESSD Projects  
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Assistant Attorney General  
N. C. Department of Justice  
P.O. Box 629  
Raleigh, North Carolina 27602



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF FROM REGULATORY REQUIREMENTS

DUKE POWER COMPANY

DOCKET NOS. 50-369 AND 50-370

MCGUIRE NUCLEAR STATION, UNITS 1 AND 2

1.0 INTRODUCTION

Technical Specification 4.0.5 for the McGuire Nuclear Station, Units 1 and 2, states that the surveillance requirements for inservice inspection of ASME Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Code and applicable Addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i).

Pursuant to 10 CFR 50.55a(g)(5), if the licensee determines that conformance with an examination requirement of Section XI of the ASME Code is not practical for the facility, information shall be submitted to the Commission in support of that determination and a request made for relief from the ASME Code requirement. After evaluation of the determination, pursuant to 10 CFR 50.55a(g)(6)(i), the Commission may grant relief and may impose alternative requirements as it determines to be authorized by law, will not endanger life or property or the common defense and security, and are otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed.

In letters dated June 27, 1988, and February 16, 1989, Duke Power Company (the licensee) requested relief from hydrostatic testing requirements of Section XI, 1980 Edition, including Winter 1980 Addenda, of the ASME Code, Article IWA-4400 and Article IWD-5000, for the McGuire Nuclear Station, Units 1 and 2. These requests were identified as Relief Request Numbers 88-05 and 89-02, respectively. Both requests are associated with modifications to the McGuire Nuclear Service Water (RN) System. The requests and supporting information have been evaluated by the NRC staff, as noted in the following description and evaluation.

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## 2.0 DESCRIPTION

### RELIEF REQUEST NO. 89-02

In its letter of February 16, 1989, the licensee requested relief from ASME Code requirements for six modifications proposed to improve the reliability and maintainability of the RN system. This system is an ASME Code, Class 3 system, providing cooling water to various heat exchangers during all phases of plant operation. The relief request is for weld and flange corrections associated with six nuclear station modifications (NSM). These six modifications and their planned dates for implementation are:

- (a) NSM MG-12233, Rev. 0 - January 1, 1991
- (b) NSM MG-22233, Rev. 0 - September 1, 1990
- (c) NSM MG-12243, Rev. 0 - January 1, 1990
- (d) NSM MG-22243, Rev. 0 - July 1, 1989
- (e) NSM MG-22130, Rev. 0 - July 1, 1989
- (f) NSM MG-52128, Rev. 0 - September 1, 1989

The purpose of each NSM listed above is discussed below:

- 1) NSM MG-12233 Rev. 0 and NSM MG-22233 Rev. 0 replace flow elements 1RNFE5370, 2RNFE5360, and 2RNFE5370 which provide flow indication for RN system to Component Cooling (KC) Heat Exchangers 1B, 2A, and 2B respectively.
- 2) NSM MG-12243 Rev. 0 and NSM MG-22243 Rev. 0 will replace valves 1RN-89A, 1RN-190B, 2RN-89A, and 2RN-190B which are 20-inch Fisher butterfly valves used for flow regulation and isolation of RN system to KC Heat Exchangers.
- 3) NSM MG-22130 Rev. 0 will replace expansion joints 2RN4A and 2RN4B which are used to minimize pump suction casing loading on RN Pumps 2A and 2B respectively.
- 4) NSM MG-52128 Rev. 0 will add piping and valves to allow RN system water to the Control Area HVAC/Chilled Water system (VC/YC) chiller to be discharged to the common 36-inch RN header between Unit 1 and Unit 2. This modification will aid RN system work on Unit 1.

For the above modifications the licensee requested relief because testing is impractical due to the inadequacy of the test boundaries. The hydrostatic test boundary isolation valves include 36-in., 20-in., and 18-in., butterfly valves. These valves have a history of leakage and do not offer adequate isolation to permit a hydrostatic test.



The RN system is a low pressure, low temperature system designed to a pressure of 135 psig and a temperature of 150° F. The required test pressure is 1.1 times design or approximately 150 psig. NSM MG-22130, Rev. 0, contains an expansion bellows assembly having a design pressure of 35 psig. The required test pressure for this section of piping would be 38.5 psig.

In lieu of hydrostatic testing, the licensee proposes that all welds in the modifications be subjected to a dye penetrant (PT) or magnetic particle (MT) examination on the root pass and finished weld. An in-service leak test would also be performed at normal system pressure.

