

ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8811290047 DOC.DATE: 88/09/08 NOTARIZED: YES DOCKET #
 FACIL:50-244 Robert Emmet Ginna Nuclear Plant, Unit 1, Rochester G 05000244
 AUTH.NAME AUTHOR AFFILIATION
 KOBER,R.W. Rochester Gas & Electric Corp.
 RECIP.NAME RECIPIENT AFFILIATION
 RUSSELL,W.T. Region 1, Ofc of the Director

SUBJECT: Responds to NRC Bulletin 87-001 re thinning of pipe walls in nuclear power plants.

DISTRIBUTION CODE: IE11D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 75
 TITLE: Bulletin Response (50 DKT)

NOTES:License Exp date in accordance with 10CFR2,2.109(9/19/72). 05000244

| | RECIPIENT ID CODE/NAME | COPIES LTTR ENCL | RECIPIENT ID CODE/NAME | COPIES LTTR ENCL |
|-----------|---------------------------|---------------------|---------------------------|---------------------|
| | PD1-3 LA | 1 0 | PD1-3 PD | 1 1 |
| | STAHL, C | 1 1 | | |
| INTERNAL: | AEOD/DOA | 1 1 | AEOD/DSP/TPAB | 1 1 |
| | NRR ALEXION, T | 1 1 | NRR/DEST/ADE 8H | 1 1 |
| | NRR/DEST/ADS 7E | 1 1 | NRR/DEST/MEB 9H | 1 1 |
| | NRR/DOEA/EAB 11 | 1 1 | NRR/DOEA/GCB 11 | 1 1 |
| | NRR/DREP/EPB 10 | 1 1 | NRR/PMAS/ILRB12 | 1 1 |
| | NUDOCS-ABSTRACT | 1 1 | <u>REG FILE</u> 02 | 1 1 |
| | RES/DSIR/EIB | 1 1 | RGNI FILE 01 | 1 1 |
| EXTERNAL: | LPDR | 1 1 | NRC PDR | 1 1 |
| | NSIC | 1 1 | | |

NOTE TO ALL "RIDS" RECIPIENTS:

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK,
 ROOM P1-37 (EXT. 20079) TO ELIMINATE YOUR NAME FROM DISTRIBUTION
 LISTS FOR DOCUMENTS YOU DON'T NEED!

TOTAL NUMBER OF COPIES REQUIRED: LTTR 20 ENCL 19

R
I
D
S
/
A
D
D
S

A/0-1

B



ROCHESTER GAS AND ELECTRIC CORPORATION • 89 EAST AVENUE, ROCHESTER, N.Y. 14649-0001

TELEPHONE
AREA CODE 716 546-2700

September 8, 1987

Mr. William T. Russell
Regional Administrator
U.S. Nuclear Regulatory Commission
Region 1
631 Park Avenue
King of Prussia, PA 19406

Subject: Nuclear Regulator Commission Bulletin 87-01
R.E. Ginna Nuclear Power Plant
Docket No. 50-244

Dear Mr. Russell:

NRC Bulletin 87-01 requested information concerning thinning of pipe walls in nuclear power plants. Our responses to the bulletin are attached.

Very truly yours,

Roger W. Kober
Roger W. Kober

Subscribed and sworn to me on
this 8th day of September 1987

Lynn I. Hauck
LYNN I. HAUCK
Notary Public in the State of New York
MONROE COUNTY
Commission Expires Nov. 30, 1988

xc: USNRC Document Control Desk
Desk (Original)

T. Polich, Ginna Resident
Inspector

8811290047 880908
PDR ADOCK 05000244
PDC

75
11
15-11

Response to NRC IE Bulletin 87-01

1. Question:

Identify the codes or standards to which the piping was designed and fabricated.

Response:

All safety related and non-safety related piping systems were originally designed and fabricated to the requirements of USAS B31.1 Power Piping Code. Since the original construction, repairs and/or modifications have been made which have been designed and fabricated to later codes, including ASME Section III. Reanalysis of critical safety related piping 2½" and larger was performed under the Seismic Upgrade Program which was reviewed by the NRC under SEP Topic III-6. This program updated the piping analysis basis to criteria consistent with the ANSI 31.1 Code, including Summer 1973 addenda, with some amendments. This code edition remains as the current analysis basis for modifications performed on safety related piping. Non-safety related piping is designed and fabricated in accordance with the appropriate current edition of ANSI B31.1.

2. Question:

Describe the scope and extent of your programs for ensuring that pipe wall thicknesses are not reduced below the minimum allowable thickness. Include in the description the criteria that you have established for:

- a. selecting points at which to make thickness measurements
- b. determining how frequently to make thickness measurements
- c. selecting the methods used to make thickness measurements
- d. making replacement/repair decisions

Response:

Although one facet of the pipe wall thickness inspection has been ongoing for more than 10 years, the major portions of the Ginna inspection program have been put into place over the past five years. The various facets of the program were developed in response to either maintenance concerns at the Ginna plant or industry concerns associated with pipe wall thickness degradation. Piping inspections have been performed in areas previously identified as potential problem areas, in areas which had become suspect from inspections or events at other plants, and in areas identified via regulatory information. Information sources used as references were: NRC Bulletins and IE Information Notices, INPO Significant Event Reports or Significant Operating Experience Reports, and industry meetings and contacts.

8811290047



In the determination of inspection scopes, no attempt was made to selectively inspect isolated fittings. If an area of concern was identified, pipe and fittings subject to that concern were inspected. This methodology included duplicate trains and downstream piping subject to the same operating parameters. One exception to this approach occurred while performing post Surry event inspections in December 1986. In order to provide the earliest possible information, these inspections were performed while the piping was hot. Due to the difficulty in performing "hot" inspections, the examination locations were selectively determined by using engineering judgement while assuring that the most likely areas of wall thinning were included.

For the '87 outage, the scope of systems to be inspected was expanded to cover the majority of the high energy, carbon steel piping systems (including but not limited to FW Heater & MSR Drains, Main Steam and Steam Generator Blowdown). Since the intent of the '87 outage inspection program was to sample as many of these additional systems as practical, engineering judgement was used in selecting a manageable number of components for inspection. For the December '86 and the '87 outage inspections, the dominant criteria for selection of inspection locations was the piping geometry. Based on experience at Ginna and in the industry, closely coupled fittings (such as combinations of tees, elbows, reducers, and fittings downstream of control valves) were considered to be the most likely place for erosion/corrosion to take place.

The frequency of inspections was determined by analysis of the results of data from previous outages. If inspection locations had yielded indications of significant wear, an engineering evaluation was performed to provide a basis for repair/replacement or an increased surveillance at the next scheduled outage.

Except for the turbine steam crossunder piping, which had been visually examined during a crawl-through, wall thickness measurements were made by UT examinations using current industry-accepted techniques at the time of examination.

Repair or replacement decisions prior to the '87 outage were based on an evaluation of the inspection results. For the '87 outage, a Nonconformance Report (NCR) was written for all components which experienced a greater than 30% reduction from nominal wall thickness. The NCR's were formally dispositioned with replacement/repair and further inspection decisions based on the required minimum wall thickness. Disposition of NCR's considered the piping configuration, extent of thinning, individual component service life, importance to safety and any other relevant conditions. If repair was not required, the next required inspection period was specified.

3. Question:

For liquid-phase systems, state specifically whether the following factors have been considered in establishing your criteria for selecting points at which to monitor piping thickness (Item 2a):

- a. piping material (e.g., chromium content)
- b. piping configuration (e.g., fittings less than 10 pipe diameters apart)
- c. pH of water in the system (e.g., pH less than 10)
- d. system temperature (e.g., between 190 and 500°F)
- e. fluid bulk velocity (e.g., greater than 10 ft/s)
- f. oxygen content in the system (e.g., oxygen content less than 50 ppb)

Response:

Prior to the inspections influenced by the Surry pipe failure, the criteria for selection of locations for the wall thickness measurements for liquid-phase systems was the same as that described in Item 2 above. For the inspections performed in December 1986 in response to the Surry incident, an inspection point selection criteria for liquid-phase flow systems was used that accounted for the previous Ginna Station experience and for some of the industry recognized factors affecting erosion/corrosion. The major factor considered was the piping configuration. From previous Ginna Station and other utility inspection results, tees, elbows, reducers and components downstream of control valves had the highest incidence of degradation. Locations with closely coupled combinations of these fittings were considered to have a greater potential for erosion/corrosion than those fittings having greater than ten diameters of straight pipe between them. Other considerations which led to selection of inspection points were system temperature and fluid bulk velocity.

Inspection points were also chosen which represented a configuration similar to that at Surry or were at a similar point in the system. In addition, the December 1986 inspections included portions of systems with temperatures similar to those at Surry. Since there was limited use of alloy piping materials in the original design of Ginna piping systems, piping material was not a major consideration in the inspection point selection criteria. Based on industry experience and the limited variation of the parameters within the suspect Ginna systems, pH and O₂ content in the system were not given major consideration in selecting inspection points.

These same liquid-phase selection criteria were used to determine the locations for the expanded scope of systems inspected during the '87 refueling outage.



4. Question:

Chronologically list and summarize the results of all inspections that have been performed, which were specifically conducted for the purpose of identifying pipe wall thinning, whether or not pipe wall thinning was discovered, and any other inspections where pipe wall thinning was discovered even though that was not the purpose of that inspection.

- a. Briefly describe the inspection program and indicate whether it was specifically intended to measure wall thickness or whether wall thickness measurements were an incidental determination.
- b. Describe what piping was examined and how (e.g., describe the inspection instrument(s), test method, reference thickness, locations examined, means for locating measurement point(s) in subsequent inspections).
- c. Report thickness measurement results and note those that were identified as unacceptable and why.
- d. Describe actions already taken or planned for piping that has been found to have a nonconforming wall thickness. If you have performed a failure analysis, include the results of that analysis. Indicate whether the actions involve repair or replacement, including any change of materials.

Response:

- a. Rochester Gas and Electric's inspection program is designed to determine wall loss of carbon steel piping and components. The programmatic effort began in 1983 to specifically take baseline measurements on the pre-separator system. This effort has since expanded as described below. Inspection areas have been determined as described in the response to Question #2. Since the program to date has been "concern" oriented, the following describes the inspection program for the individual areas of interest.

- (1) Routine Refueling Outage Inspection of the Turbine Crossunder Piping Between the High Pressure Turbine Sections and the Moisture Separator Reheaters.

This inspection has been a routine maintenance item for approximately the last ten refueling outages. This inspection consists of plant maintenance crews visually examining the pipe interior by crawling through the large diameter piping. The crossover piping has not had any evidence of pipe wall thickness reduction. However, the crossunder piping has had multiple areas of wall thickness degradation



and has been repaired. The procedure for repair consists of marking the areas where wall reduction was clearly evident (gouges, ripples, or depressions) and then making weld repair to bring the reduced areas back to the original wall thickness. No wall thickness measurements were taken during this routine maintenance.

Because of concern provided by a steam leak which developed in one of the expansion joints of a crossunder line, the areas of the pipe that are welded to the expansion diaphragm hinges were UT examined during the '87 refueling outage. The area of the leak was located, cut out, and replaced. To determine the extent of the problem, UT inspections were performed in similar locations on two of the other crossunder lines. These inspections found them to be in good condition. The leak was caused by corrosion resulting from poor geometry under the reinforcement pad and not due to general erosion/corrosion wear. This area of the joint is not visible during an ID inspection.

The preseparator system was installed in '83 to reduce the moisture content in the crossunders. A 70% removal effectiveness was determined through testing. Subsequent inspections indicate a reduced wear rate.

(2) Turbine Extraction Steam Piping

The extraction steam piping from the high pressure turbine to the feedwater heaters no. 4 and no. 5 was UT examined during the 1983 outage in response to the IE Information Notice 82-22 on the Oconee high pressure turbine exhaust line failure. Excessive wall reduction was found in some elbows, and they were replaced. Based on inspection results, components which had indications of significant wear were re-examined in the subsequent '84, '85, '86 & '87 refueling outages and additional elbows and piping were replaced in the '86 outage. In the '86 refueling outage, the inspection area was expanded to include the extraction steam downcomers from the low pressure turbine in the condenser neck. No unusual wear was observed at that time.

(3) Feedwater Pump Recirculation Piping

The feedwater pump recirculation line to the condenser downstream of the flow control valves has experienced excessive vibration due to suspected flashing. This piping was UT examined during the '86 refueling outage as part of the planned maintenance on the flow control valves and associated piping. Portions



of the piping were found to have excessive wall reduction and were replaced. Portions of the piping were re-examined in the subsequent '87 refueling outage. In the '87 outage a new feedwater pump recirculation/bypass piping arrangement was installed that reduces to acceptable levels the service on the old recirculation control valves to the condenser. This feedwater pump recirculation/bypass line was given a baseline thickness examination during the outage.

(4) Turbine Moisture Separator - Reheater 2nd Pass Drains to Feedwater Heater No. 5

A forced outage occurred in '86 due to the failure of an elbow downstream of the control valve in the drain line from the 2A MSR to the 5B feedwater heater (Ref. LER 86-004). Informal UT readings were taken in other portions of the same line and in similar portions of the duplicate trains which confirmed that this was an isolated situation; it should be noted that the elbow that failed had a significantly shorter length of pipe between it and the upstream control valve than all of the other lines. The failed elbow was replaced with a higher schedule of a chrome alloy material. In the subsequent '87 refueling outage the piping was re-examined and the control valve was relocated further upstream from the elbow. At the same time, the piping downstream of the control valves in the alternate dump lines to the condenser was examined, found to have excessive wall reduction, and was replaced.

(5) Feedwater Pump Suction Piping

In response to the Surry pipe failure in the feedwater pump suction piping, UT examinations were taken in December '86 in geometrically similar portions of the Ginna feedwater piping and in portions of the feedwater heater drain system while the plant was at full power operating temperatures. All of the measurements indicated that the wall thicknesses were greater than 90% of the nominal wall thickness.

(6) 1987 Outage Program Expansion

For the 1987 refueling outage, the piping inspections were expanded in response to the concerns identified regarding the Surry feedwater line break (IEN 86-106). The 299 components selected for UT examination were a combination of those requiring re-examination based on the results of previous inspections and of those systems, especially single phase liquid systems, that had not been suspected of wall



thinning problems prior to the Surry pipe failure. This scope included piping in the Steam Generator Blowdown System, the remainder of the FW Heater Drains and the Moisture Separator-Reheater Drains, including the alternate dump to the condenser. The Main Steam system was added to the scope to include the remaining high energy carbon steel piping system. The Auxiliary Feedwater discharge lines were included because of their critical plant function and moderately severe operating conditions. As a result of the inspections, portions of the Steam Generator Blowdown piping to the blowdown heat exchanger were replaced, along with portions of the Moisture Separator-Reheater drains alternate dump to the condenser. Many components inspected during 1987 have been selected for reinspection during the 1988 outage to trend the erosion/corrosion rate.

- b. The piping which was examined is described in "a" above. The method of performing the examinations is as follows.

The first step in the examination process is the removal of insulation, scale and any other materials that might interfere with the transmission of ultrasound. Next, the entire component (elbow, tee, pipe, or reducer) is laid out in grid fashion. Around the circumference of a given component, numbered rings are generated, and along the longitudinal axis lettered columns are generated. The grid size is determined according to the component's diameter. For components equal to or less than 6" in diameter, grid sizes are 1 inch; greater than 6" and less than 12" in diameter, grids are 2 inch; and greater than 12" in diameter, grids are 3 inch. The first ring begins from the centerline of the upstream weld, and its distance from the weld is the same distance as the grid size. For example, if the component has a grid size of 2 inches, the first ring would begin 2 inches downstream from the centerline of the upstream weld. The first data column follows the same rules for the reference location of a weld, typically the outside radius of an elbow, or, top center of a component. When two components are adjacent to each other, such as an elbow and a pipe (both components to be examined), the columns of the upstream component are extrapolated to the downstream component. In the case of a tee, the grids are laid out the same as for a pipe, with some variation. The rings begin on the run of a tee, leaving out the points where the bull (branch) comes out. As the last ring is marked on the run, the next ring is marked on the bull. When there is a change in flow direction or line size, the downstream component at which the flow change occurs will be examined for a distance of 12 inches. The 12 inch distance may alternately be defined in terms of a



given number of component diameters. For a representation of the component layout, refer to the drawings that follow the inspection data in Attachment 1.

After the component grid patterns have been laid out, the intersections of the grids are marked with a paint marker in order to provide locations for current and subsequent examinations. However, due to system temperatures and external surface conditions, the paint marks may not be visible for subsequent examinations. Consequently, a consistent method of component layout pattern is maintained and documented for each component. The following items are included in the component layout documentation: grid size, distance of the first ring from the upstream weld and direction the columns are lettered (clockwise or counterclockwise) in reference to flow in the component.

Once a component has been laid out, thickness readings are taken. The instruments used are the SONIC MARK I and the DMX-1. Transducers with frequencies ranging from 2.25 to 10.0 MHz and with diameters from .25" to .5" are used. The selection of the transducer is determined by the nominal wall and the component's geometry. Calibration is performed for a thickness greater than the nominal thickness expected for a given component. Nominal wall is determined from line specifications and/or previous history of the component.

Thickness readings of the component are then taken by a certified NDE technician, who either dictates the measured data to another technician, or he utilizes a data logger. The data logger can be connected to either the SONIC or the DMX-1. This device stores the thickness readings of one or more components, and the data is later downloaded into a computer.

The next step is the data entry into the computer. When the data is recorded manually the data has to be entered manually, but when the data is recorded via the data logger, then it is entered through a serial interface. Each component has a unique number assigned to it and is referred to as a summary number. This number becomes the file name of the data entered into the computer. Grid profile information, type of component, pipe wall schedule and diameter are entered along with the transducer data.

With this information entered the file is compiled and spread sheets and color plots are generated. The color plot is used as a quick reference tool to locate a potential area of concern for a given component. The colors represent different percentages of the nominal wall remaining. The spread sheet is used for exact



thickness readings for specific grid locations. (Refer to the sample plot and spread sheet that are attached as Attachment 2)

- c. Thickness measurement results are reported chronologically in Attachment 1.
- d. Actions taken based on thickness measurement results are described in Attachment 1. The "Remarks" column will indicate next to a specific component if it was repaired, replaced or scheduled for further inspection.

5. Question:

Describe any plans either for revising the present or for developing new or additional programs for monitoring pipe wall thickness.

Response:

A significant level of pipe wall thickness inspections have already been made in both single and two phase flow systems as part of the existing Ginna Station program. To date, 501 component UT examinations have been performed, and the results have been recorded and appropriate actions taken. The turbine crossunder piping has been routinely visually examined and repaired as necessary. Beginning with the '87 refueling outage, the procedure for dispositioning non-conforming wall thickness measurements has been more closely controlled by processing a Non-Conformance Report using the plant QA program. The results from previous outages are being entered into the Ginna Station Maintenance In-Service Inspection Program data base system to facilitate identifying, tracking, and scheduling of future inspections.

The existing inspection program will be formalized further for both single and two phase flow systems consistent with the general guidelines of the NUMARC Working Group on Piping Erosion/Corrosion Summary Report dated June 11, 1987. Inspection sample size, inspection methods, acceptance guidelines, and program follow up represent the key areas of the recommended program. The scope of the present program's inspection points will be reviewed and evaluated. Consideration will be given to the need for expanding the number of inspection points and the selection of additional inspection points, if necessary, for single phase flow systems. An analytical computer model recognized by the utility industry will be utilized as a tool for evaluation of the suggested fittings, suggested piping locations, and key parameters identified in the NUMARC summary report (tabulated and included in Attachment 3).

For two phase flow systems, the appropriate portions of the single phase evaluation, previous Ginna Station experience,



and other utility industry recognized evaluation methods will be used. Included in this evaluation will be the determination of the schedule for the completion of the inspections for any additional points and reinspection of the existing points.



Attachment 1

to

NRC IE Bulletin 87-01 Response

(Item 4)



THE FOLLOWING IS A LIST OF COMPONENTS
EXAMINED DURING THE 1983 OUTAGE AT GINNA

STEAM EXTRACTION TO PRESEPARATOR B AND 4B L.P. HEATER

- A. 4 ELBOWS
- B. 2 PIPE SECTIONS
- C. 1 TEE

STEAM EXTRACTION TO PRESEPARATOR A AND 4A L.P. HEATER

- A. 3 ELBOWS
- B. 2 PIPE SECTIONS
- C. 1 TEE

STEAM EXTRACTION TO 5A & 5B H.P. HEATERS

- A. 6 ELBOWS
- B. 2 TEES

TOTAL COMPONENTS

NOTE: AS PART OF THE ACCEPTANCE OF COMPONENTS BEING USED FOR A NEW PRESEPARATOR SYSTEM, 40 ADDITIONAL COMPONENTS WERE INSPECTED. ALL INSTALLED COMPONENTS MET ALLOWABLE STANDARDS, HOWEVER, NO ATTEMPT WAS MADE TO TRACK SPECIFIC INSPECTION POINTS IN THE RECEIPT INSPECTION TO SPECIFIC LOCATIONS IN THE FINAL INSTALLED MODIFICATION.



RESULTS OF THICKNESS READINGS AT
GINNA DURING 1983 OUTAGE

90 - 85% NOMINAL WALL THICKNESS

- 1 STEAM EXTRACTION TO PRESEPARATOR B & 4B L.P.H.
- 3 STEAM EXTRACTION TO 5A & 5B H.P.H.

80 - 70% NOMINAL WALL THICKNESS

- 1 STEAM EXTRACTION TO PRESEPARATOR B & 4B L.P.H.
- 2 STEAM EXTRACTION TO PRESEPARATOR A & 4A L.P.H.
- 1 STEAM EXTRACTION TO 5A & 5B H.P.H.

< 70% NOMINAL WALL THICKNESS

- 4 STEAM EXTRACTION TO PRESEPARATOR B & 4B L.P.H.
- 2 STEAM EXTRACTION TO PRESEPARATOR A & 4A L.P.H.
- 2 STEAM EXTRACTION TO 5A & 5B H.P.H.



1983 OUTAGE THICKNESS READINGS AT BINNA STATION

STEAM EXTRACTION TO PRESEPARATOR B AND 4B L.P. HEATER DRAWING M-21

| RG&E TYPE NUMBER | ID NO. OF NOMINAL DRAWING | COMPONENT | PERCENTAGE THICKNESS | REMARKS SUMMARY | PER |
|------------------------|---------------------------------|-----------|-------------------------|-----------------|-----|
| 301015 | 1AD | P | 90-85 | | |
| 301025 | 2AD | P | >90 | | |
| 301350 | 33 | T | 70-65 .580 | | |
| 301370 | 35 | E | 80-70 | | |
| 301390 | 37 | E | <65 .220 | | |
| 301410 | 38 | E | <65 .220 | | |
| 301430 | 40 | E | 70-65 .260 | | |

STEAM EXTRACTION TO PRESEPARATOR A AND 4A L.P. HEATER DRAWING M-22

| RG&E TYPE NUMBER | ID NO. OF NOMINAL DRAWING | COMPONENT | PERCENTAGE THICKNESS | REMARKS SUMMARY | PER |
|------------------------|---------------------------------|-----------|-------------------------|---------------------------------|-----|
| 301705 | 1B | P | >90 | | |
| 301715 | 2B | P | >90 | | |
| 302070 | 33 | T | 80-70 | | |
| 302090 | 35 | E | 80-70 | | |
| 302130 | 38 | E | <65 .200 | REPLACED PRIOR TO END OF OUTAGE | |
| 302140 | 39 | P | | REPLACED PRIOR TO END OF OUTAGE | |
| 302150 | 40 | E | <65 .210 | REPLACED PRIOR TO END OF OUTAGE | |

STEAM EXTRACTION TO 5A & 5B H.P. HEATERS

DRAWING M-75

| RG&E TYPE NUMBER | ID NO. OF NOMINAL DRAWING | COMPONENT | PERCENTAGE THICKNESS | REMARKS SUMMARY | PER |
|------------------------|---------------------------------|-----------|-------------------------|-----------------|-----|
| 303090 | 9 | T | 90-85 | | |
| 303110 | 11 | E | >90 | | |
| 303130 | 13 | E | 70-65 .260 | | |
| 303140 | 14 | E | 80-70 | | |
| 303230 | 23 | T | >90 | | |
| 303240 | 24 | E | 90-85 | | |
| 303260 | 26 | E | 90-85 | | |
| 303280 | 28 | E | <65 .240 | | |



THE FOLLOWING IS A LIST OF COMPONENTS
EXAMINED DURING THE 1984 OUTAGE AT GINNA

STEAM EXTRACTION TO PRESEPARATOR B AND 4B L.P. HEATER

- A. 19 ELBOWS
- B. 2 PIPE SECTIONS
- C. 2 TEES

STEAM EXTRACTION TO PRESEPARATOR A AND 4A L.P. HEATER

- A. 14 ELBOWS
- B. 2 PIPE SECTIONS
- C. 2 TEES

STEAM EXTRACTION TO 5A & 5B H.P. HEATERS

- A. 5 ELBOWS
- B. 1 TEES

47 TOTAL COMPONENTS



**RESULTS OF THICKNESS READINGS AT
GINNA DURING 1984 OUTAGE**

90 - 85% NOMINAL WALL THICKNESS

- 3 STEAM EXTRACTION TO PRESEPARATOR B & 4B L.P.H.
- 5 STEAM EXTRACTION TO PRESEPARATOR A & 4A L.P.H.
- 2 STEAM EXTRACTION TO 5A & 5B H.P.H.

85 - 80% NOMINAL WALL THICKNESS

- 4 STEAM EXTRACTION TO PRESEPARATOR B & 4B L.P.H.
- 2 STEAM EXTRACTION TO PRESEPARATOR A & 4A L.P.H.
- 1 STEAM EXTRACTION TO 5A & 5B H.P.H.

80 - 70% NOMINAL WALL THICKNESS

- 4 STEAM EXTRACTION TO PRESEPARATOR B & 4B L.P.H.
- 2 STEAM EXTRACTION TO PRESEPARATOR A & 4A L.P.H.
- 3 STEAM EXTRACTION TO 5A & 5B H.P.H.

70 - 60% NOMINAL WALL THICKNESS

- 2 STEAM EXTRACTION TO PRESEPARATOR B & 4B L.P.H.
- 1 STEAM EXTRACTION TO PRESEPARATOR A & 4A L.P.H.



1984 OUTAGE THICKNESS READINGS AT GINNA STATION

STEAM EXTRACTION TO PRESEPARATOR B AND 4B L.P.HEATER DRAWING M-21

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 301015 | 1A | P | 85-80 | |
| 301020 | 2 | E | >90 | |
| 301025 | 2A | P | 85-80 | |
| 301030 | 3 | E | 80-70 | |
| 301050 | 5 | E | >90 | |
| 301070 | 7 | E | >90 | |
| 301120 | 11 | E | 90-85 | |
| 301130 | 12 | E | 90-85 | |
| 301160 | 15 | E | >90 | |
| 301180 | 17 | E | >90 | |
| 301230 | 21 | E | 90-85 | |
| 301260 | 24 | E | >90 | |
| 301280 | 26 | E | >90 | |
| 301300 | 28 | E | >90 | |
| 301320 | 30 | T | 85-80 | |
| 301350 | 33 | T | 80-70 | |
| 301370 | 35 | E | 80-70 | |
| 301390 | 37 | E | <65 .222 | |
| 301410 | 38 | E | <65 .227 | |
| 301430 | 40 | E | 80-70 | |
| 301470 | 44 | E | >90 | |
| 301490 | 46 | E | >90 | |
| 301510 | 48 | E | 85-80 | |

STEAM EXTRACTION TO PRESEPARATOR A AND 4A L.P.HEATER DRAWING M-22

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 301705 | 1B | P | >90 | |
| 301715 | 2B | P | 90-85 | |
| 301720 | 3 | E | >90 | |
| 301740 | 5 | E | >90 | |
| 301760 | 7 | E | 90-85 | |
| 301780 | 9 | E | 90-85 | |
| 301800 | 11 | E | >90 | |
| 301850 | 15 | E | >90 | |
| 301900 | 19 | E | >90 | |



AM EXTRACTION TO PRESEPARATOR A AND 4A L.P. HEATER DRAWING M-22 CONT.

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 301920 | 21 | E | >90 | |
| 301980 | 26 | E | 90-85 | |
| 302030 | 30 | E | >90 | |
| 302050 | 32 | E | >90 | |
| 302070 | 33 | T | 70-65 .450 | |
| 302090 | 35 | E | 80-70 | |
| 302110 | 37 | T | 80-70 | |
| 302130 | 38 | E | 90-85 | |
| 302150 | 40 | E | 85-80 | |

STEAM EXTRACTION TO 5A & 5B H.P. HEATERS

DRAWING M-75

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 303090 | 9 | T | 80-70 | |
| 303110 | 11 | E | 90-85 | |
| 303130 | 13 | E | 90-85 | |
| 303140 | 14 | E | 80-70 | |
| 303260 | 26 | E | 80-70 | |
| 303280 | 28 | E | 85-80 | |



THE FOLLOWING IS A LIST OF COMPONENTS
EXAMINED DURING THE 1985 OUTAGE AT GINNA

STEAM EXTRACTION TO PRESEPARATOR B AND 4B L.P. HEATER

- A. 4 ELBOWS
- B. 2 PIPE SECTIONS

STEAM EXTRACTION TO PRESEPARATOR A AND 4A L.P. HEATER

- A. 4 ELBOWS
- B. 2 PIPE SECTIONS

STEAM EXTRACTION TO 5A & 5B H.P. HEATERS

- A. 4 ELBOWS

16 TOTAL COMPONENTS



**RESULTS OF THICKNESS READINGS AT
GINNA DURING 1985 OUTAGE**

90 - 85% NOMINAL WALL THICKNESS

2 STEAM EXTRACTION TO PRESEPARATOR A & 4A L.P.H.

85 - 80% NOMINAL WALL THICKNESS

1 STEAM EXTRACTION TO PRESEPARATOR A & 4A L.P.H.

1 STEAM EXTRACTION TO 5A & 5B H.P.H.

80 - 70% NOMINAL WALL THICKNESS

1 STEAM EXTRACTION TO PRESEPARATOR B & 4B L.P.H.

2 STEAM EXTRACTION TO 5A & 5B H.P.H.

< 70% NOMINAL WALL THICKNESS

2 STEAM EXTRACTION TO PRESEPARATOR B & 4B L.P.H.

1 STEAM EXTRACTION TO 5A & 5B H.P.H.



1985 OUTAGE THICKNESS READINGS AT GINNA STATION

STEAM EXTRACTION TO PRESEPARATOR B AND 4B L.P. HEATER DRAWING M-21

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 301015 | 1A | P | 80-70 | |
| 301020 | 2 | E | >90 | |
| 301025 | 2A | P | 85-80 | |
| 301390 | 37 | E | <65 .225 | |
| 301430 | 40 | E | <65 .236 | |
| 301440. | 41 | P | >90 | |

STEAM EXTRACTION TO PRESEPARATOR A AND 4A L.P. HEATER DRAWING M-22

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 301705 | 1B | P | 85-80 | |
| 301715 | 2B | P | >90 | |
| 301720 | 3 | E | >90 | |
| 301900 | 19 | E | >90 | |
| 302130 | 38 | E | 90-85 | |
| 302150 | 40 | E | 90-85 | |

STEAM EXTRACTION TO 5A & 5B H.P. HEATERS DRAWING M-75

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 303130 | 13 | E | 80-70 | |
| 303140 | 14 | E | 80-70 | |
| 303260 | 26 | E | 85-80 | |
| 303280 | 28 | E | <65 .238 | |



THE FOLLOWING IS A LIST OF COMPONENTS
EXAMINED DURING THE 1986 OUTAGE AT GINNA

FEEDWATER BYPASS TO CONDENSER (CV-18)

- A. 7 ELBOWS
- B. 2 REDUCERS
- C. 8 PIPE SECTIONS

FEEDWATER BYPASS TO CONDENSER (CV-19)

- A. 4 ELBOWS
- B. 2 REDUCERS
- C. 4 PIPE SECTIONS

STEAM EXTRACTION TO PRESEPARATOR B AND 4B L.P. HEATER

- A. 6 ELBOWS
- B. 4 PIPE SECTIONS
- C. 1 TEE

STEAM EXTRACTION TO PRESEPARATOR A AND 4A L.P. HEATER

- A. 2 ELBOWS

STEAM EXTRACTION TO 5A & 5B H.P. HEATERS

- A. 3 ELBOWS
- B. 2 PIPE SECTION
- C. 1 TEE

LOW PRESSURE DOWN COMERS

- A. 7 PIPE SECTIONS

53 TOTAL COMPONENTS



RESULTS OF THICKNESS READINGS AT
GINNA DURING 1986 OUTAGE

90 - 85% NOMINAL WALL THICKNESS

1 FEEDWATER RECIRC CV-18
1 FEEDWATER RECIRC CV-19
3 LOW PRESSURE DOWNCOMER

85 - 80% NOMINAL WALL THICKNESS

2 FEEDWATER RECIRC CV-18
1 FEEDWATER RECIRC CV-19
1 STEAM EXTRACTION TO 5A & 5B H.P.H.
1 LOW PRESSURE DOWNCOMER

80 - 70% NOMINAL WALL THICKNESS

5 FEEDWATER RECIRC CV-18
1 STEAM EXTRACTION TO PRESEPARATOR B & 4B L.P.H.
1 STEAM EXTRACTION TO 5A & 5B H.P.H.
LOW PRESSURE DOWNCOMER

< 70% NOMINAL WALL THICKNESS

6 FEEDWATER RECIRC CV-18
5 FEEDWATER RECIRC CV-19
1 STEAM EXTRACTION TO PRESEPARATOR B & 4B L.P.H.
1 STEAM EXTRACTION TO PRESEPARATOR A & 4A L.P.H.
2 STEAM EXTRACTION TO 5A & 5B H.P.H.
2 LOW PRESSURE DOWNCOMER



1986 OUTAGE THICKNESS READINGS AT BINNA STATION

FEED WATER BYPASS TO CONDENSER (OLD CV-18) DRAWING CV-18

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------------------------|
| 300300 | 29 | R | <65 .212 | REPLACED END OF 86 OUTAGE |
| 300310 | 30 | P | <65 .214 | REPLACED END OF 86 OUTAGE |
| 300320 | 31 | E | <65 .273 | REPLACED END OF 86 OUTAGE |
| 300330 | 32 | P | <65 .186 | REPLACED END OF 86 OUTAGE |
| 300340 | 33 | E | <65 .253 | REPLACED END OF 86 OUTAGE |
| 300350 | 34 | E | 80-70 | REPLACED END OF 86 OUTAGE |
| 300360 | 35 | P | 85-80 | REPLACED END OF 86 OUTAGE |
| 300370 | 36 | E | 85-80 | REPLACED END OF 86 OUTAGE |
| 300380 | 37 | P | >90 | REPLACED END OF 86 OUTAGE |
| 300390 | 38 | E | 80-70 | REPLACED END OF 86 OUTAGE |
| 300400 | 39 | P | 90-85 | |
| 300410 | 40 | E | 80-70 | |
| 300420 | 41 | P | 80-70 | |
| 300430 | 42 | E | >90 | |
| 300440 | 43 | P | 70-65 .291 | |
| 300450 | 44 | R | >90 | |
| 300460 | 45 | P | 80-70 | |

FEED WATER BYPASS TO CONDENSER (OLD CV-19) DRAWING CV-19

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------------------------|
| 300550 | 9 | E | 85-80 | |
| 300790 | 33 | R | <65 .062 | REPLACED END OF 86 OUTAGE |
| 300800 | 34 | E | <65 .088 | REPLACED END OF 86 OUTAGE |
| 300810 | 35 | P | <65 .243 | REPLACED END OF 86 OUTAGE |
| 300820 | 36 | E | 90-85 | REPLACED END OF 86 OUTAGE |
| 300830 | 37 | P | >90 | REPLACED END OF 86 OUTAGE |
| 300840 | 38 | E | 70-65 .284 | |
| 300850 | 39 | P | 70-65 .284 | |
| 300860 | 40 | R | >90 | |
| 300870 | 41 | P | >90 | |



STEAM EXTRACTION TO PRESEPARATOR B AND 4B L.P. HEATER DRAWING M-21

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|--------------|
| 301020 | 2 | E | >90 | |
| 301160 | 15 | E | >90 | |
| 301350 | 33 | T | 80-70 | |
| 301370 | 35 | E | 70-65 .260 | |
| 301380 | 36 | P | >90 | |
| 301390 | 37 | E | >90 | * , BASELINE |
| 301400 | 37A | P | >90 | * , BASELINE |
| 301410 | 38 | E | >90 | * , BASELINE |
| 301420 | 39 | P | >90 | * , BASELINE |
| 301430 | 40 | E | >90 | * , BASELINE |
| 301440 | 41 | P | >90 | |

* THESE COMPONENTS WERE REPLACED AT
THE BEGINNING OF THE 1986 OUTAGE

STEAM EXTRACTION TO PRESEPARATOR A AND 4A L.P. HEATER DRAWING M-22

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 301720 | 3 | E | >90 | |
| 301900 | 19 | E | >90 | |

STEAM EXTRACTION TO 5A & 5B H.P. HEATERS

DRAWING M-75

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 303090 | 9 | T | 70-65 .380 | |
| 303130 | 13 | E | <65 .240 | |
| 303140 | 14 | E | 80-70 | |
| 303150 | 15 | P | 85-80 | |
| 303280 | 28 | E | <65 .239 | |
| 303290 | 29 | P | >90 | |



PRESSURE DOWN COMER

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| DC1A86 | A | P | 90-85 | |
| DC1B86 | B | P | 85-80 | |
| DC1C86 | C | P | 80-70 | |
| DC1D86 | D | P | 90-85 | |
| DC1E86 | E | P | 90-85 | |
| DC1F86 | F | P | <65 .224 | |
| DC1G86 | G | P | <65 .131 | |



THE FOLLOWING IS A LIST OF COMPONENTS
EXAMINED DURING DECEMBER 1986 AT GINNA

HEATERS 4A & 4B TO FEEDWATER SUCTION

- A. 2 ELBOWS
- B. 3 PIPE SECTIONS
- C. 2 TEES

FEEDWATER SUCTION TO PUMPS A & B

- A. 4 ELBOWS
- B. 7 PIPE SECTIONS

5A H.P.H. DRAIN TO 4A L.P.H.

- A. 3 TEES

5B H.P.H. DRAIN TO 4B L.P.H.

- 3 TEES

24 TOTAL COMPONENTS



DECEMBER 1986 THICKNESS READINGS AT GINNA STATION

TERS 4A & 4B TO FEEDWATER SUCTION

M-5

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 205110 | 11 | T | >90 | |
| 205230 | 23 | T | >90 | |
| 205250 | 25 | T | >90 | |
| 205260 | 26 | P | >90 | |
| 205280 | 28 | P | >90 | |
| 205310 | 31 | E | >90 | |
| 205330 | 33 | E | >90 | |
| 205340 | 34 | P | >90 | |

FEEDWATER SUCTION TO PUMPS A & B

M-6

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 206020 | 2 | P | >90 | |
| 206030 | 3 | E | >90 | |
| 206040 | 4 | P | >90 | |
| 206050 | 5 | E | >90 | |
| 206060 | 6 | P | >90 | |
| 206110 | 11 | P | >90 | |
| 206120 | 12 | E | >90 | |
| 206140 | 14 | P | >90 | |
| 206250 | 25 | P | >90 | |
| 206260 | 26 | E | >90 | |
| 206270 | 27 | P | >90 | |

5A H.P.H. DRAIN TO 4A L.P.H.

M-41A

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 290210 | 21 | T | >90 | |
| 290230 | 23 | T | >90 | |
| 290250 | 25 | T | >90 | |

5B H.P.H. DRAIN TO 4B L.P.H.

M-41B

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 291210 | 60 | T | >90 | |
| 291230 | 62 | T | >90 | |
| 291250 | 64 | T | >90 | |



THE FOLLOWING IS A LIST OF COMPONENTS
EXAMINED DURING THE 1987 OUTAGE AT GINNA

MSR 1A & 1B 2ND PASS DRAIN TO 5A H.P.H. & CONDENSER

- A. 4 ELBOWS
- B. 10 PIPE SECTIONS
- C. 3 REDUCERS
- D. 9 TEES

MSR 2A & 2B 2ND PASS DRAIN TO 5B H.P.H. & CONDENSER

- A. 6 ELBOWS
- B. 9 PIPE SECTIONS
- C. 3 REDUCERS
- D. 6 TEES

1A, 2A, & 3A L.P.H. DRAINS

- A. 10 PIPE SECTIONS
- B. 1 REDUCER
- D. 9 TEES

1B, 2B, & 3B L.P.H. DRAINS

- A. 2 ELBOWS
- B. 11 PIPE SECTIONS
- C. 1 REDUCER
- D. 7 TEES

MSR 1A, 1B, 2A & 2B TO HEATER DRAIN TANK

- A. 2 ELBOWS
- B. 3 PIPE SECTIONS

FEEDWATER PUMP BYPASS

- A. 24 ELBOWS
- B. 18 PIPE SECTIONS
- C. 5 REDUCERS
- D. 5 TEES

FEEDWATER BYPASS TO CONDENSER (CV-18)

- A. 11 ELBOWS
- B. 2 REDUCERS
- C. 11 PIPE SECTIONS



WATER BYPASS TO CONDENSER (CV-19)

- A. 12 ELBOWS
- B. 2 REDUCERS
- C. 11 PIPE SECTIONS

STEAM EXTRACTION TO PRESEPARATOR B AND 4B L.P. HEATER

- A. 3 ELBOWS
- B. 1 TEE

STEAM EXTRACTION TO PRESEPARATOR A AND 4A L.P. HEATER

- A. 3 ELBOWS
- B. 1 TEE

STEAM EXTRACTION TO 5A & 5B H.P. HEATERS

- A. 5 ELBOWS
- B. 1 PIPE SECTION
- C. 2 TEES

S/G BLOWDOWN TO BLOWDOWN HEAT EXCHANGER

- A. 4 ELBOWS
- B. 14 PIPE SECTIONS
- C. 4 REDUCERS
- D. 2 TEES

* THIS INCLUDES BASELINE ON
COMPONENTS THAT WERE REPLACED

S/G BLOWDOWN TO BLOWDOWN TANK HEADER

- A. 12 ELBOWS
- B. 26 PIPE SECTIONS
- C. 2 REDUCERS

PRESEPARATOR A & B DRAIN TO HEATER DRAIN TANK

- A. 3 ELBOWS
- B. 5 PIPE SECTIONS
- C. 1 TEE



AUX. FEEDWATER PUMP A TO F.W. DISCHARGE LINES

- A. 1 ELBOW**
- B. 3 PIPE SECTIONS**

AUX. FEEDWATER PUMP B TO F.W. DISCHARGE LINES

- A. 1 ELBOW**
- B. 2 PIPE SECTIONS**

TURBINE DRIVEN AUX. FEEDWATER PUMP TO F.W. DISCHARGE LINES

- A. 3 PIPE SECTIONS**

MAIN STEAM FROM S/G B

- A. 1 ELBOW**

MAIN STEAM TO TURBINE

- A. 1 ELBOW**
- B. 1 PIPE SECTION**

299 TOTAL COMPONENTS



**RESULTS OF THICKNESS READINGS AT
GINNA DURING 1987 OUTAGE**

90 - 85% NOMINAL WALL THICKNESS

- 1 MSR 1A & 1B 2ND PASS DRAIN TO 5A H.P.H. & CONDENSER
- 4 MSR 2A & 2B 2ND PASS DRAIN TO 5B H.P.H. & CONDENSER
- 4 FEEDWATER RECIRC CV-18
- 3 FEEDWATER RECIRC CV-19
- 1 STEAM EXTRACTION TO 5A & 5B H.P.H.
- 3 S/G BLOWDOWN TO BLOWDOWN HEAT EXCHANGER
- 8 S/G BLOWDOWN TO BLOWDOWN TANK HEADER
- 2 PRESEPARATOR A & B DRAIN TO HEATER DRAIN TANK
- 1 AUX F.W. PUMP A TO F.W. DISCHARGE LINES
- 1 AUX F.W. PUMP B TO F.W. DISCHARGE LINES