RELIEF REQUEST NO. 88-05

In its letter of June 27, 1988, the licensee requested relief for four additional modifications to be made in the RN system. Eight welded butterfly valves will be replaced with flange end connection valves, four each in the Containment Spray and Component Cooling Systems. Relief from the hydrostatic test requirements was requested for all welds associated with the valves being replaced. The welds connect new flanges to existing pipe. The four modifications and their planned dates for implementation are:

- (a) NSM MG-12107, Rev. 0 - February 1, 1990
- (b) NSM MG-22107, Rev. 0 - August 1, 1989
- (c) NSM MG-12129, Rev. 0 - February 1, 1991
- (d) NSM MG-22129, Rev. 0 - January 1, 1991

NSM MG-12107, Rev. 0 will replace Unit 1 valves 1RN-134A and 1RN-235B and NSM MG-22107, Rev. 0 will replace corresponding Unit 2 valves 2RN-134A and 2RN-235B. These four valves provide inlet isolation to the four Containment Spray System heat exchangers. NSM MG-12129, Rev. 0 will replace Unit 1 valves 1RN-86A and 1RN-187B and NSM MG-22129, Rev. 0 will replace corresponding Unit 2 valves 2RN-86A and 2RN-187B. These four valves provide inlet isolation to the KC System heat exchangers.

The modifications for which relief has been requested will be made during refueling outages. The RN system provides coolant for the Residual Heat Removal and Spent Fuel Cooling Systems, both of which are needed during the outage. During the outage, the supply and discharge header for either train can be drained and available for work for six days on Unit 1 and ten days on Unit 2. Unit 1 is more restricted because the control room ventilation and chilled water system discharge to the Unit 1 discharge header only. Thus, when this header is drained, these systems are inoperable, which places Unit 2 in a seven day operability constraint in compliance with Technical Specification 3.7.6. These short time periods restrict the allowable time to that required for the modifications. A hydrostatic test is impractical and would add days to the outage schedule.

Since the isolation valves on the system are 36-in. butterfly valves, the valves would leak at hydrostatic test pressure. To replace the valves would involve a major undertaking. The licensee stated that the additional manpower, planning, execution expense, and burden required to perform the test would not provide a commensurate increase in operational quality.

In lieu of hydrostatic testing the licensee proposes that the welds be subjected to a liquid penetrant or magnetic particle examination on the root pass and the final welding pass. An inservice leak test at system pressure and temperature would also be made on the welds involved. The licensee believes that the alternative testing that is planned is adequate to ensure safe and consistent reliability of the system.

### 3.0 EVALUATION

We have reviewed the licensee's submittals including drawings and descriptions of the modifications. We concur with the licensee that the ASME Code requirements of Article IWA-4400 and Article IWD-5000 are impractical to perform on the modifications at the McGuire Nuclear Station, Units 1 and 2, and that the alternate testing provides an equivalent level of confidence in system integrity. We also find that due to design constraints, compliance with the Code would result in a burden on the licensee.

### 4.0 CONCLUSION

We conclude from our evaluations of the information submitted by the licensee in support of Relief Request Nos. 89-02 and 88-05 that the Section XI ASME Code requirements of Article IWA-4400 and Article IWD-5000 are impractical for McGuire Nuclear Station, Units 1 and 2. The alternative weld examinations and inservice leak tests proposed in lieu of the ASME Code requirements will ensure acceptable levels of inservice structural integrity for the RN system.

Accordingly, relief from the hydrostatic test requirements is granted as requested, pursuant to 10 CFR 50.55a(g)(6)(i). This relief is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

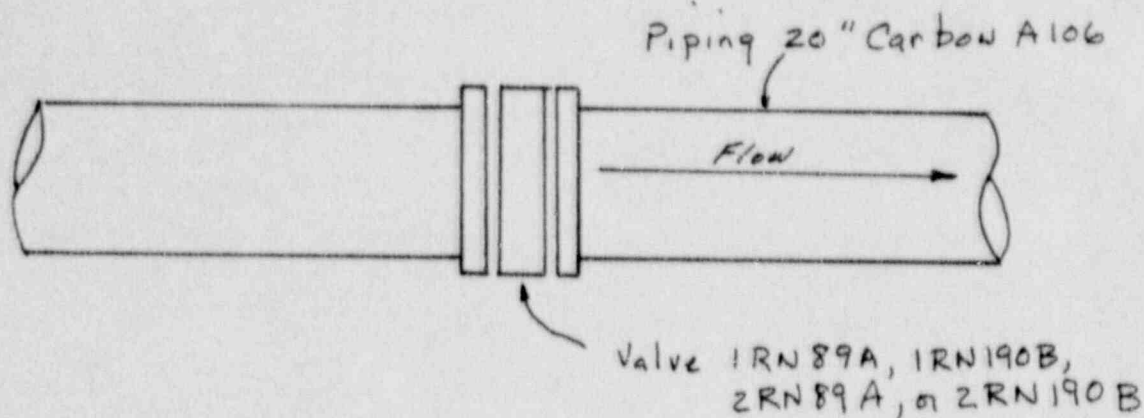
Principal Contributor: D. Hood, PD#11-3/DRP-1/II  
F. Litton, EM/EB/DEST