85 - 80% NOMINAL WALL THICKNESS

- 2 MSR 2A & 2B 2ND PASS DRAIN TO 5B H.P.H. & CONDENSER
- 1 MSR 1A, 1B, 2A & 2B TO HEATER DRAIN TANK
- 1 STEAM EXTRACTION TO 5A & 5B H.P.H.
- 2 S/G BLOWDOWN TO BLOWDOWN TANK HEADER
- 2 TURBINE DRIVE AUX F.W. PUMP TO DISCHARGE LINES

80 - 70% NOMINAL WALL THICKNESS

- 4 MSR 1A & 1B 2ND PASS DRAIN TO 5A H.P.H. & CONDENSER
- 2 MSR 2A & 2B 2ND PASS DRAIN TO 5B H.P.H. & CONDENSER
- 3 FEEDWATER RECIRC CV-18
- 3 FEEDWATER RECIRC CV-19
- 1 STEAM EXTRACTION TO PRESEPARATOR B & 4B L.P.H.
- 1 STEAM EXTRACTION TO PRESEPARATOR A & 4A L.P.H.
- 2 STEAM EXTRACTION TO 5A & 5B H.P.H.
- 2 S/G BLOWDOWN TO BLOWDOWN HEAT EXCHANGER
- 1 S/G BLOWDOWN TO BLOWDOWN TANK HEADER

< 70% NOMINAL WALL THICKNESS

- 2 MSR 1A & 1B 2ND PASS DRAIN TO 5A H.P.H. & CONDENSER
- 1 MSR 2A & 2B 2ND PASS DRAIN TO 5B H.P.H. & CONDENSER
- 1 FEEDWATER RECIRC CV-18
- 1 FEEDWATER RECIRC CV-19
- 1 STEAM EXTRACTION TO PRESEPARATOR B & 4B L.P.H.
- 1 STEAM EXTRACTION TO PRESEPARATOR A & 4A L.P.H.
- 4 STEAM EXTRACTION TO 5A & 5B H.P.H.
- 2 S/G BLOWDOWN TO BLOWDOWN HEAT EXCHANGER
- 2 S/G BLOWDOWN TO BLOWDOWN TANK HEADER



1987 OUTAGE THICKNESS READINGS AT BINNA STATION

MSR 1A & 1B 2ND PASS DRAIN TO 5A H.P.H. & CONDESER DRAWING M-12A

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---|
| 222230 | 21A | R | >90 | |
| 222240 | 22 | E | >90 | REPLACED END OF 87 OUTAGE |
| 222250 | 23 | P | >90 | REPLACED END OF 87 OUTAGE |
| 222330 | 31 | R | >90 | |
| 222340 | 32 | T | >90 | |
| 222350 | 33 | T | >90 | |
| 222352 | 33A | P | >90 | |
| 222357 | 33B | T | >90 | |
| 222360 | 34 | P | >90 | |
| 222370 | 35 | T | >90 | |
| 222380 | 36 | P | >90 | |
| 222390 | 37 | T | >90 | |
| 222400 | 38 | P | >90 | |
| 222410 | 39 | T | >90 | |
| 222415 | 39A | P | >90 | |
| 222420 | 40 | T | >90 | |
| 222920 | 90 | T | >90 | |
| 223020 | 99 | T | | NO READINGS WERE TAKEN DUE TO WELD OVERLAY, REPLACED 87 OUTAGE |
| 223030 | 100 | P | 80-70 | REPLACED END OF 87 OUTAGE |
| 223040 | 101 | E | 70-65 (.298) | REPLACED END OF 87 OUTAGE |
| 223050 | 102 | P | 90-85 | REPLACED END OF 87 OUTAGE |
| 223060 | 103 | E | <65 (.274) | REPLACED END OF 87 OUTAGE |
| 223070 | 104 | P | 80-70 | REPLACED END OF 87 OUTAGE |
| 223080 | 105 | E | 80-70 | REEXAMINE DURING 88 OUTAGE |
| 223090 | 106 | P | 80-70 | REEXAMINE DURING 88 OUTAGE |
| 223095 | 106A | R | >90 | |

MSR 2A & 2B 2ND PASS DRAIN TO 5B H.P.H. & CONDENSER DRAWING M-12B

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---|
| 222490 | 47 | R | >90 | |
| 222500 | 48 | E | 80-70 | ELBOW WAS REPLACED SUMMER 1986 WITH SCHEDULE 120. LINE SCHEDULE IS 80. REEXAMINE DURING 88 OUTAGE |
| 222510 | 49 | P | >90 | |
| 222520 | 50 | E | >90 | |
| 222530 | 51 | P | 90-85 | REEXAMINE DURING 88 OUTAGE |
| 222680 | 66 | T | >90 | |



2A & 2B 2ND PASS DRAIN TO 5B H.P.H. & CONDENSER DRAWING M-12B CONT.

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---|
| 222690 | 67 | T | >90 | |
| 222700 | 68 | P | >90 | |
| 222710 | 69 | T | >90 | |
| 222720 | 70 | P | >90 | |
| 222730 | 71 | T | >90 | |
| 222800 | 78 | R | >90 | |
| 222810 | 79 | E | >90 | REPLACED END OF 87 OUTAGE |
| 222820 | 80 | P | 90-85 | REPLACED END OF 87 OUTAGE |
| 222830 | 81 | T | | NO READINGS WERE TAKEN DUE TO WELD OVERLAY, REPLACED 87 OUTAGE |
| 222840 | 82 | P | 85-80 | REPLACED END OF 87 OUTAGE |
| 222850 | 83 | E | <65 (.254) | REPLACED END OF 87 OUTAGE |
| 222860 | 84 | P | >90 | REPLACED END OF 87 OUTAGE |
| 222870 | 85 | E | 90-85 | REPLACED END OF 87 OUTAGE |
| 222880 | 86 | P | 80-70 | REPLACED END OF 87 OUTAGE |
| 222890 | 87 | E | 85-80 | REPLACED END OF 87 OUTAGE |
| 222900 | 88 | P | 90-85 | REEXAMINE DURING 88 OUTAGE |
| 222905 | 88A | R | >90 | |
| 222910 | 89 | T | >90 | |

1A, 2A, & 3A, L.P.H. DRAINS

DRAWING M-19

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 234180 | 18 | T | >90 | |
| 234190 | 19 | P | >90 | |
| 234200 | 20 | T | >90 | |
| 234210 | 21 | P | >90 | |
| 234220 | 22 | T | >90 | |
| 234230 | 23 | P | >90 | |
| 234240 | 24 | T | >90 | |
| 234250 | 25 | P | >90 | |
| 234260 | 26 | T | >90 | |
| 234270 | 27 | P | >90 | |
| 234340 | 34 | R | >90 | |
| 234345 | 34A | P | >90 | |
| 234350 | 35 | T | >90 | |
| 234355 | 35A | P | >90 | |
| 234370 | 37 | T | >90 | |
| 234380 | 38 | P | >90 | |
| 234510 | 51 | T | >90 | |
| 234520 | 52 | P | >90 | |
| 234530 | 53 | T | >90 | |
| 234540 | 54 | P | >90 | |



2B & 3B L.P.H. DRAINS
DRAWING M-20

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 235160 | 16 | P | >90 | |
| 235170 | 17 | E | >90 | |
| 235180 | 18 | P | >90 | |
| 235190 | 19 | E | >90 | |
| 235200 | 20 | P | >90 | |
| 235210 | 21 | T | >90 | |
| 235220 | 22 | F | >90 | |
| 235230 | 23 | T | >90 | |
| 235240 | 24 | P | >90 | |
| 235250 | 25 | T | >90 | |
| 235260 | 26 | P | >90 | |
| 235325 | 32A | R | >90 | |
| 235330 | 33 | P | >90 | |
| 235340 | 34 | T | >90 | |
| 235350 | 35 | P | >90 | |
| 235370 | 37 | T | >90 | |
| 235380 | 38 | P | >90 | |
| 235510 | 51 | T | >90 | |
| 235520 | 52 | P | >90 | |
| 235530 | 53 | T | >90 | |
| 235540 | 54 | P | >90 | |

MSR 1A, 1B, 2A & 2B TO HEATER DRAIN TANK
DRAWING M-33

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|----------------------------|
| 262030 | 3 | E | >90 | |
| 262040 | 4 | P | >90 | |
| 262055 | 5A | P | >90 | |
| 262060 | 6 | E | >90 | |
| 262070 | 7 | P | 85-80 | REEXAMINE DURING 88 OUTAGE |

FEEDWATER PUMP BYPASS
DRAWING M-92

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 281020 | 2 | E | BASELINE | |
| 281030 | 3 | P | BASELINE | |
| 281040 | 4 | E | BASELINE | |
| 281050 | 5 | P | BASELINE | |
| 281060 | 6 | E | BASELINE | |
| 281070 | 7 | P | BASELINE | |
| 281090 | 9 | P | BASELINE | |
| 281110 | 11 | P | BASELINE | |



FEEDWATER PUMP BYPASS

DRAWING M-92 CONTINUED

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 281130 | 13 | R | BASELINE | |
| 281140 | 14 | P | BASELINE | |
| 281150 | 15 | E | BASELINE | |
| 281160 | 16 | P | BASELINE | |
| 281180 | 18 | E | BASELINE | |
| 281190 | 19 | P | BASELINE | |
| 281200 | 20 | E | BASELINE | |
| 281210 | 21 | P | BASELINE | |
| 281230 | 23 | P | BASELINE | |
| 281250 | 25 | P | BASELINE | |
| 281270 | 27 | R | BASELINE | |
| 281280 | 28 | P | BASELINE | |
| 281290 | 29 | R | BASELINE | |
| 281300 | 30 | T | BASELINE | |
| 281310 | 31 | E | BASELINE | |
| 281320 | 32 | T | BASELINE | |
| 281330 | 33 | P | BASELINE | |
| 281340 | 34 | E | BASELINE | |
| 281350 | 35 | E | BASELINE | |
| 281360 | 36 | P | BASELINE | |
| 281370 | 37 | E | BASELINE | |
| 281380 | 38 | E | BASELINE | |
| 281390 | 39 | P | BASELINE | |
| 281400 | 40 | E | BASELINE | |
| 281410 | 41 | P | BASELINE | |
| 281420 | 42 | E | BASELINE | |
| 281440 | 44 | E | BASELINE | |
| 281460 | 46 | E | BASELINE | |
| 281480 | 48 | E | BASELINE | |
| 281490 | 49 | E | BASELINE | |
| 281500 | 50 | P | BASELINE | |
| 281520 | 52 | T | BASELINE | |
| 281530 | 53 | R | BASELINE | |
| 281540 | 54 | T | BASELINE | |
| 281560 | 56 | E | BASELINE | |
| 281600 | 60 | E | BASELINE | |
| 281620 | 62 | E | BASELINE | |
| 281640 | 64 | E | BASELINE | |
| 281680 | 68 | T | BASELINE | |
| 281700 | 70 | E | BASELINE | |
| 281730 | 73 | R | BASELINE | |
| 281750 | 75 | E | BASELINE | |
| 281760 | 76 | P | BASELINE | |
| 281770 | 77 | E | BASELINE | |

NOTE: FEEDWATER BYPASS LINE IS A NEW INSTALLATION
DONE DURING THE 87 OUTAGE





WATER BYPASS TO CONDENSER (OLD CV-18)

DRAWING CV-18

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 300220 | 22 | E | >90 | |
| 300230 | 23 | P | >90 | |
| 300240 | 24 | E | >90 | |
| 300250 | 25 | P | >90 | |
| 300260 | 26 | E | 90-85 | * |
| 300270 | 27 | P | 90-85 | * |
| 300280 | 28 | E | >90 | |
| 300300 | 29 | R | >90 | |
| 300310 | 30 | P | >90 | |
| 300320 | 31 | E | >90 | |
| 300330 | 32 | P | >90 | |
| 300340 | 33 | E | >90 | |
| 300350 | 34 | E | >90 | |
| 300360 | 35 | P | >90 | |
| 300370 | 36 | E | >90 | |
| 300380 | 37 | P | >90 | |
| 300390 | 38 | E | >90 | |
| 300400 | 39 | P | 80-70 | * |
| 300410 | 40 | E | 80-70 | * |
| 300420 | 41 | P | 80-70 | * |
| 300430 | 42 | E | >90 | |
| 300440 | 43 | P | 70-65 (.299) | * |
| 300450 | 44 | R | 90-85 | * |
| 300460 | 45 | P | 90-85 | * |

* NOTE: IT HAS NOT BEEN DECIDED IF THESE COMPONENTS WILL BE REEXAMINED IN 1988. THE FEEDWATER BYPASS SYSTEM THAT WAS INSTALLED IN 1987 SHOULD TAKE OF THIS EROSION PROBLEM. ALSO THE NEW FEEDWATER BYPASS HAS REPLACED COMPONENTS 1 THROUGH 20

FEED WATER BYPASS TO CONDENSER (OLD CV-19)

DRAWING CV-19

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 300480 | 2 | E | >90 | |
| 300490 | 3 | P | >90 | |
| 300640 | 18 | E | >90 | |
| 300650 | 19 | P | >90 | |
| 300660 | 20 | E | >90 | |
| 300670 | 21 | P | >90 | |
| 300680 | 22 | E | >90 | |
| 300690 | 23 | P | 90-85 | * |
| 300700 | 24 | E | >90 | |
| 300710 | 25 | P | >90 | |
| 300720 | 26 | E | 80-70 | * |



D WATER BYPASS TO CONDENSER (OLD CV-19)
DRAWING CV-19 CONTINUED

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 300730 | 27 | P | >90 | |
| 300740 | 28 | E | 90-85 | * |
| 300750 | 29 | P | 90-85 | * |
| 300760 | 30 | E | >90 | |
| 300770 | 31 | E | >90 | |
| 300790 | 33 | R | >90 | |
| 300800 | 34 | E | >90 | |
| 300810 | 35 | P | >90 | |
| 300820 | 36 | E | 80-70 | * |
| 300830 | 37 | P | >90 | |
| 300840 | 38 | E | 80-70 | * |
| 300850 | 39 | P | <65 (.270) | * |
| 300860 | 40 | R | >90 | |
| 300870 | 41 | P | >90 | |

* NOTE: IT HAS NOT BEEN DECIDED IF THESE COMPONENTS WILL BE REEXAMINED IN 1988. THE FEEDWATER BYPASS SYSTEM THAT WAS INSTALLED IN 1987 SHOULD TAKE OF THIS EROSION PROBLEM. ALSO THE NEW FEEDWATER BYPASS HAS REPLACED COMPONENTS 3 THROUGH 16.

STEAM EXTRACTION TO PRESEPARATOR B AND 4B L.P.HEATER DRAWING M-21

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|----------------------------|
| 301020 | 2 | E | >90 | |
| 301160 | 15 | E | >90 | |
| 301350 | 33 | T | 80-70 | REEXAMINE DURING 88 OUTAGE |
| 301370 | 35 | E | 70-65 (.260) | REEXAMINE DURING 88 OUTAGE |

STEAM EXTRACTION TO PRESEPARATOR A AND 4A L.P.HEATER DRAWING M-22

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|----------------------------|
| 301720 | 3 | E | >90 | |
| 301900 | 19 | E | >90 | |
| 302070 | 33 | T | 80-70 | REEXAMINE DURING 88 OUTAGE |
| 302090 | 35 | E | <65 (.223) | REEXAMINE DURING 88 OUTAGE |



AM EXTRACTION TO 5A & 5B H.P. HEATERS

DRAWING M-75

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|----------------------------|
| 303090 | 9 | T | <65 (.244) | REEXAMINE DURING 88 OUTAGE |
| 303100 | 10 | P | 80-70 | REEXAMINE DURING 88 OUTAGE |
| 303110 | 11 | E | 80-70 | REEXAMINE DURING 88 OUTAGE |
| 303130 | 13 | E | <65 (.237) | REEXAMINE DURING 88 OUTAGE |
| 303140 | 14 | E | 70-65 (.247) | REEXAMINE DURING 88 OUTAGE |
| 303230 | 23 | T | 90-85 | REEXAMINE DURING 88 OUTAGE |
| 303240 | 24 | E | 85-80 | REEXAMINE DURING 88 OUTAGE |
| 303280 | 28 | E | <65 (.232) | REEXAMINE DURING 88 OUTAGE |

S/G BLOWDOWN TO BLOWDOWN HEAT EXCHANGER

DRAWING M-87

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---|
| 304080 | 8 | P | >90 | |
| 304100 | 10 | P | <65 (.120) | * |
| | 10 | P | BASELINE | |
| | 12 | P | <65 (.121) | * |
| | 12 | P | BASELINE | |
| 304130 | 13 | R | 90-85 | * |
| | 13 | R | BASELINE | |
| 304210 | 21 | P | >90 | |
| 304230 | 23 | P | <65 (.115) | * |
| | 23 | P | BASELINE | |
| 304240 | 24 | P | 80-70 | COMPONENT HAS BEEN ELIMINATED |
| 304250 | 25 | T | 70-65 (.208) | * |
| | 25 | T | BASELINE | |
| 304260 | 26 | P | 80-70 | * |
| | 26 | P | BASELINE | |
| 304270 | 27 | E | >90 | |
| 304280 | 28 | P | >90 | |
| 304290 | 29 | E | >90 | |
| 304300 | 30 | P | >90 | |
| 304320 | 32 | E | 90-85 | REEXAMINE DURING 88 OUTAGE |
| 304330 | 33 | P | >90 | |
| 304340 | 34 | R | >90 | |
| 304350 | 35 | E | 90-85 | REEXAMINE DURING 88 OUTAGE |
| 304360 | 36 | R | | 4 X 10 REDUCER CAN NOT BE PROPERLY LAID OUT, HOWEVER SCAN SHOWS NO SIGN OF WEAR |

* THESE COMPONENTS WERE REPLACED DURING 87 OUTAGE
AND BASELINE DATA WAS TAKEN



BLOWDOWN LINES - INTERMEDIATE BLDG.

DRAWING M-88A

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---|
| 304420 | 2 | E | | COMPONENT IS A FORGED ELBOW AND CAN NOT BE LAID OUT, HOWEVER SCAN SHOWS MINIMUM WALL OF .180 WILL REEXAMINE DURING 88 OUTAGE |
| 304440 | 4 | E | | COMPONENT IS A FORGED ELBOW AND CAN NOT BE LAID OUT, HOWEVER SCAN SHOWS MINIMUM WALL OF .150 WILL REEXAMINE DURING 88 OUTAGE |

S/G BLOWDOWN TO BLOWDOWN TANK HEADER

DRAWING M-88B

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---|
| 304690 | 29 | P | >90 | |
| 304710 | 31 | P | >90 | |
| 304730 | 33 | P | >90 | |
| 304750 | 35 | P | >90 | |
| 304770 | 37 | P | >90 | |
| 304790 | 39 | P | 80-70 | REEXAMINE DURING 88 OUTAGE |
| 304820 | 42 | P | >90 | |
| 304840 | 44 | P | >90 | |
| 304860 | 46 | R | >90 | |
| 304865 | 46A | E | <65 (.208) | OUTSIDE RADIUS OF ELBOW CAN NOT BE EXAMINED DUE TO RESTRICTIONS, REEXAMINE DURING 88 OUTAGE |
| 304870 | 47 | P | 85-80 | REEXAMINE DURING 88 OUTAGE |
| 304880 | 48 | E | 90-85 | REEXAMINE DURING 88 OUTAGE |
| 304890 | 49 | P | >90 | |
| 304900 | 50 | E | 85-80 | REEXAMINE DURING 88 OUTAGE |
| 304920 | 52 | E | 90-85 | REEXAMINE DURING 88 OUTAGE |
| 304930 | 53 | P | >90 | |
| 305220 | 82 | P | >90 | |
| 305240 | 84 | P | >90 | |
| 305260 | 86 | P | >90 | |
| 305280 | 88 | P | >90 | |
| 305300 | 90 | P | >90 | |
| 305320 | 92 | P | >90 | |
| 305340 | 94 | P | >90 | |
| 305360 | 96 | P | 70-65 (.142) | REEXAMINE DURING 88 OUTAGE |
| 305390 | 99 | P | >90 | |
| 305410 | 101 | P | 90-85 | REEXAMINE DURING 88 OUTAGE |
| 305430 | 103 | R | >90 | |



BLOWDOWN TO BLOWDOWN TANK HEADER

DRAWING M-88B CONTINUED

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---|
| 305440 | 104 | E | 70-65 (.229) | OUTSIDE RADIUS OF ELBOW CAN NOT BE EXAMINED DUE TO RESTRICTIONS, REEXAMINE DURING 88 OUTAGE |
| 305450 | 105 | P | >90 | |
| 305460 | 106 | E | 90-85 | REEXAMINE DURING 88 OUTAGE |
| 305470 | 107 | P | 90-85 | REEXAMINE DURING 88 OUTAGE |
| 305480 | 108 | E | >90 | |
| 305490 | 109 | P | 90-85 | REEXAMINE DURING 88 OUTAGE |
| 305500 | 110 | E | >90 | |
| 305510 | 111 | P | >90 | |
| 305520 | 112 | E | 90-85 | REEXAMINE DURING 88 OUTAGE |
| 305540 | 114 | E | >90 | |
| 305550 | 115 | P | 90-85 | REEXAMINE DURING 88 OUTAGE |

NOTE: MANY ELBOW COMPONENTS CAN NOT BE EXAMINED
DUE TO GEOMETRY. ELBOWS ARE FORGED AND DO
NOT LEND THEMSELVES TO LAYOUT OR U.T. SCANNING

SEPARATOR A & B DRAIN TO HEATER DRAIN TANK

DRAWING M-46B

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|----------------------------|
| 328160 | 16 | T | >90 | |
| 328240 | 24 | P | >90 | UPSTREAM PORTION OF PIPE |
| 328245 | 24 | P | >90 | DOWNSTREAM PORTION OF PIPE |
| 328250 | 25 | E | >90 | |
| 328260 | 26 | P | >90 | |
| 328270 | 27 | E | 90-85 | REEXAMINE DURING 88 OUTAGE |
| 328280 | 28 | P | >90 | |
| 328290 | 29 | E | 90-85 | REEXAMINE DURNIG 88 OUTAGE |
| 328300 | 30 | P | >90 | |

AUX. F.W. PUMP A TO F.W. DISCHARGE LINES

DRAWING M-48

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|----------------------------|
| 320240 | 25 | E | 90-85 | REEXAMINE DURING 88 OUTAGE |
| 320264 | 26A | P | >90 | |
| 320430 | 43 | P | >90 | UPSTREAM PORTION OF PIPE |
| 320435 | 43 | P | >90 | DOWNSTREAM PORTION OF PIPE |



F.W. PUMP B TO F.W. DISCHARGE LINES
DRAWING M-49

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|----------------------------|
| 323200 | 20 | E | >90 | |
| 323210 | 21 | P | >90 | |
| 323420 | 42 | P | 90-85 | REEXAMINE DURING 88 OUTAGE |

TURBINE DRIVEN AUX F.W. PUMP TO F.W. DISCHARGE LINES DRAWING-47

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|----------------------------|
| 327560 | 56 | P | >90 | UPSTREAM PORTION OF PIPE |
| 327565 | 56 | P | >90 | DOWNSTREAM PORTION OF PIPE |
| 327880 | 88 | P | 85-80 | REEXAMINE DURING 88 OUTAGE |

MAIN STEAM FROM S/G A & B
DRAWING M-70

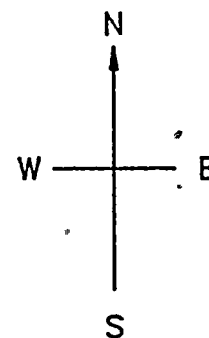
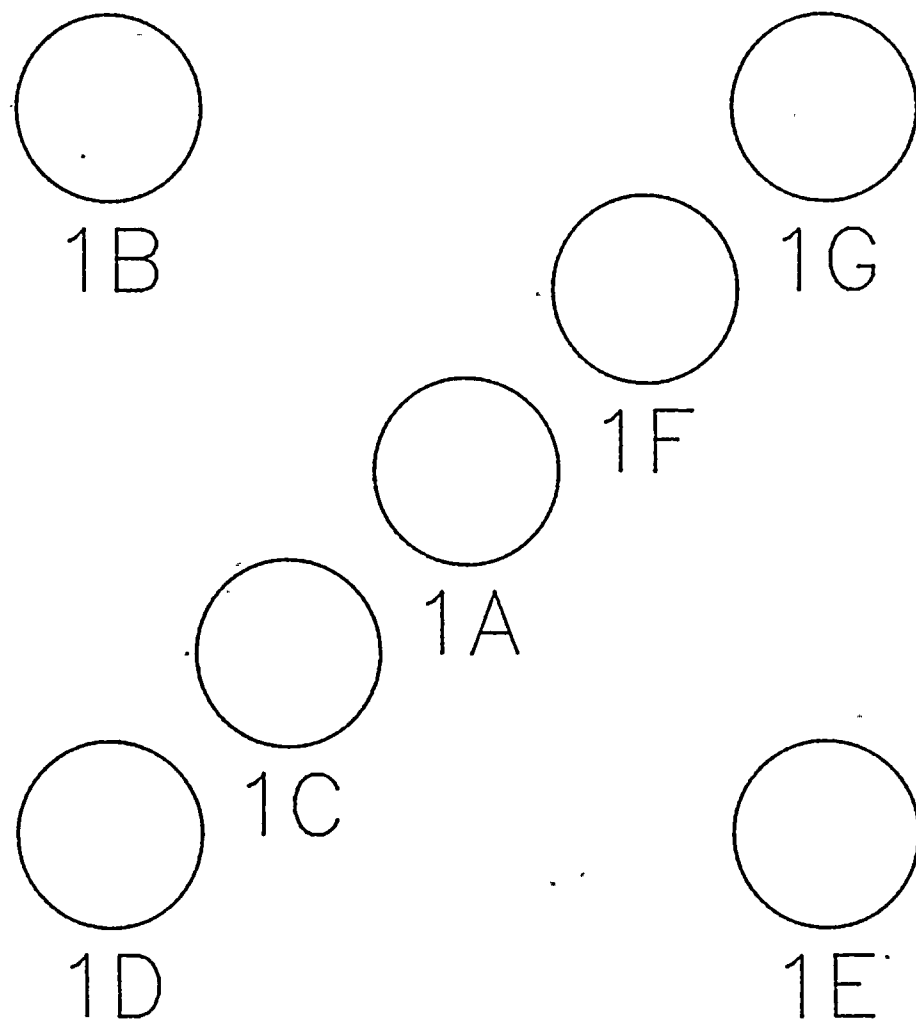
| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 370020 | 2 | E | >90 | |

MAIN STEAM TO TURBINE
DRAWING M-72

| RG&E SUMMARY NUMBER | ID NO. PER DRAWING | COMPONENT TYPE | PERCENTAGE OF NOMINAL THICKNESS | REMARKS |
|---------------------------|--------------------------|-------------------|---------------------------------------|---------|
| 372140 | 14 | E | >90 | |
| 372150 | 15 | P | >90 | |



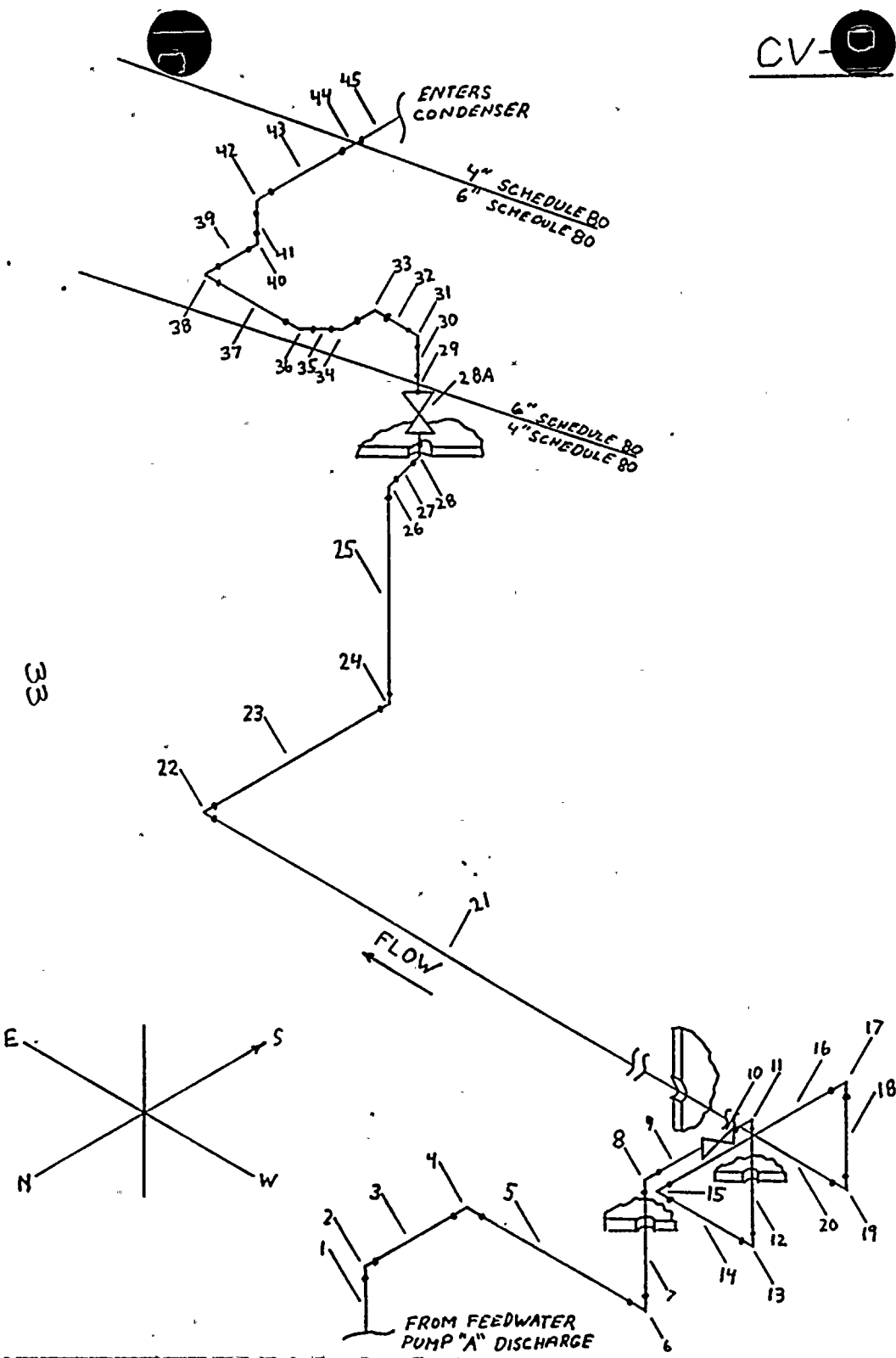
LOW PRESSURE DOWNCOMERS



TOP VIEW



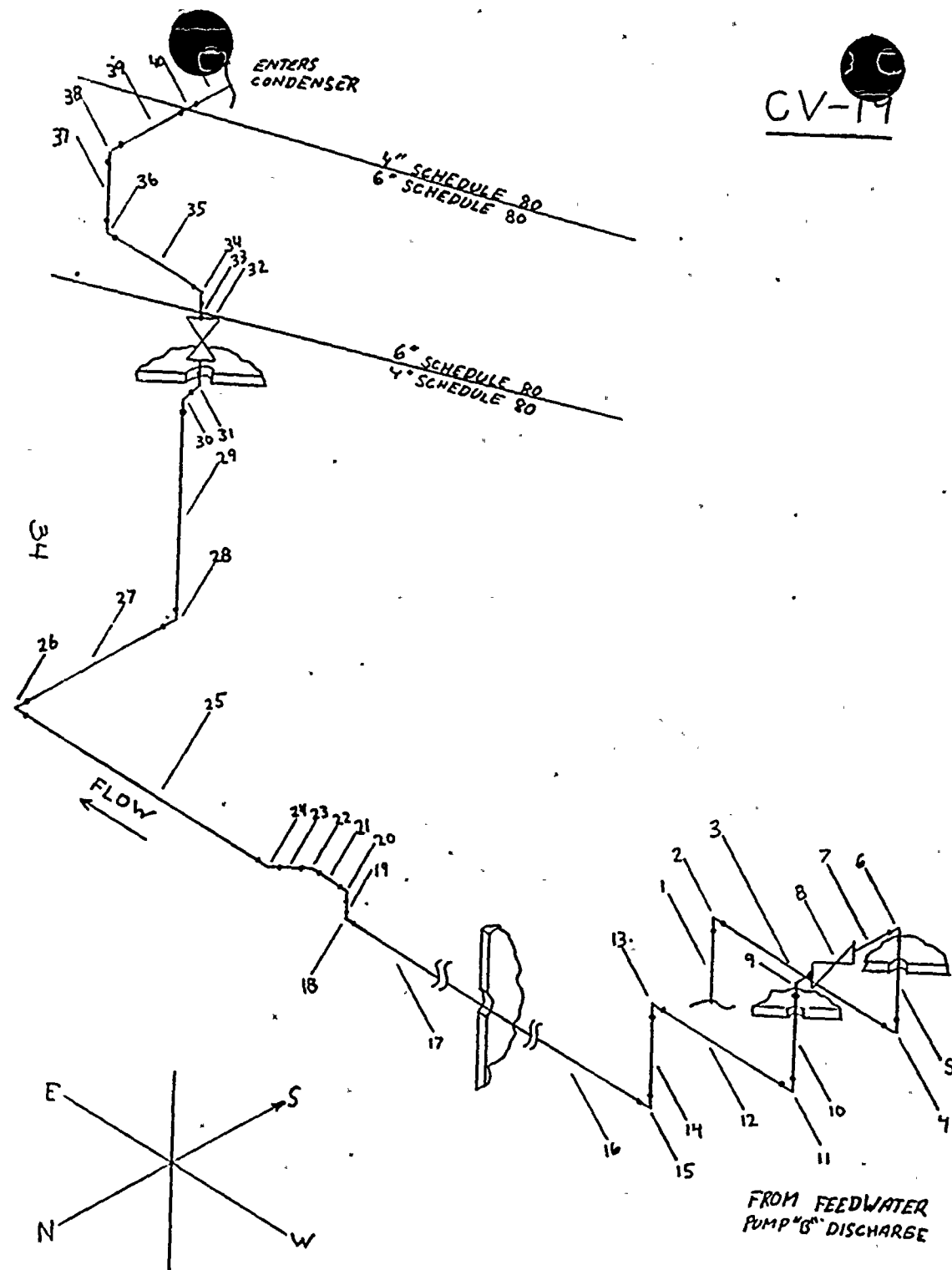
CV-



| NO. | DESCRIPTION | FILE NAME |
|-----|------------------|-----------|
| 1 | 4' PIPE | 300010 |
| 2 | 90 ELBOW | 300020 |
| 3 | 6' PIPE | 300030 |
| 4 | 90 ELBOW | 300040 |
| 5 | 6' PIPE | 300050 |
| 6 | 90 ELBOW | 300060 |
| 7 | 3' PIPE | 300070 |
| 8 | 90 ELBOW | 300080 |
| 9 | 2' PIPE | 300090 |
| 10 | VALVE 4061 | 300100 |
| 11 | 90 ELBOW | 300110 |
| 12 | 3' PIPE | 300120 |
| 13 | 90 ELBOW | 300130 |
| 14 | 4' PIPE | 300140 |
| 15 | 90 ELBOW | 300150 |
| 16 | 9' PIPE | 300160 |
| 17 | 90 ELBOW | 300170 |
| 18 | 4' PIPE | 300180 |
| 19 | 90 ELBOW | 300190 |
| 20 | 27' PIPE | 300200 |
| 21 | 51' PIPE | 300210 |
| 22 | 90 ELBOW | 300220 |
| 23 | 12' PIPE | 300230 |
| 24 | 90 ELBOW | 300240 |
| 25 | 8' PIPE | 300250 |
| 26 | 45 ELBOW | 300260 |
| 27 | 1' PIPE | 300270 |
| 28 | 45 ELBOW | 300280 |
| 28A | VALVE 4262 | 300290 |
| 29 | 4" TO 6" REDUCER | 300300 |
| 30 | 2' PIPE | 300310 |
| 31 | 45 ELBOW | 300320 |
| 32 | 1' PIPE | 300330 |
| 33 | 45 ELBOW | 300340 |
| 34 | 45 ELBOW | 300350 |
| 35 | 1' PIPE | 300360 |
| 36 | 45 ELBOW | 300370 |
| 37 | 4' PIPE | 300380 |
| 38 | 90 ELBOW | 300390 |
| 39 | 2' PIPE | 300400 |
| 40 | 45 ELBOW | 300410 |
| 41 | 1' PIPE | 300420 |
| 42 | 45 ELBOW | 300430 |
| 43 | 4' PIPE | 300440 |
| 44 | 6" TO 4" REDUCER | 300450 |
| 45 | 2' PIPE | 300460 |



CV-19



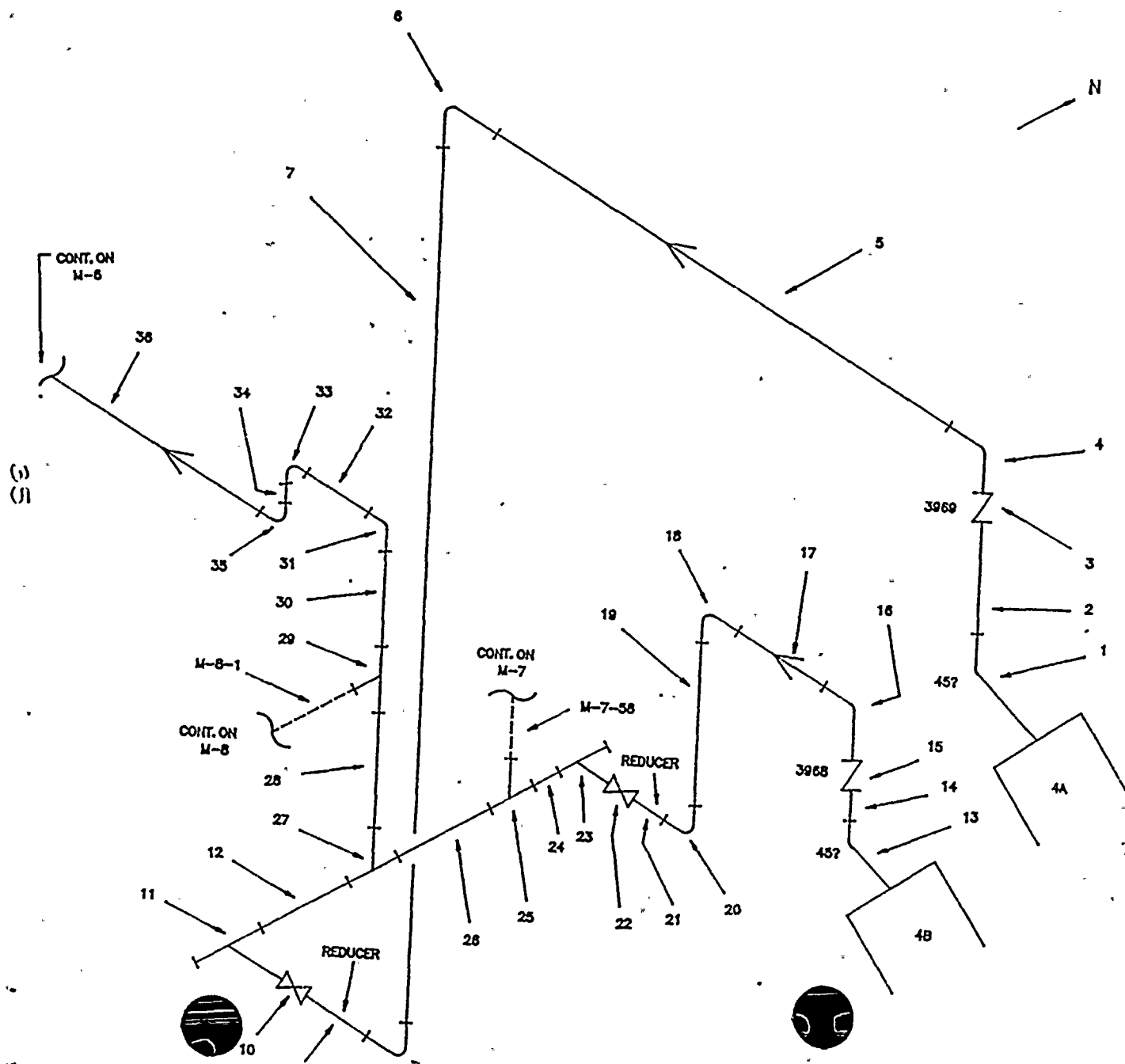
| NO. | DESCRIPTION | FILE NAME |
|-----|------------------|-----------|
| 1 | 3' PIPE | 300470 |
| 2 | 90 ELBOW | 300480 |
| 3 | 8' PIPE | 300490 |
| 4 | 90 ELBOW | 300500 |
| 5 | 3' PIPE | 300510 |
| 6 | 90 ELBOW | 300520 |
| 7 | 2' PIPE | 300530 |
| 8 | VALVE 4060 | 300540 |
| 9 | 90 ELBOW | 300550 |
| 10 | 3' PIPE | 300560 |
| 11 | 90 ELBOW | 300570 |
| 12 | 6' PIPE | 300580 |
| 13 | 90 ELBOW | 300590 |
| 14 | 4' PIPE | 300600 |
| 15 | 90 ELBOW | 300610 |
| 16 | 27' PIPE | 300620 |
| 17 | 40' PIPE | 300630 |
| 18 | 45 ELBOW | 300640 |
| 19 | 1' PIPE | 300650 |
| 20 | 45 ELBOW | 300660 |
| 21 | 1' PIPE | 300670 |
| 22 | 45 ELBOW | 300680 |
| 23 | 1' PIPE | 300690 |
| 24 | 45 ELBOW | 300700 |
| 25 | 11' PIPE | 300710 |
| 26 | 90 ELBOW | 300720 |
| 27 | 10' PIPE | 300730 |
| 28 | 90 ELBOW | 300740 |
| 29 | 10' PIPE | 300750 |
| 30 | 45 ELBOW | 300760 |
| 31 | 45 ELBOW | 300770 |
| 32 | VALVE 4363 | 300780 |
| 33 | 4" TO 6" REDUCER | 300790 |
| 34 | 90 ELBOW | 300800 |
| 35 | 4' PIPE | 300810 |
| 36 | 45 ELBOW | 300820 |
| 37 | 3' PIPE | 300830 |
| 38 | 45 ELBOW | 300840 |
| 39 | 3' PIPE | 300850 |
| 40 | 6" TO 4" REDUCER | 300860 |
| 41 | 2' PIPE | 300870 |