Dated: June 29, 1989

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
January 22, 1990

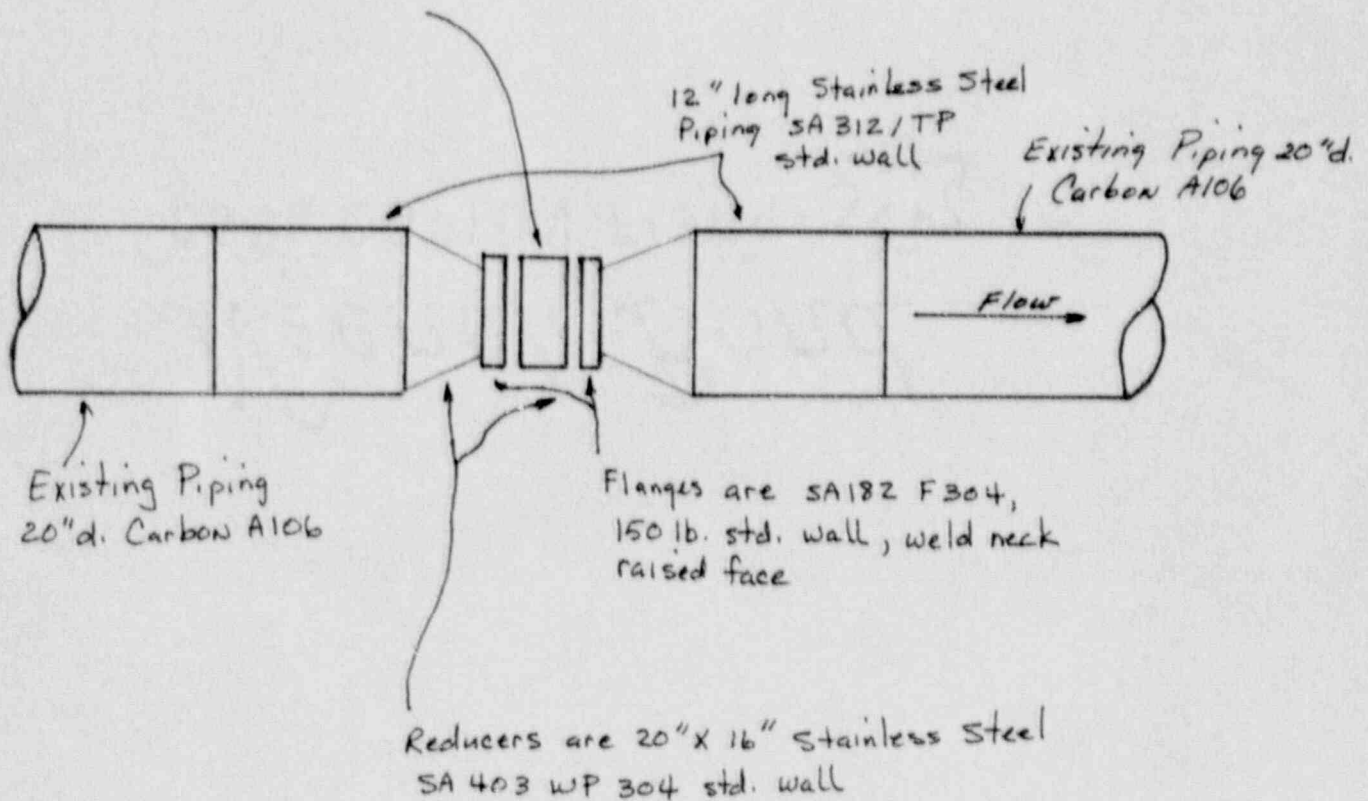
Attachment No. 3





Present Piping Configuration

New valves are 16" of Stainless Steel construction,  
 for 1RN89A, 1RN190B, 2RN89A, and 2RN190B



Piping Configuration After Implementation of  
 MG-12243 and MG-22243 Modifications