FROM FEEDWATER
PUMP "B" DISCHARGE



M-5

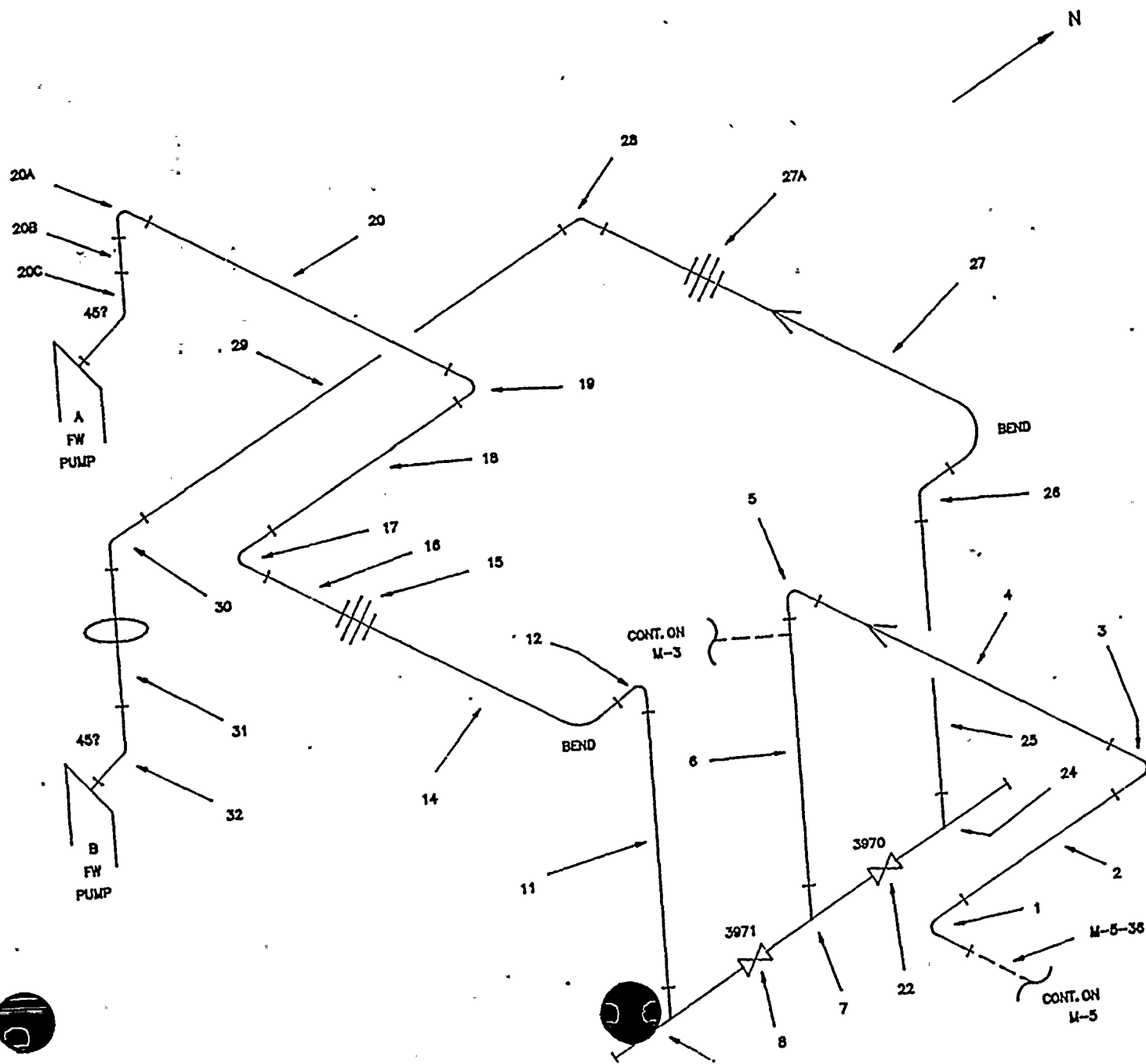
HEATERS 4A & 4B TO FEEDWATER SUCTION





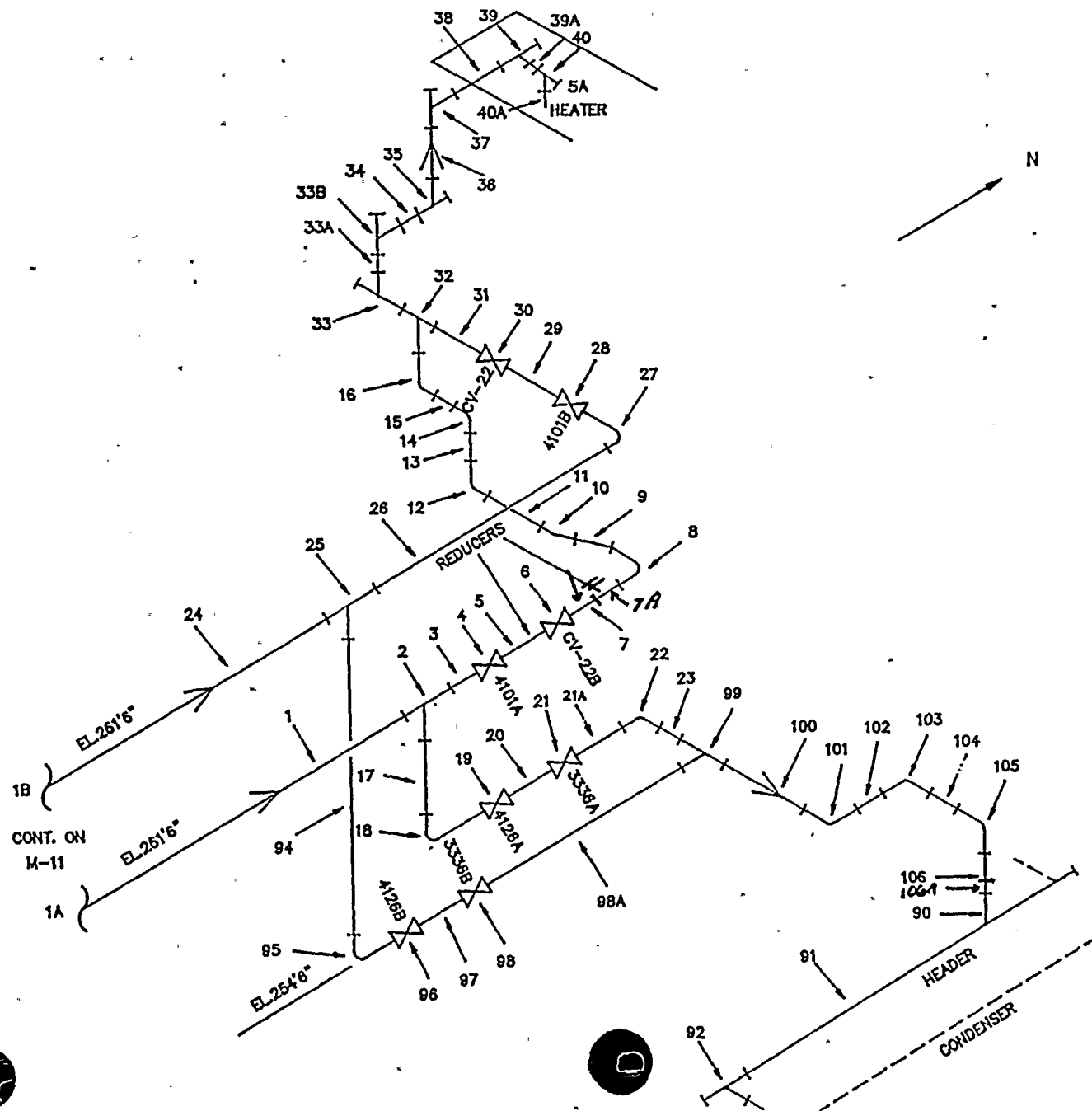
M-6

FEEDWATER SUCTION TO PUMPS A & B





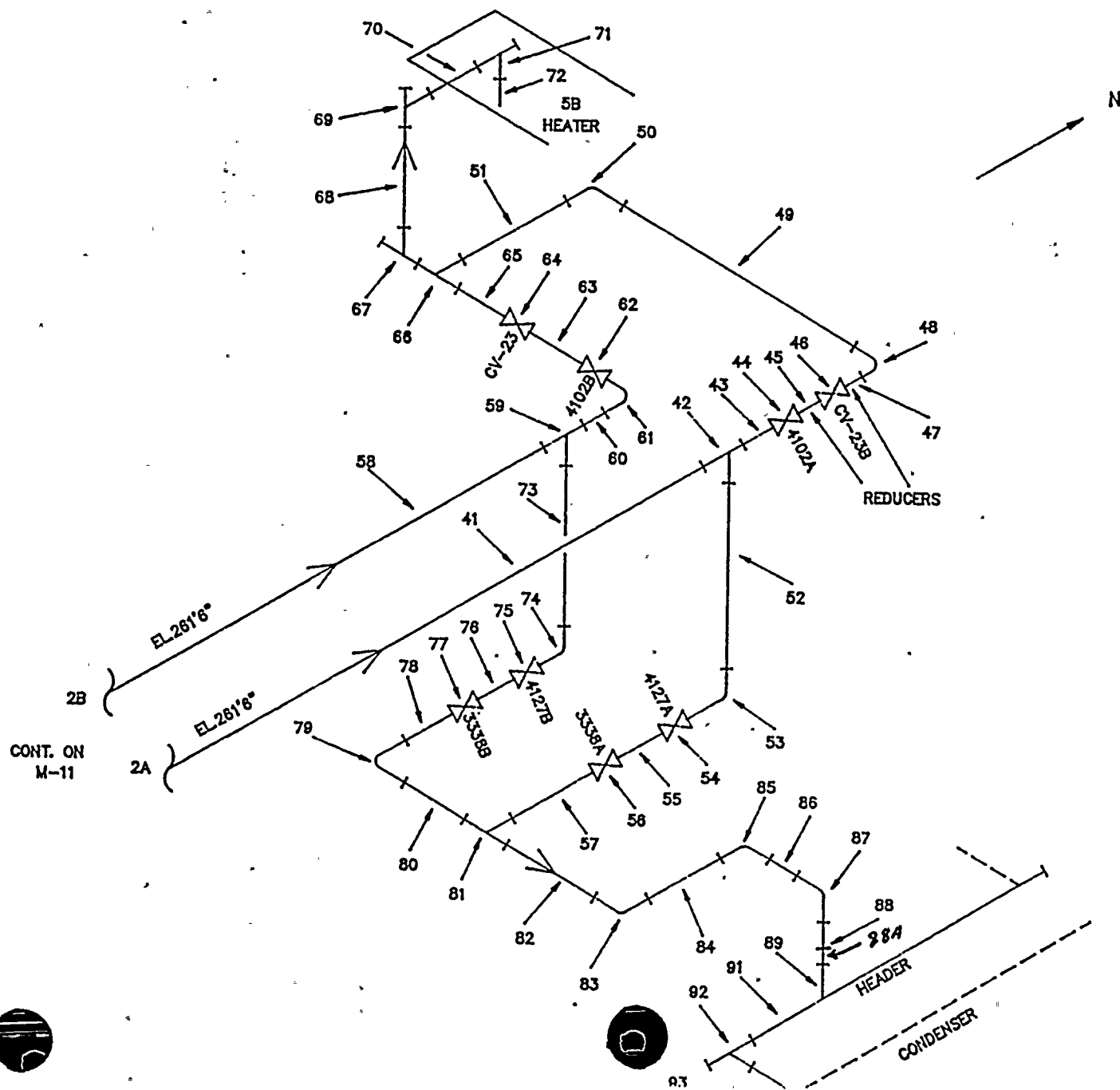
MSR 1A & 1B 2ND PASS DRAIN TO 5A H.P.H. & CONDENSER





M-12B

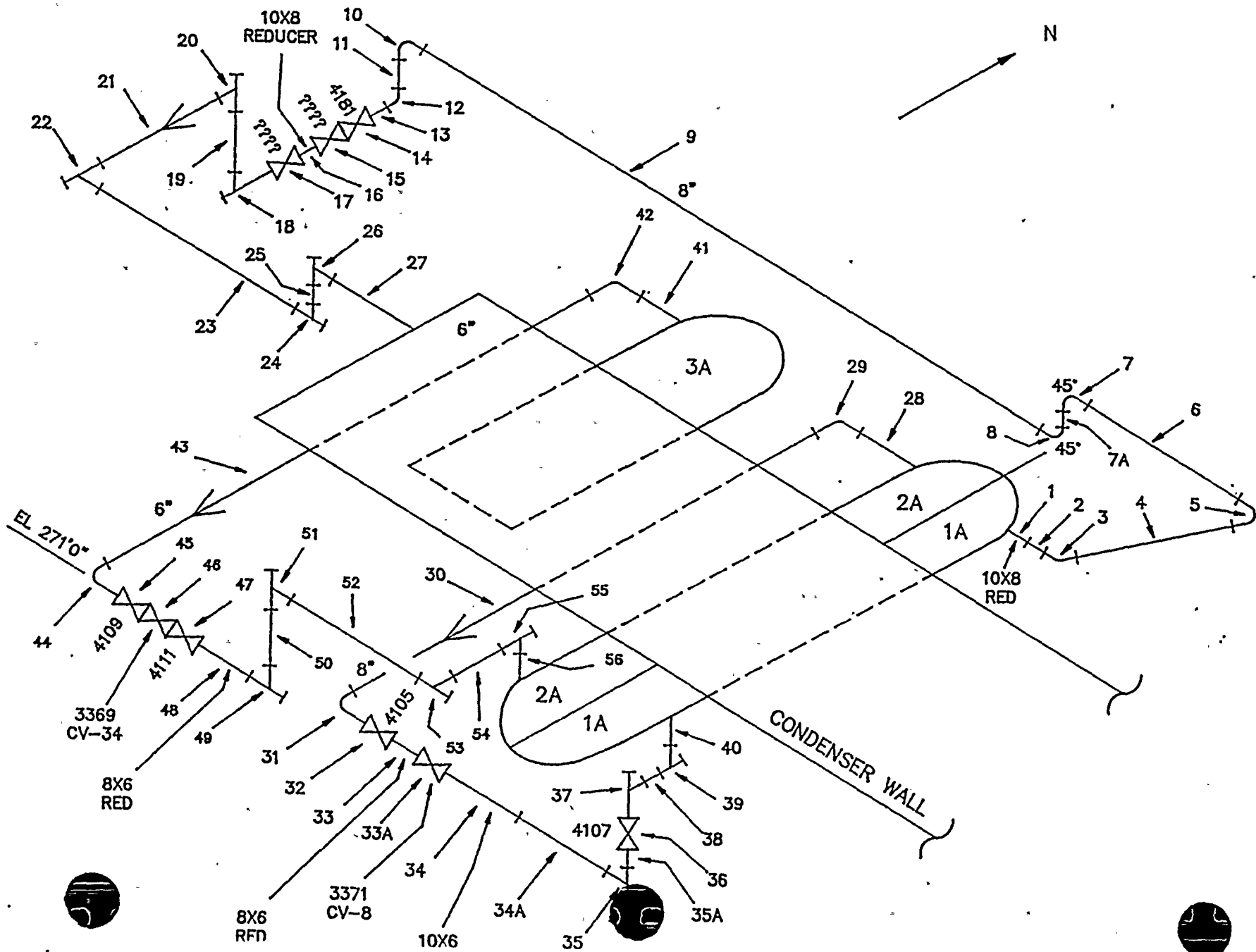
MSR 2A & 2B 2ND PASS DRAIN TO 5B H.P.H. & CONDENSER





M-19

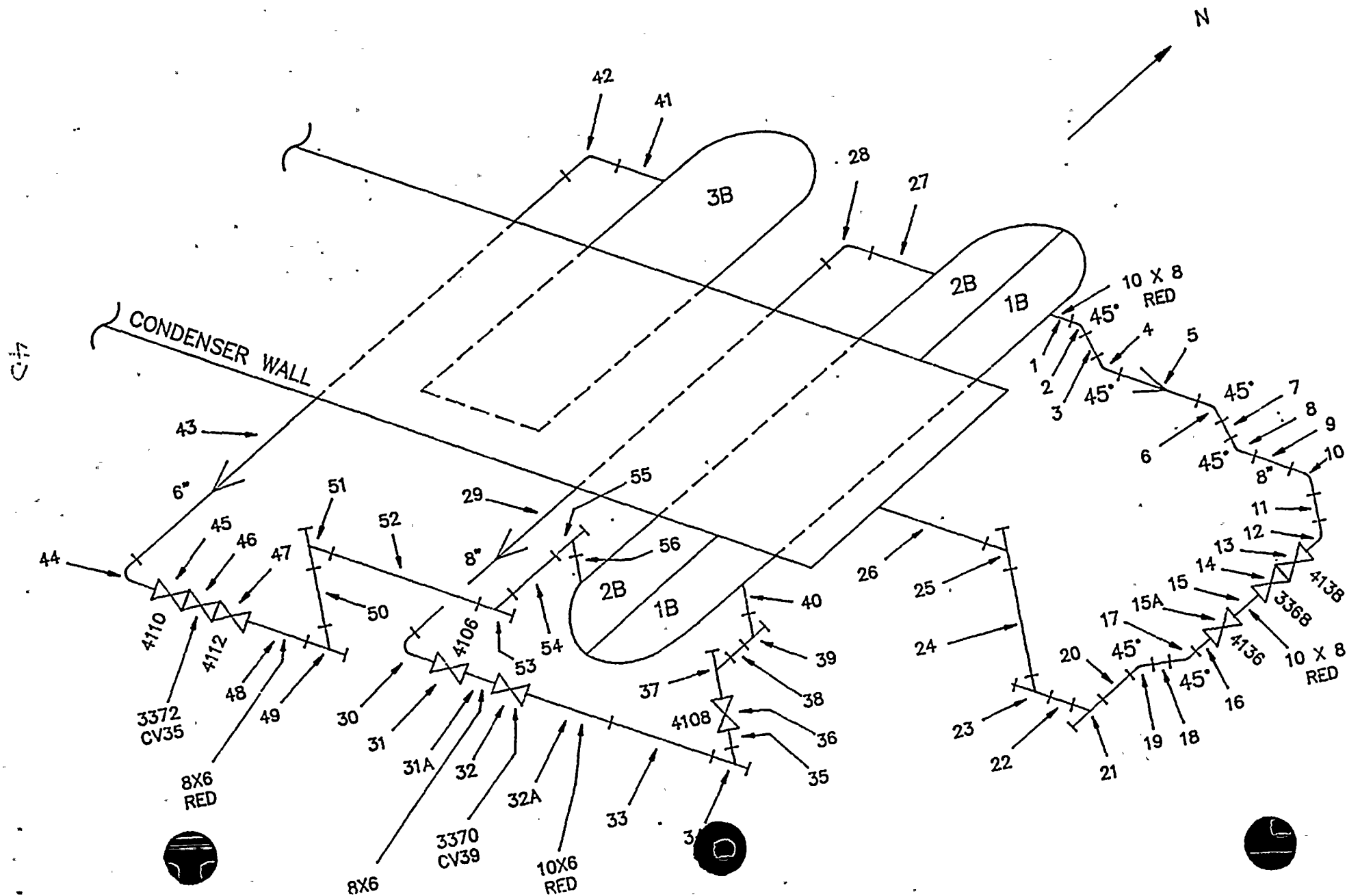
1A, 2A & 3A L.P.H. DRAINS





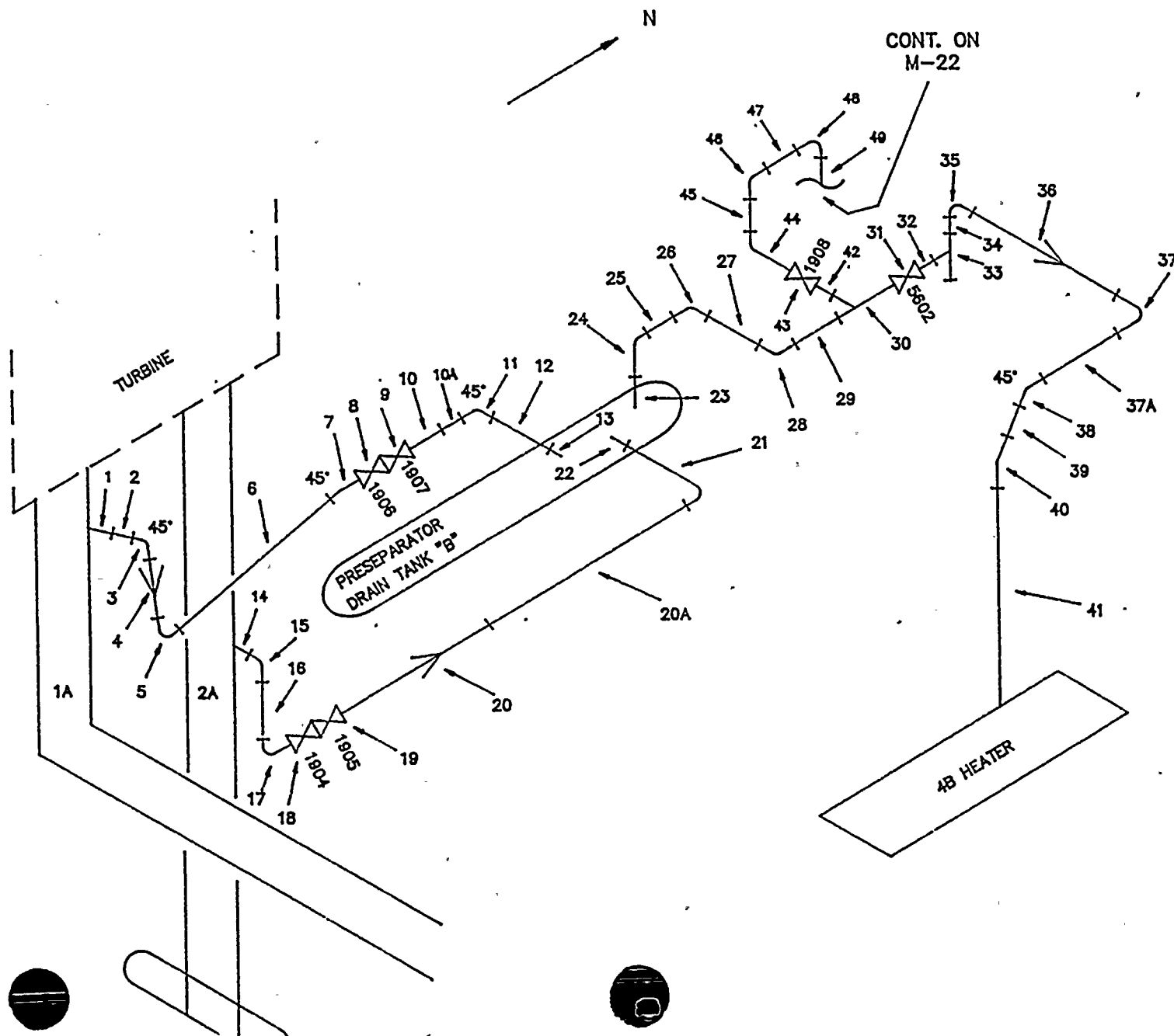
M-20

1B, 2B & 3B L.P.H. DRAINS



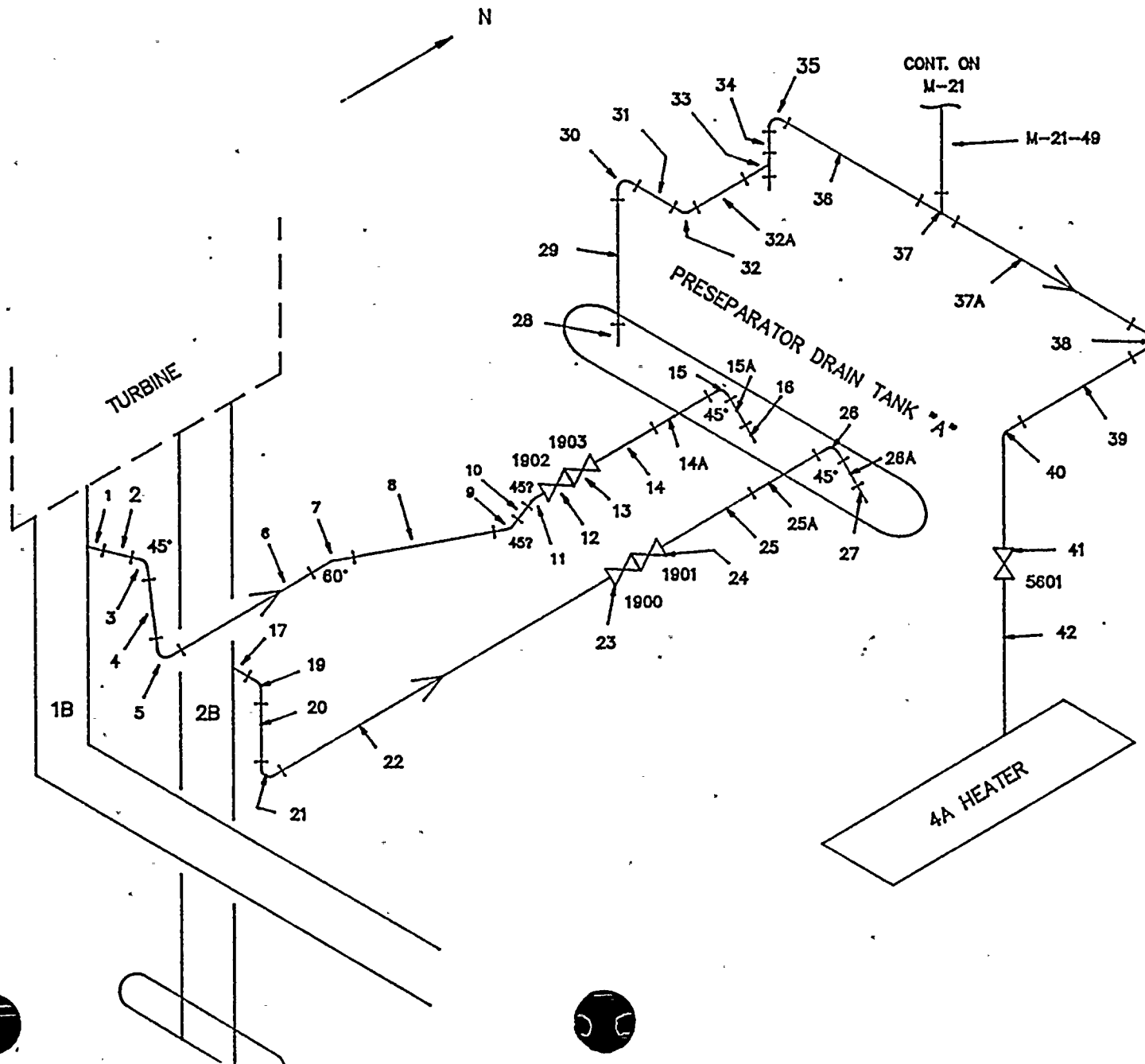


M-21 STEAM EXTRACTION TO PRESEPARATOR B & 4B L.F.H.





M-22 STEAM EXTRACTION TO PRESEPARATOR A & 4A L.P.H.

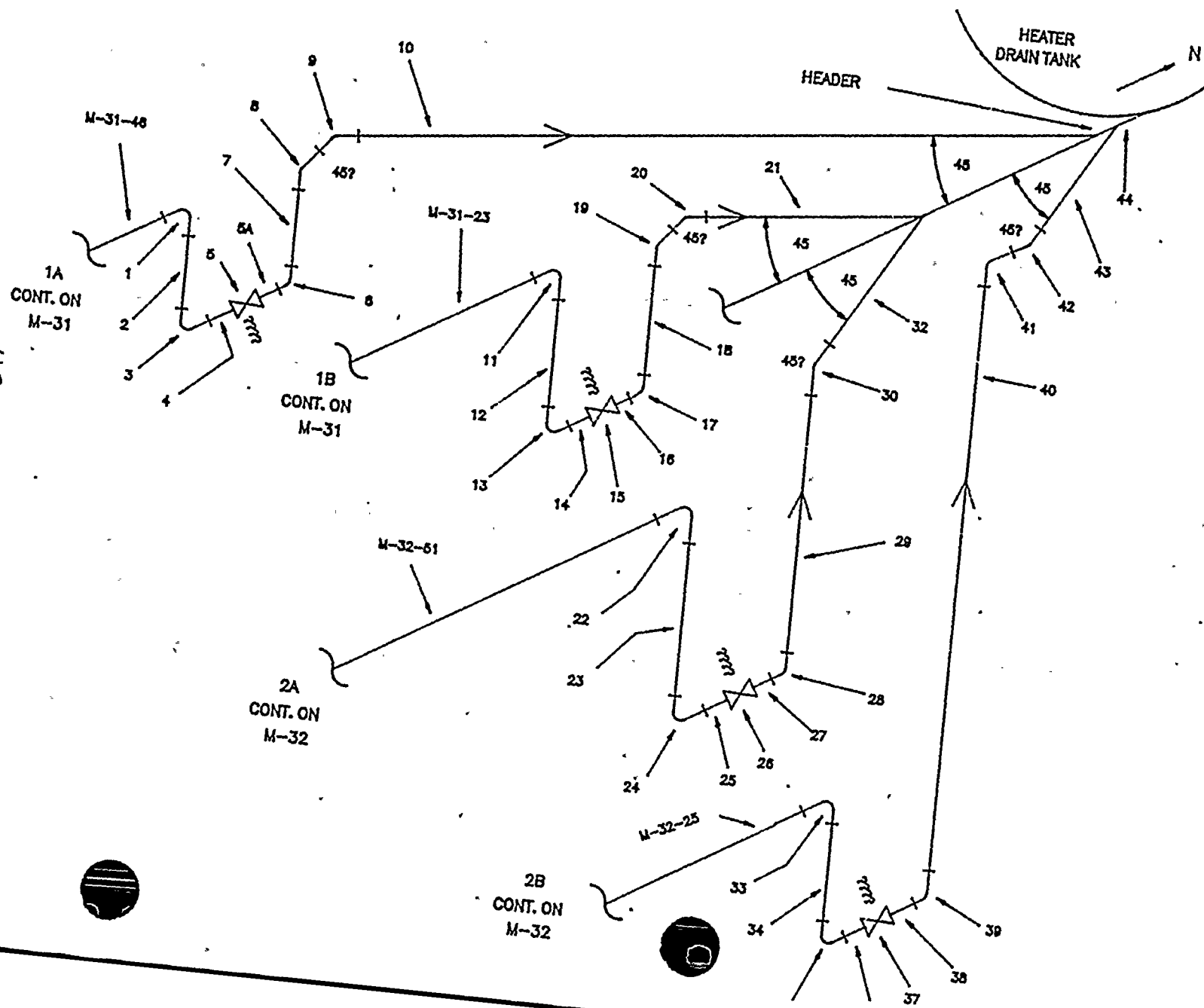


42



M-33

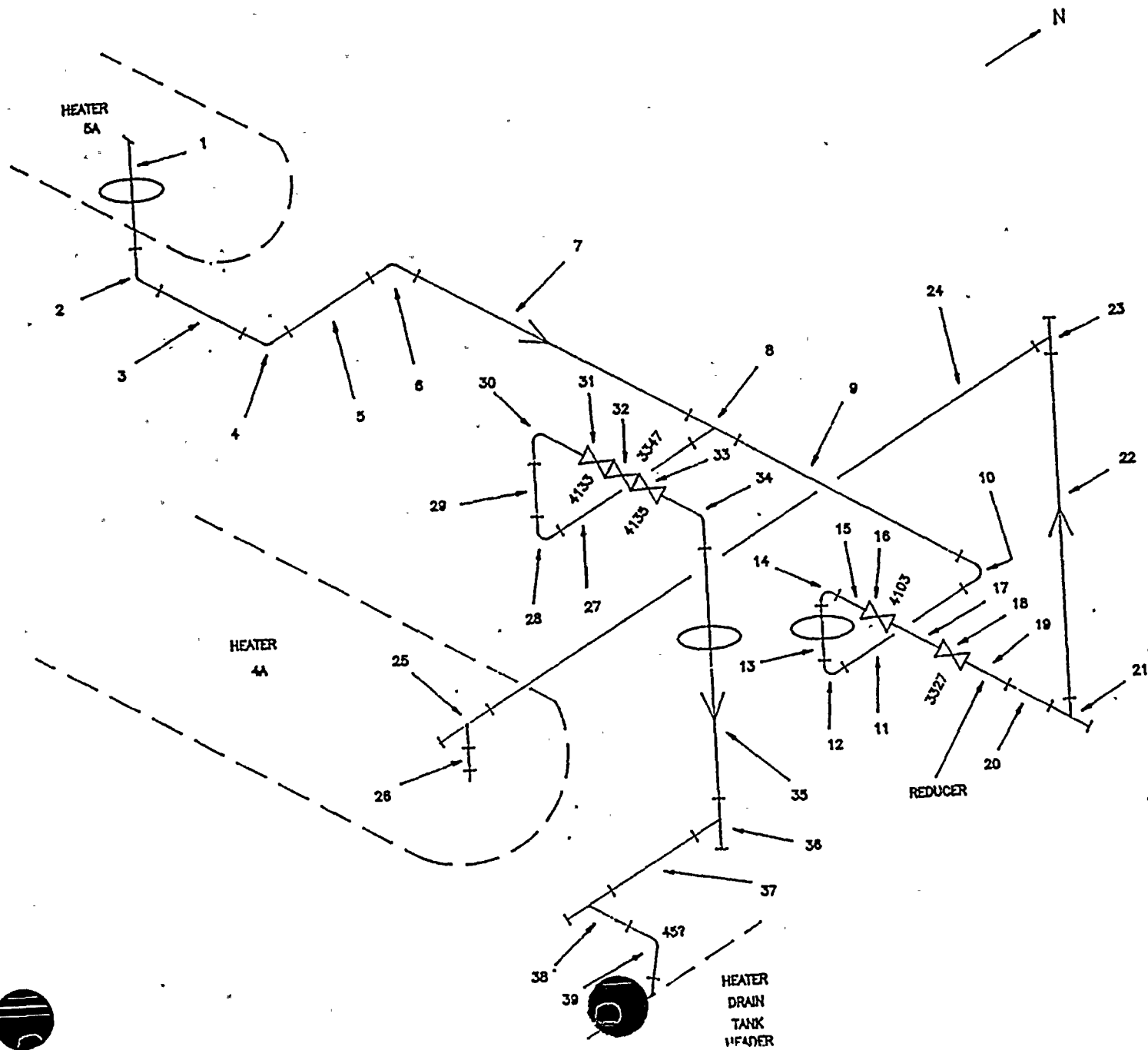
MSR 1A, 1B, 2A & 2B TO HEATER DRAIN TANK





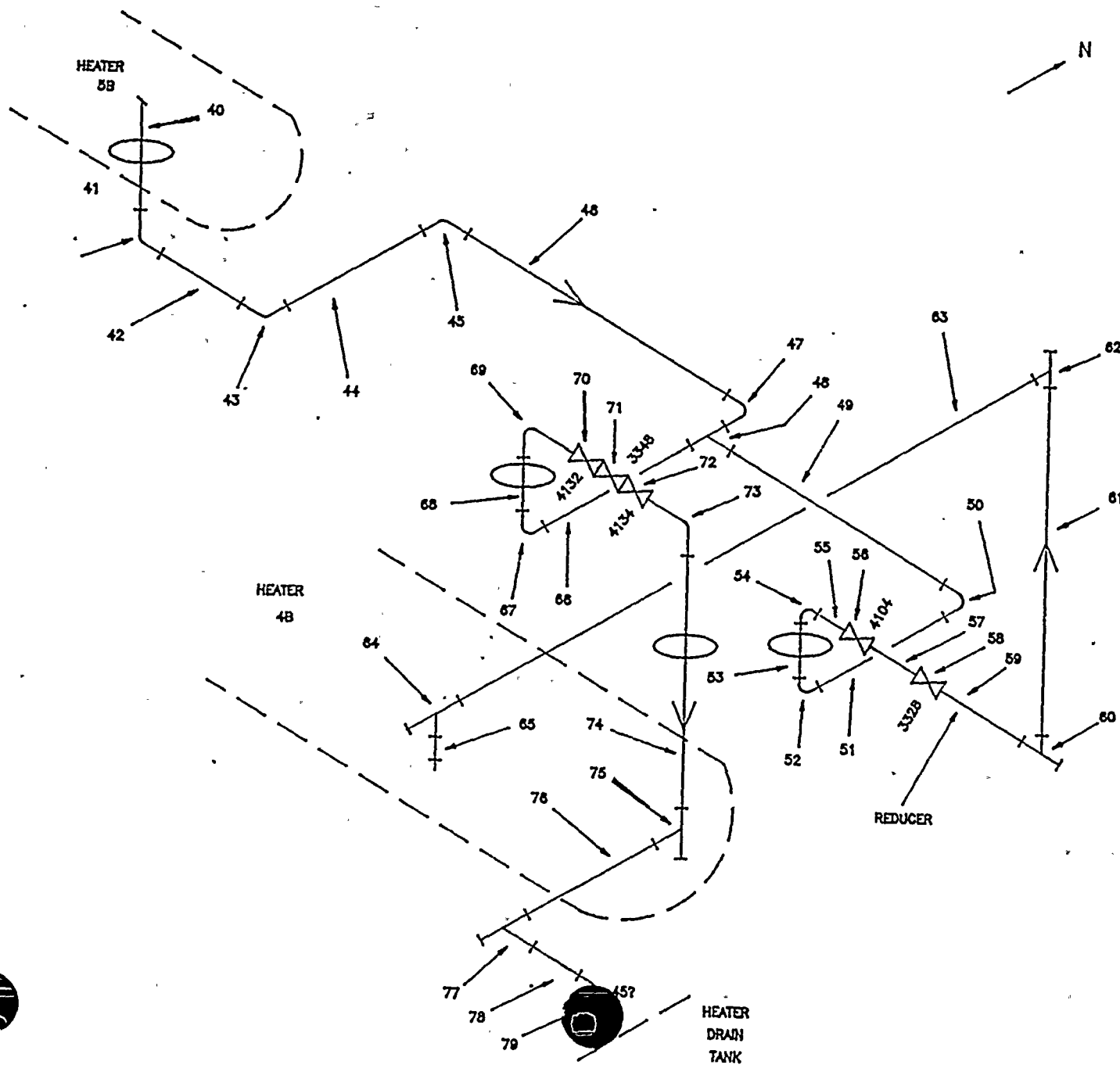
M-41A

5A H.P.H. DRAIN TO 4A L.P.H.





M-41B 5B H.P.H. DRAIN TO 4B L.P.H.

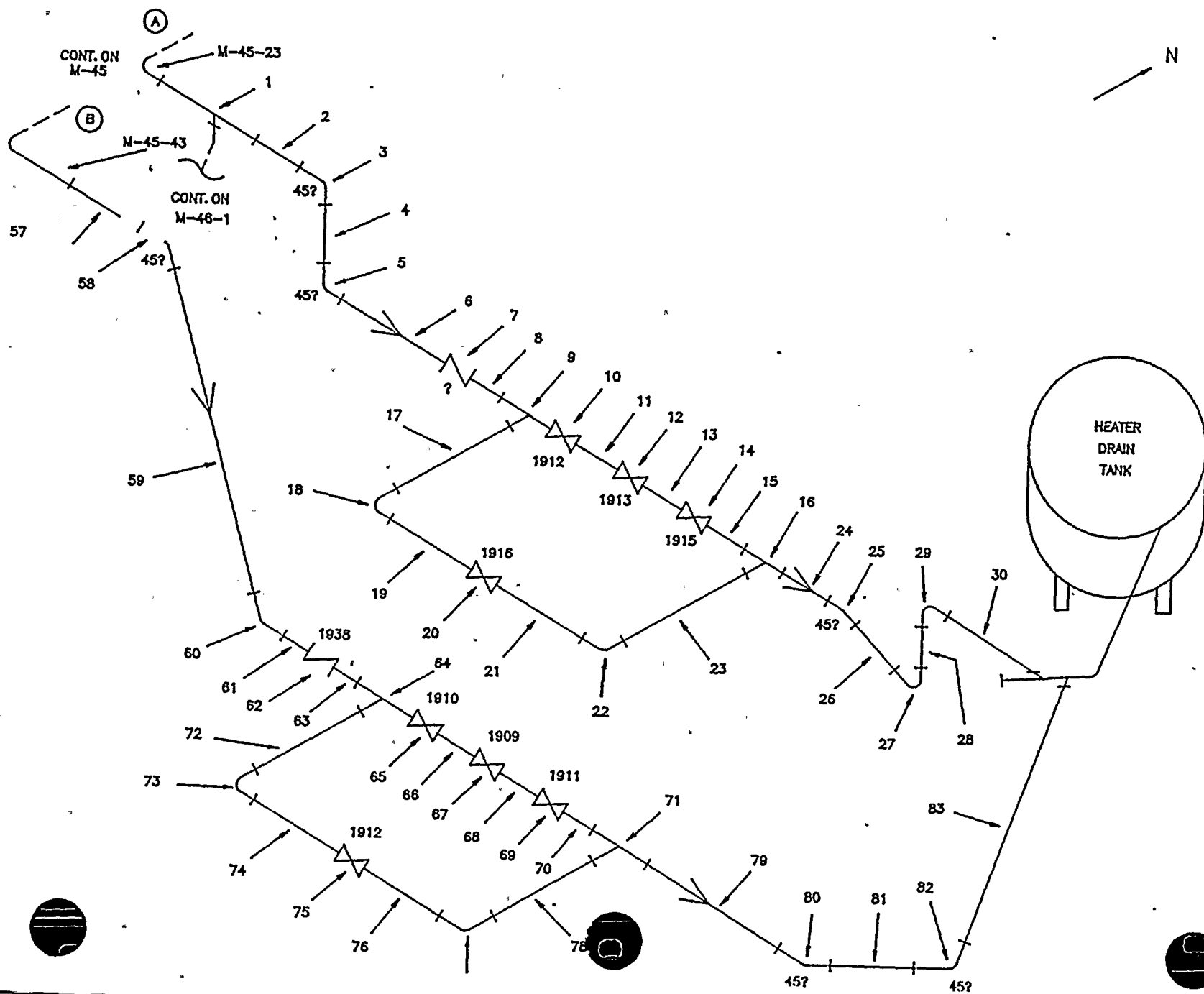


45



M-46B

PRESEPARATOR A & B DRAIN TO HEATER DRAIN TANK

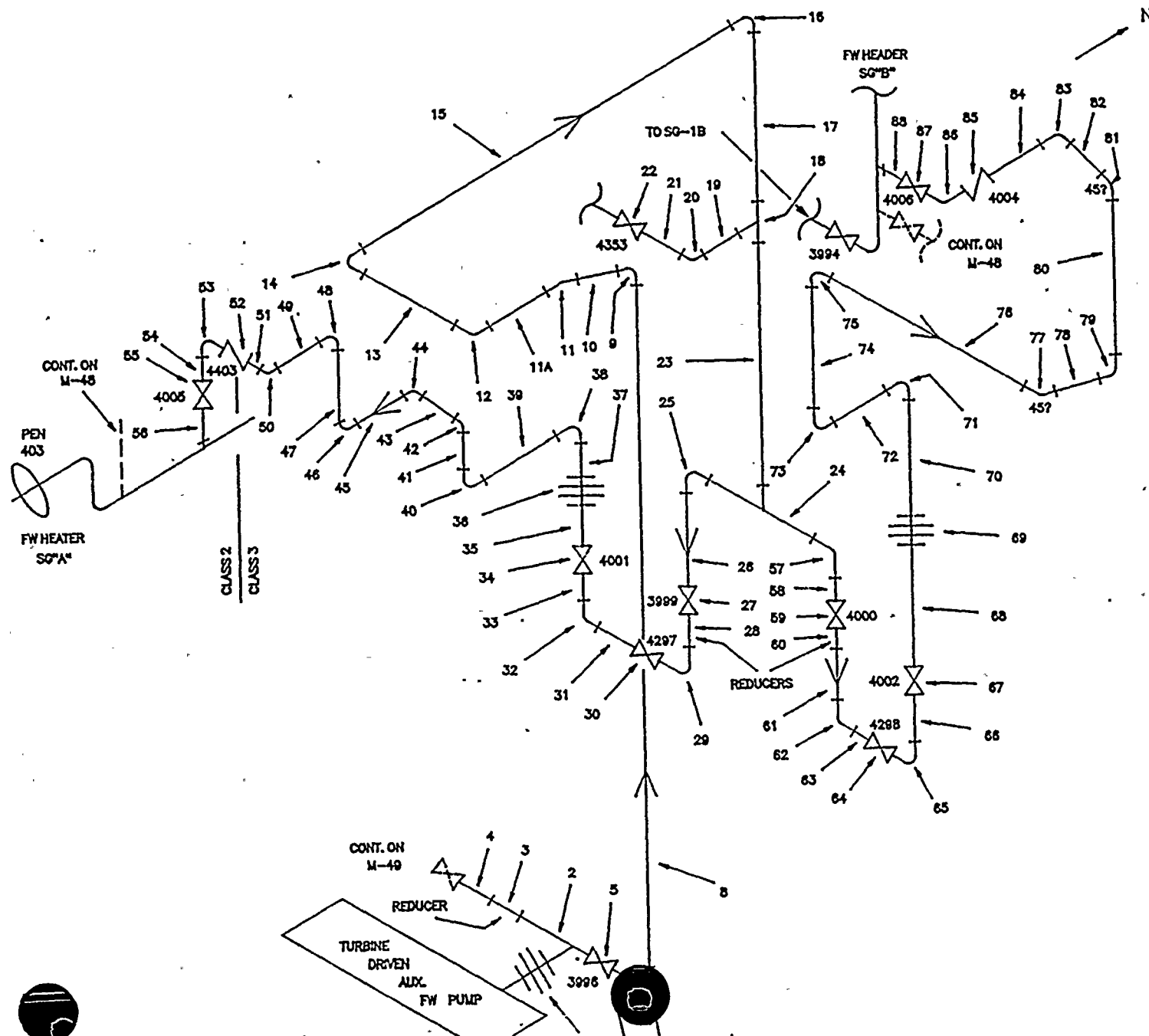


46



M-47

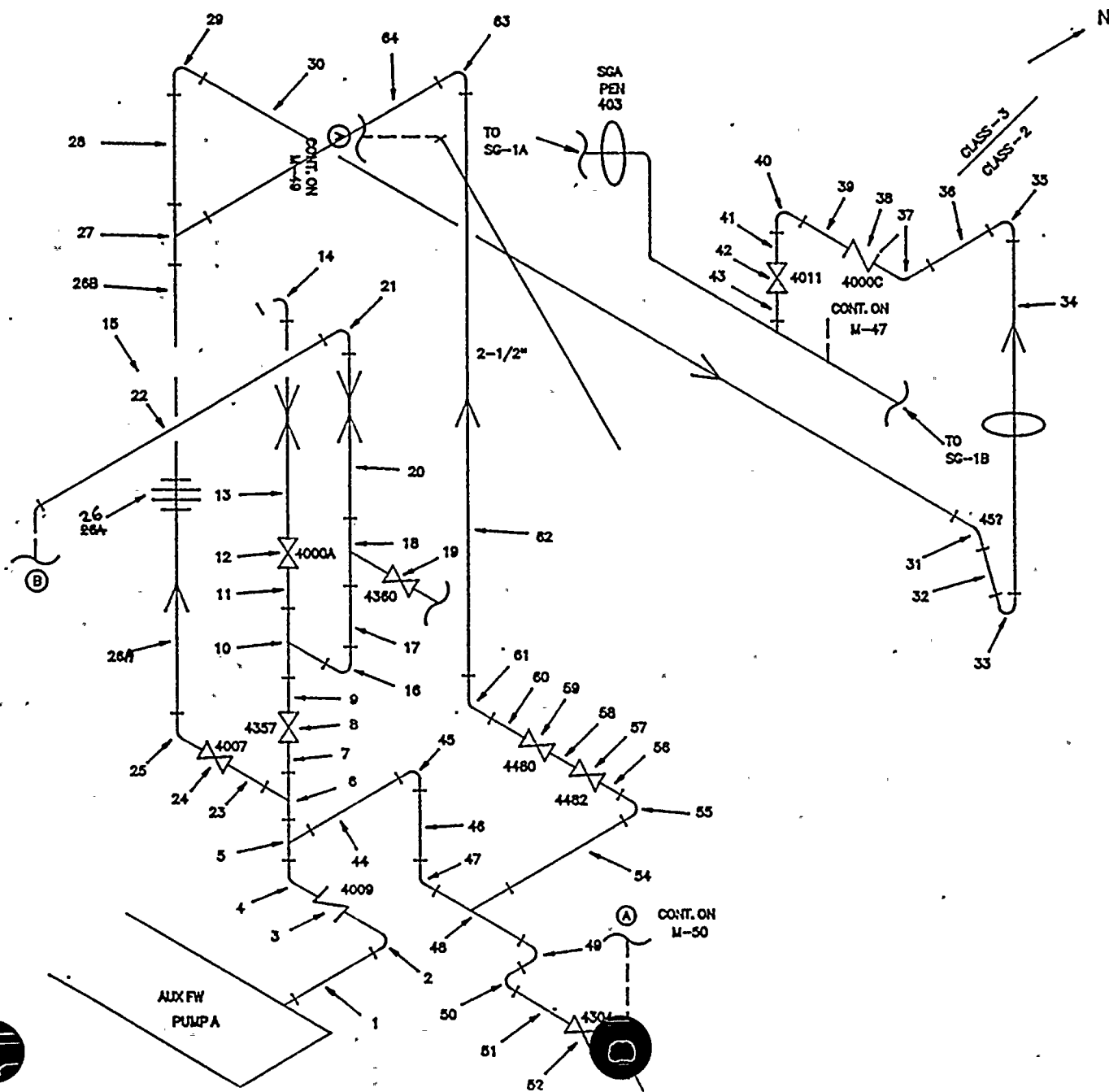
TURBINE DRIVEN AUX F.W. PUMP TO DISCHARGE LINES





M-48

AUX F.W. PUMP A TO DISCHARGE LINES



AUX FW
PUMP A

CONT. ON
M-50

SGA
PEN
403

TO
SC-1A

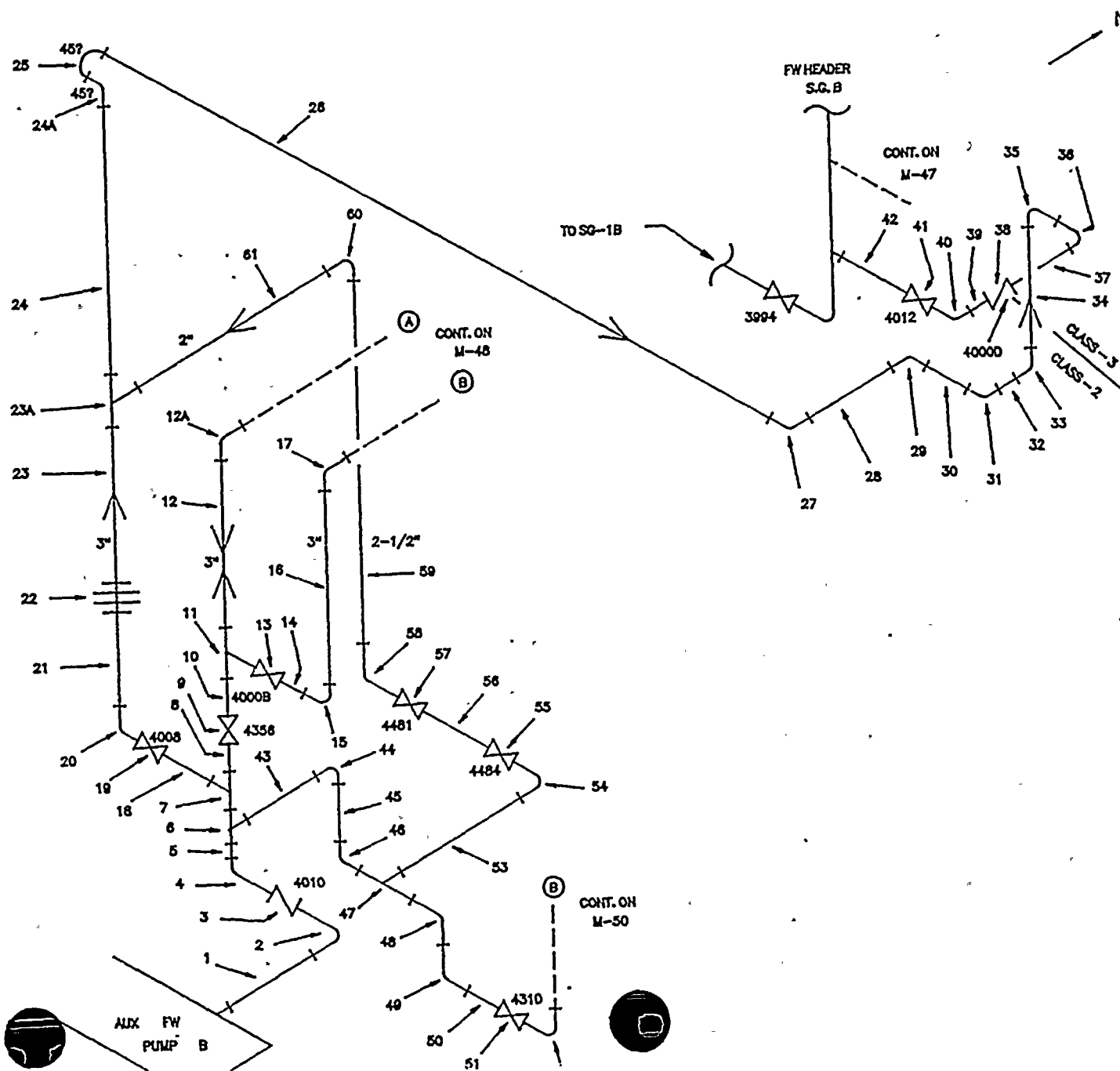
CONT. ON
M-47

TO
SC-1B

CLASS-3
CLASS-2



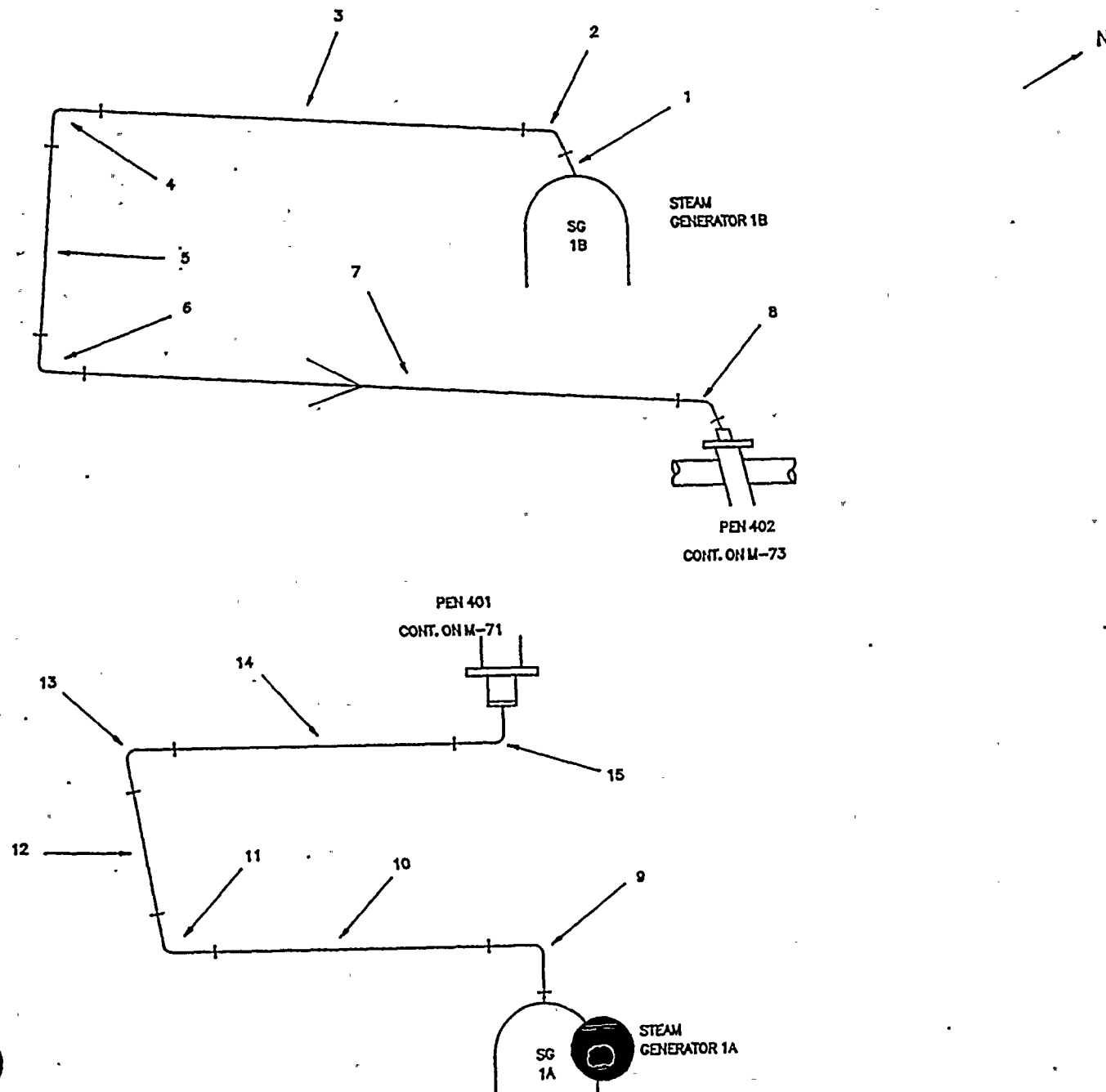
AUX F.W. PUMP B TO DISCHARGE LINES





M-70

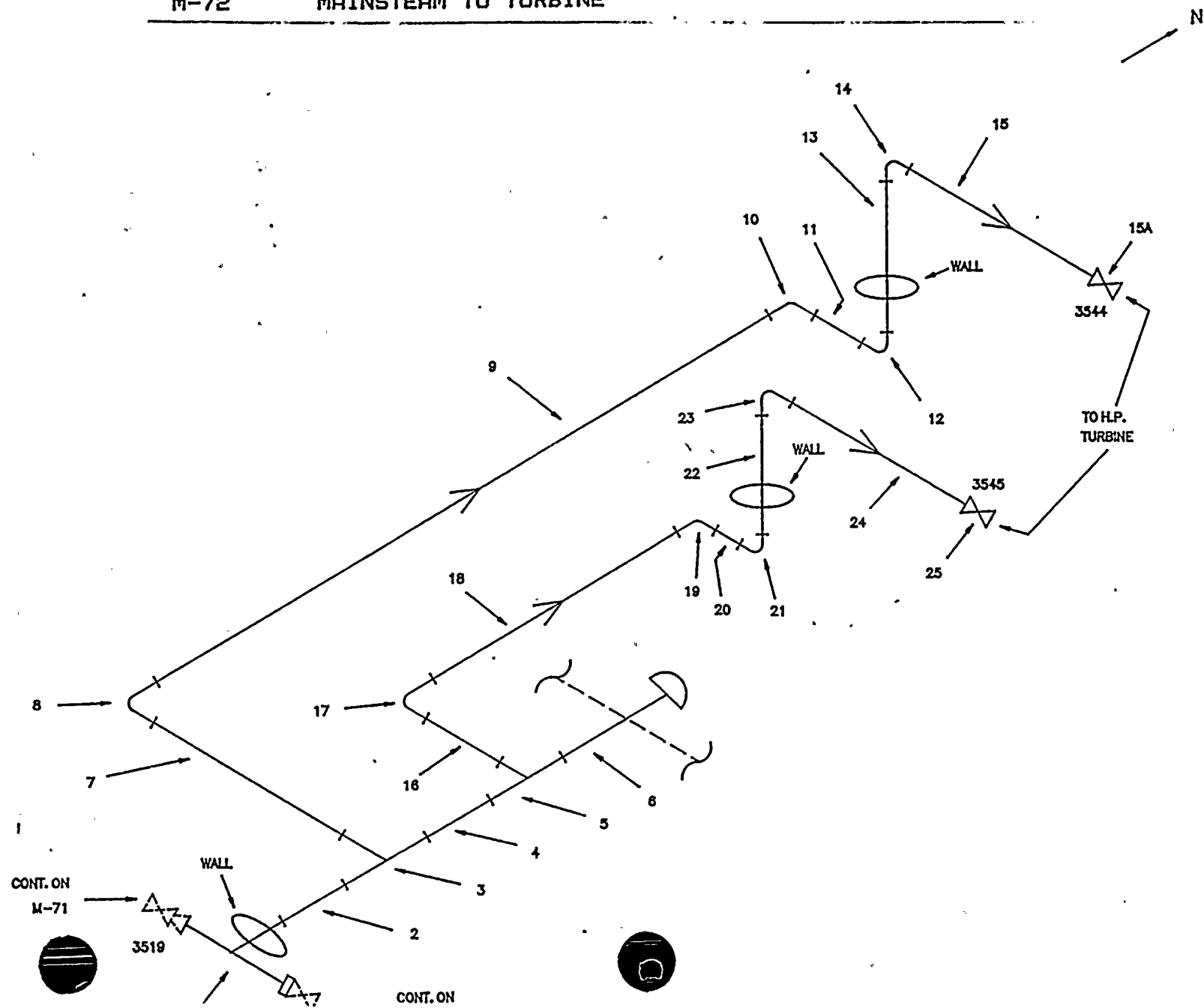
MAINSTEAM FROM S/G A & B





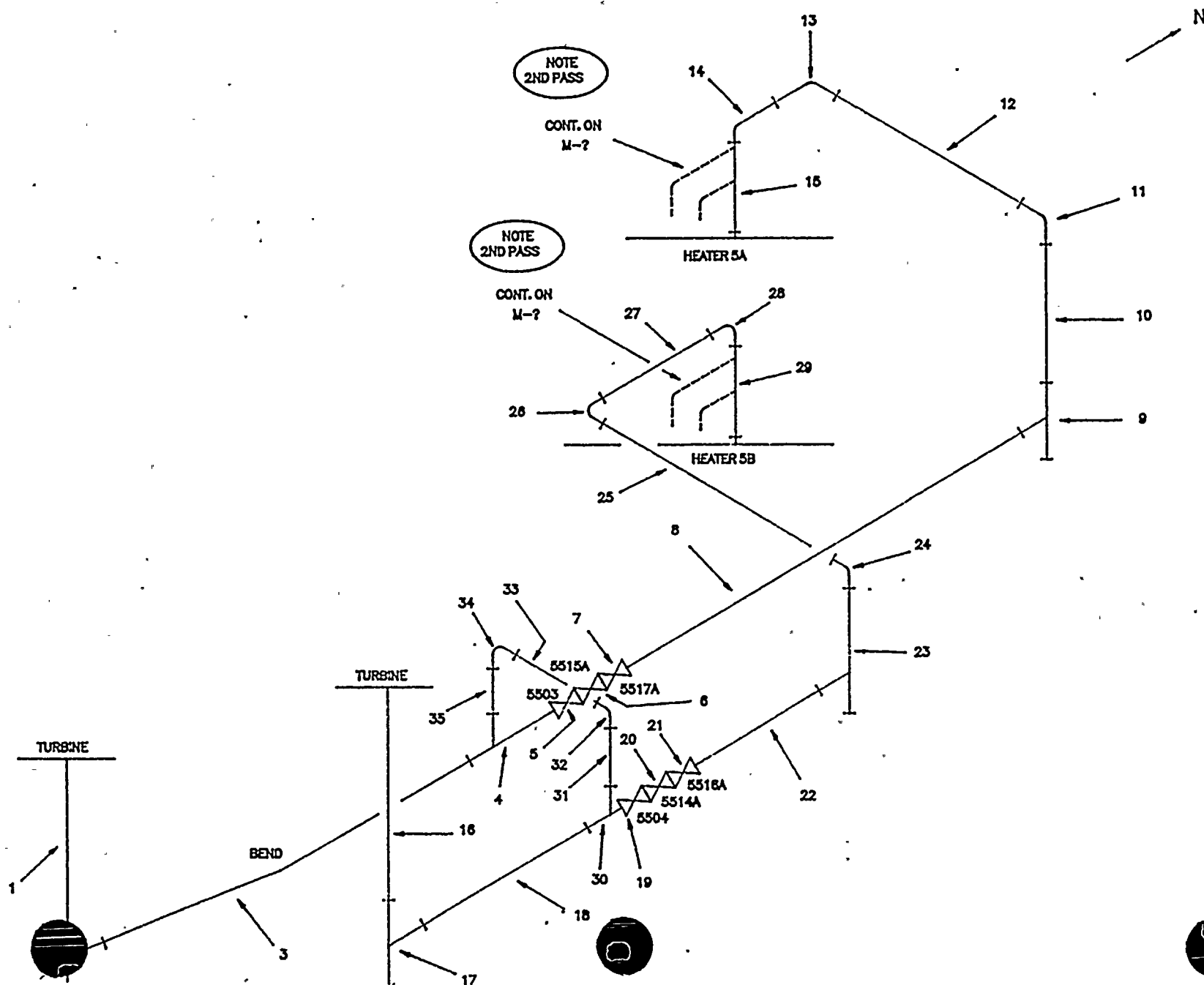
M-72

MAINSTEAM TO TURBINE





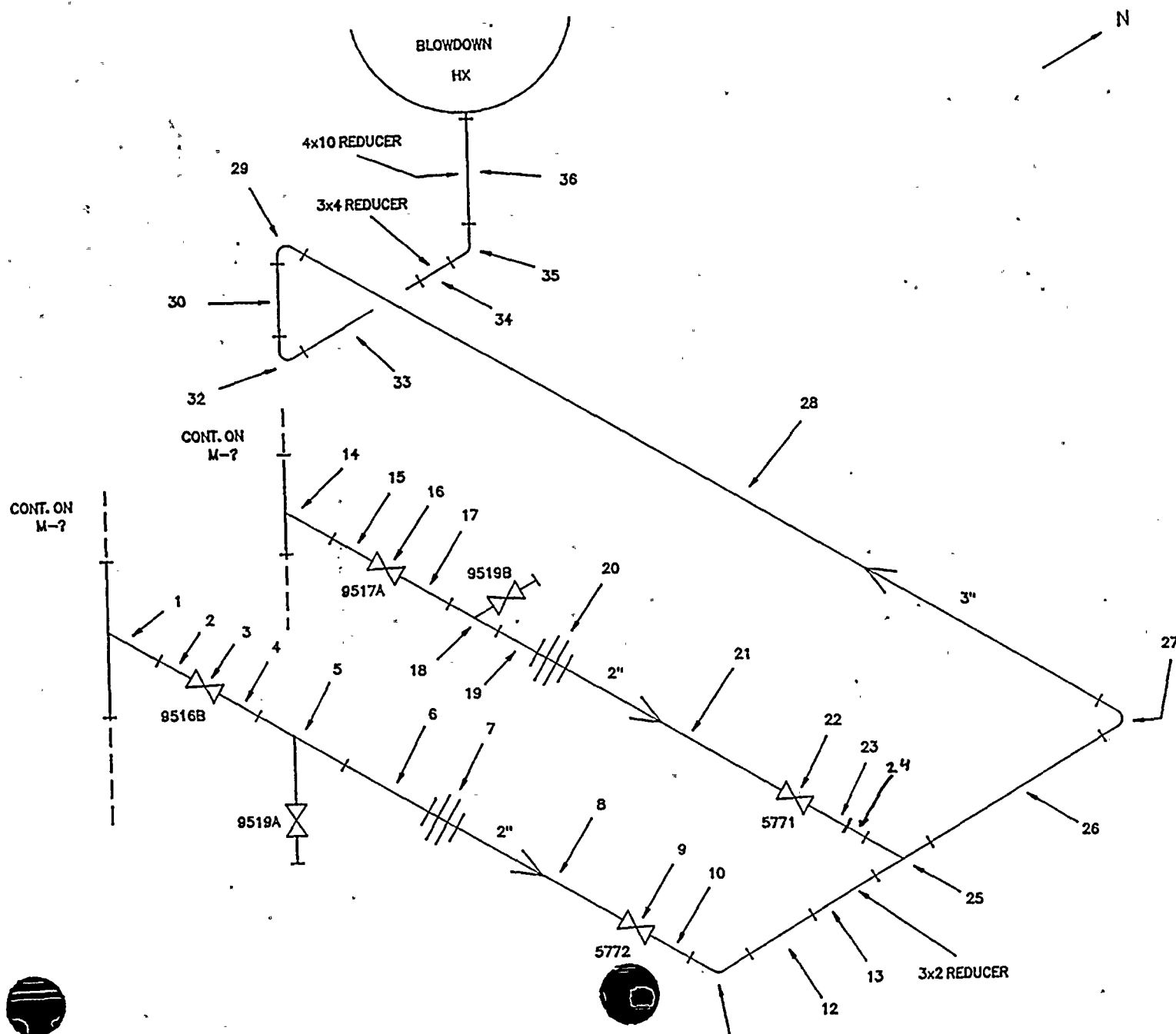
59





M-87

S/G BLOWDOWN TO BLOWDOWN HEAT EXCHANGER



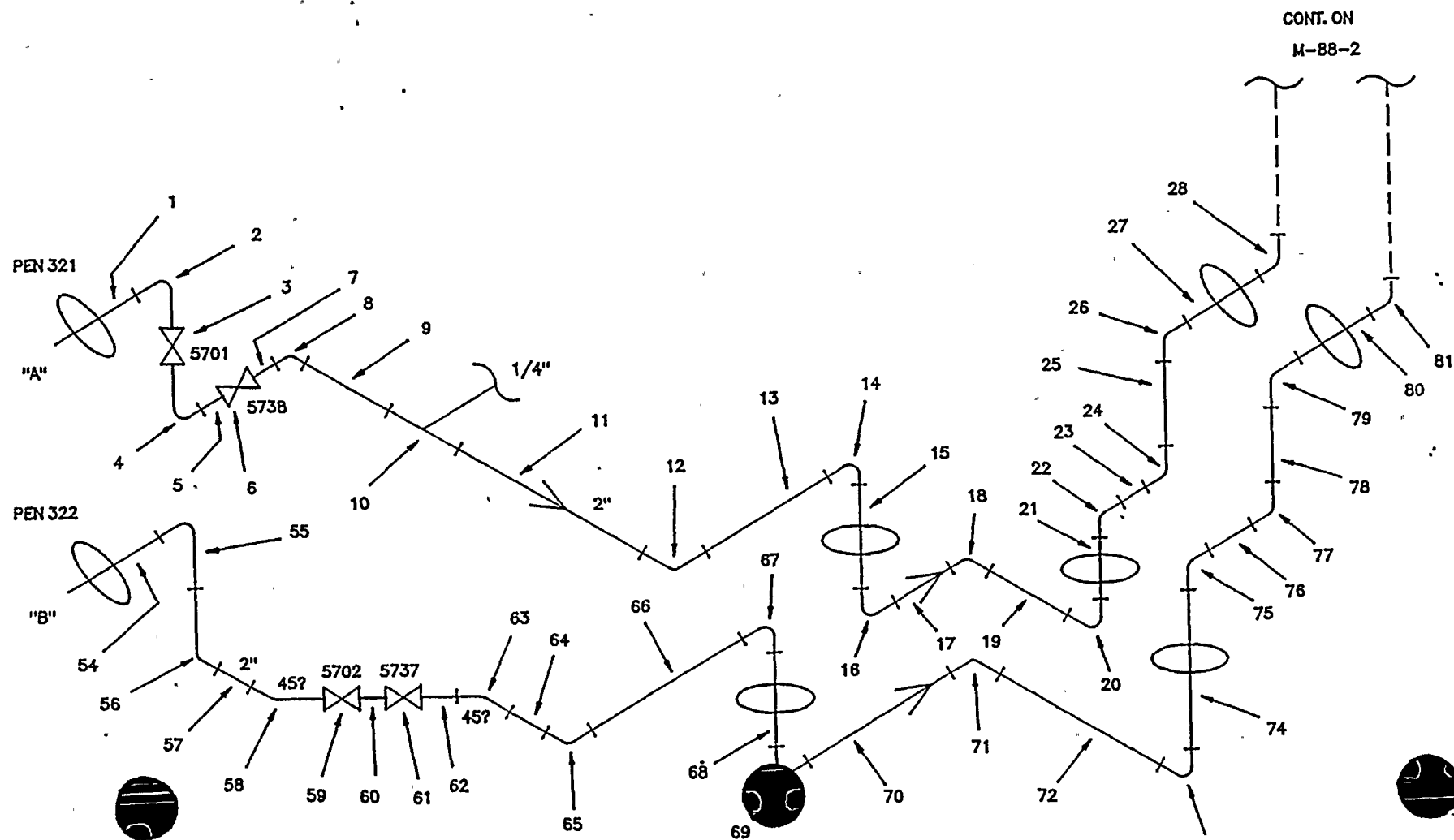


M-88A

S/G BLOWDOWN LINES - INTERMEDIATE BLDG.

N

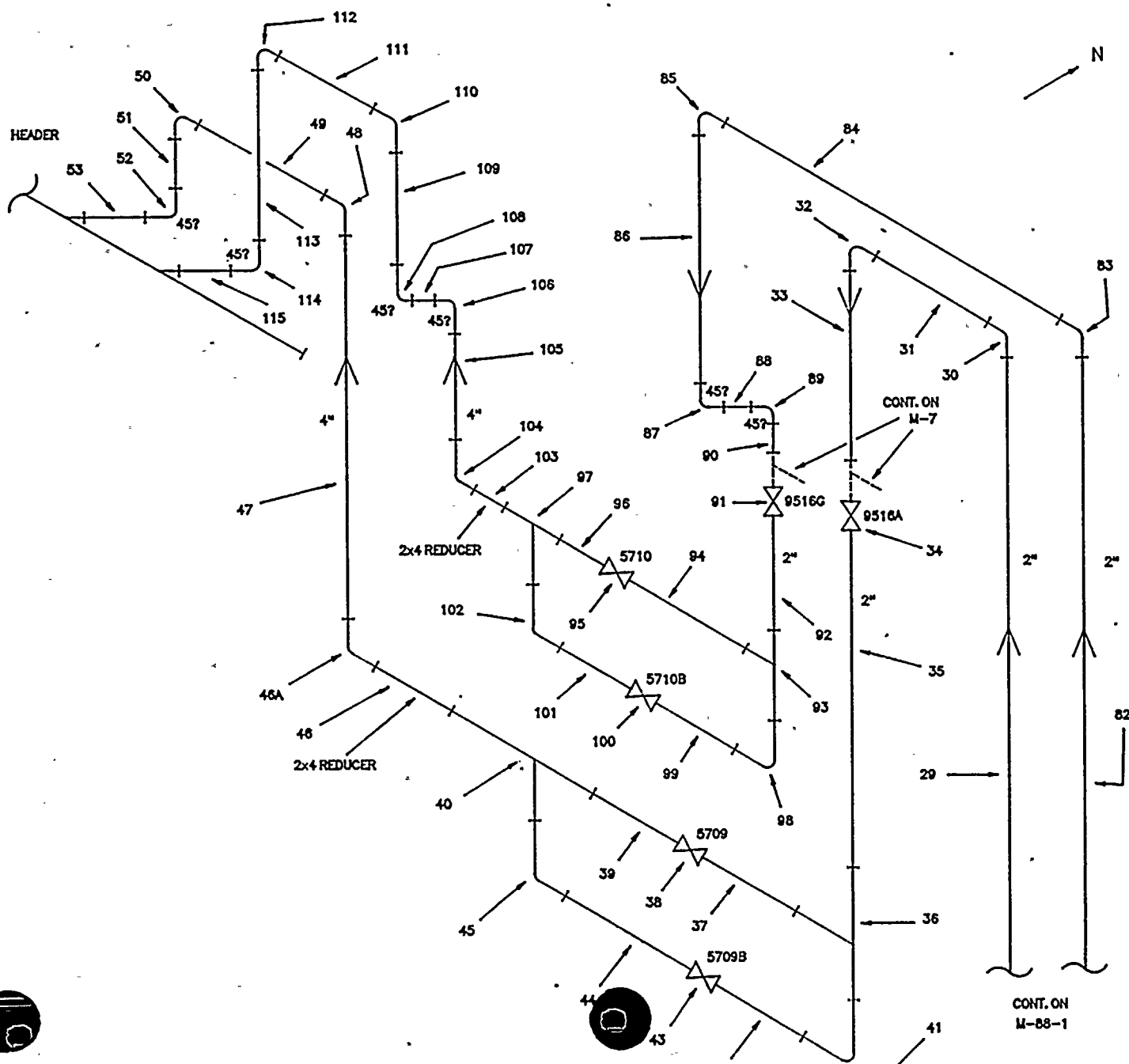
45





M-88B

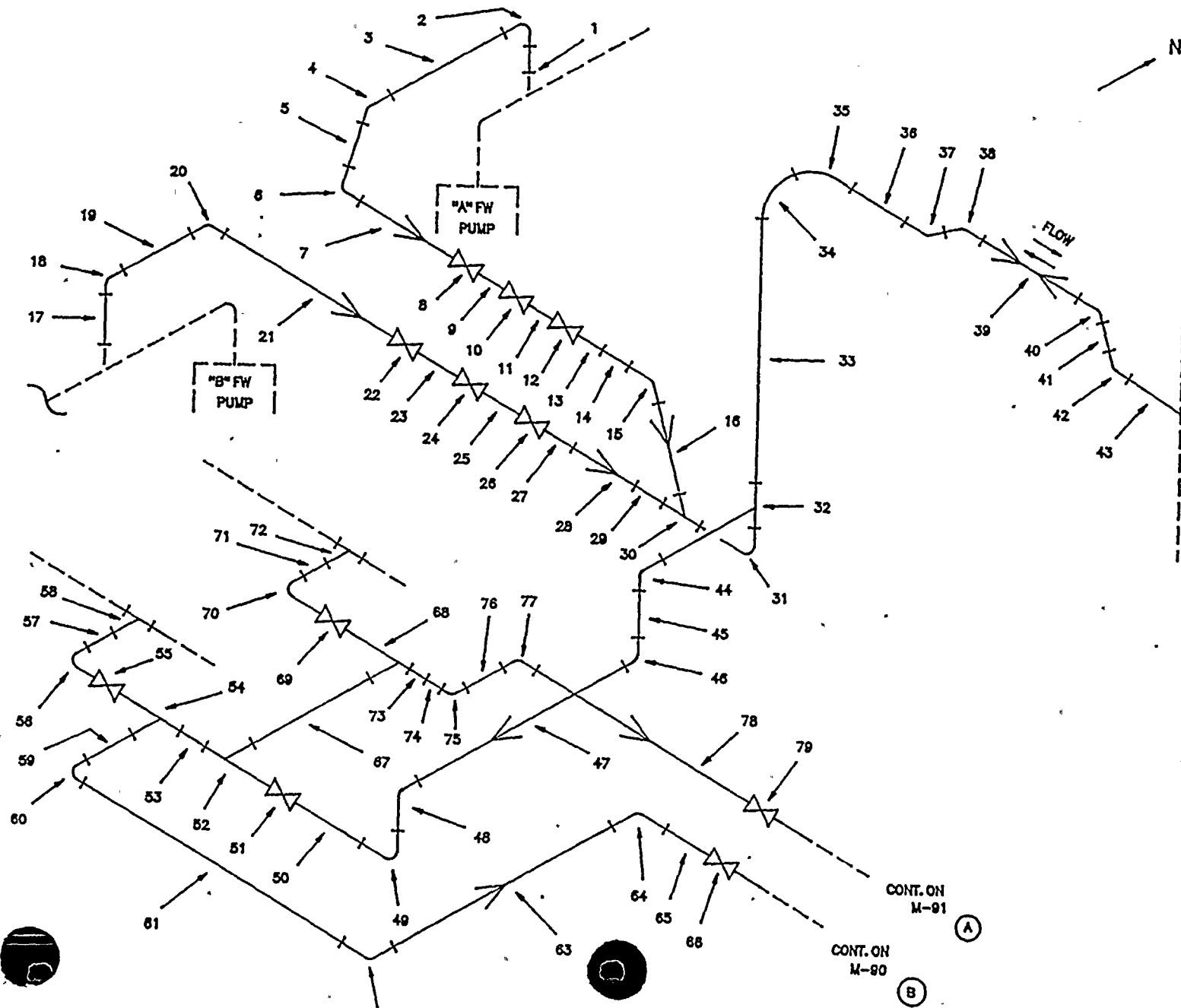
S/G BLOWDOWN TO BLOWDOWN TANK HEADER





M-92

FEEDWATER PUMP BYPASS



56



Attachment 2

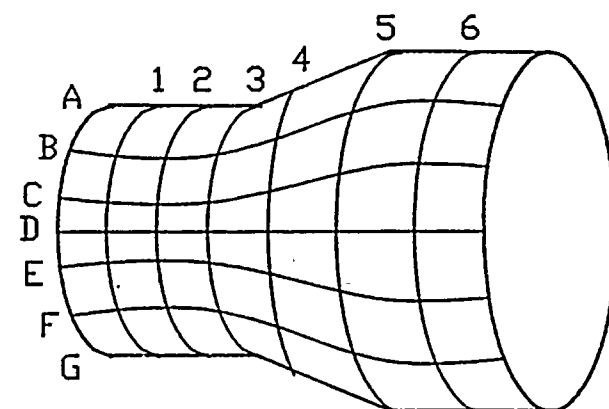
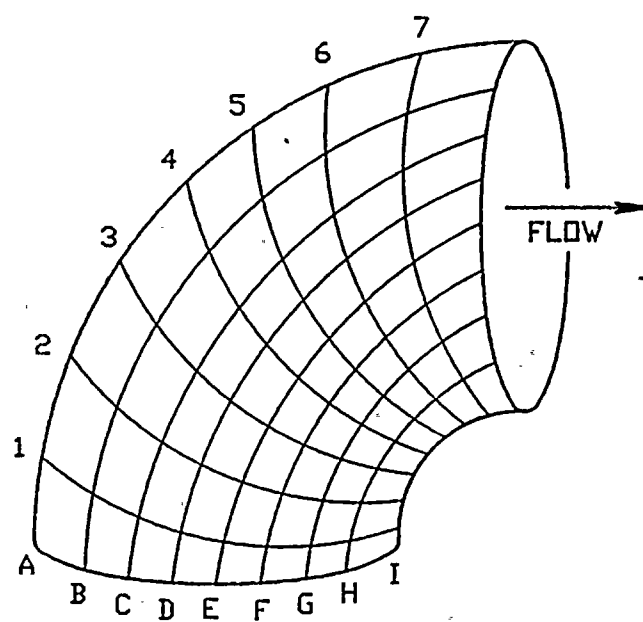
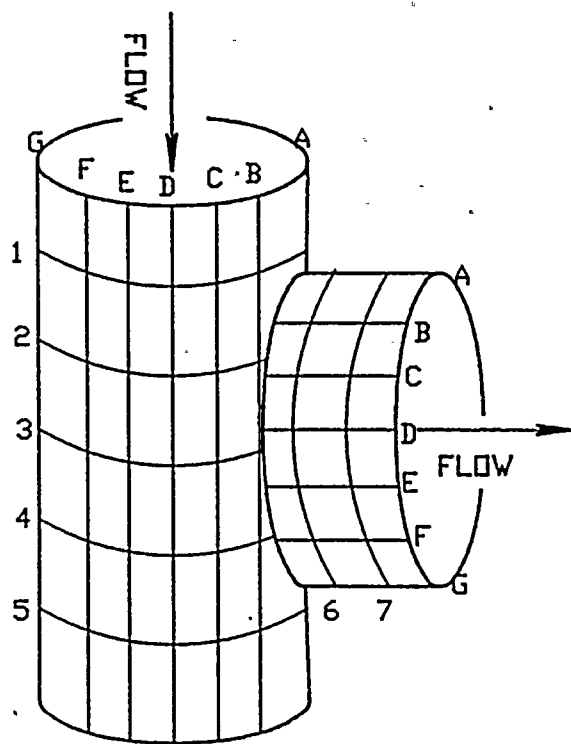
to

NRC IE Bulletin 87-01 Response

(Ref. Item 4b)



LAYOUT FOR U.T. THICKNESS READINGS





FILE : SAMPLE.PLT

DESCRIPTION: 90 DEGREE ELBOW

SCHEDULE: 80

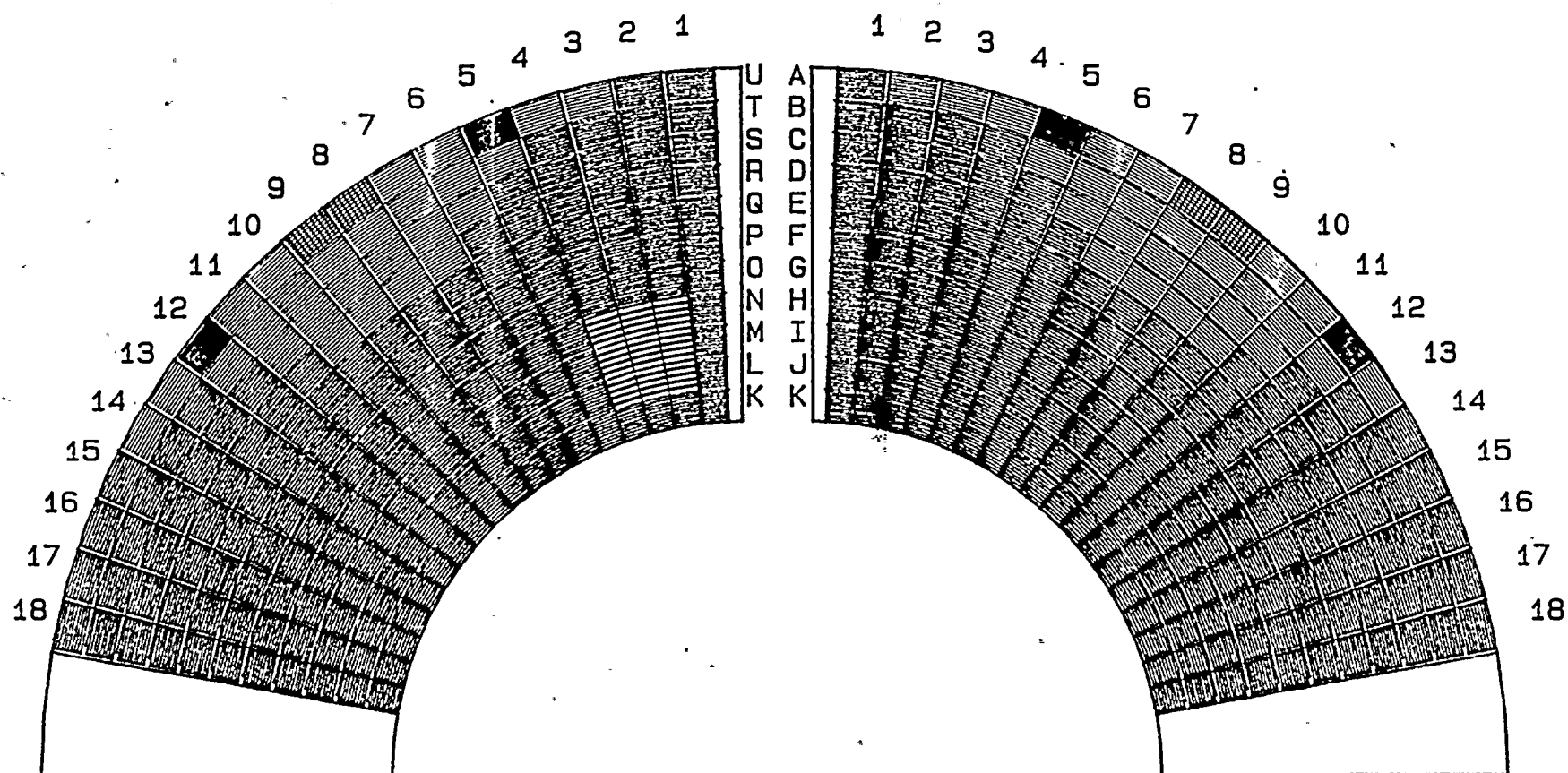
PIPE OD: 6.625

NOMINAL THICKNESS: .432

REFERENCE: UPSTREAM WELD

LOCATION OF FIRST RING: .5 INCHES

DISTANCE BETWEEN DATA RINGS: 1



FLOW DIRECTION : DOWNSTREAM

INCREMENT DIRECTION : CW



> 90



90 - 85



85 - 80



80 - 70



70 - 65



< 65



RESTRICTION



DATA FILE : SAMPLE.PLT

ELBOW

ELBOW ANGLE : 90

COMPONENT DESCRIPTION : 90 DEGREE ELBOW

SCHEDULE NUMBER : 80

NOMINAL PIPE SIZE : 6
OUTER DIAMETER : 6.625
PIPE THICKNESS : .432

CIRCUMFERENTIAL RANGE : A - U
LENGTH RANGE : 1 - 18
NUMBERS OF TRANSITION RINGS : 1 AND 18

FLOW DIRECTION : DOWNSTREAM

INCREMENT DIRECTION : CW
REFERENCE FROM WHICH RINGS WILL BE MEASURED : UPSTREAM WELD
LOCATION OF FIRST DATA RING (FROM REFERENCE) : .5
DISTANCE BETWEEN DATA RINGS : 1

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|--------|---------|---------|---------|--------|--------|--------|--------|--------|--------|
| A | 0.4850 | 0.3820 | 0.3820 | 0.3820 | 0.3610 | 0.3400 | 0.2970 | 0.1540 | 0.0920 | 0.2970 |
| B | 0.4480 | 0.4370 | 0.4340 | 0.4340 | 0.3820 | 0.3820 | 0.3400 | 0.2970 | 0.2970 | 0.3400 |
| C | 0.4190 | 0.4140 | 0.4160 | 0.4190 | 0.4110 | 0.3820 | 0.3820 | 0.3400 | 0.3400 | 0.3820 |
| D | 0.4460 | 0.4230 | 0.4170 | 0.4380 | 0.4130 | 0.4000 | 0.3820 | 0.3820 | 0.3820 | 0.3820 |
| E | 0.4380 | 0.4490 | 0.4550 | 0.4340 | 0.4310 | 0.4240 | 0.4370 | 0.4450 | 0.4620 | 0.4190 |
| F | 0.4760 | 0.4590 | 0.4600 | 0.4690 | 0.4480 | 0.4740 | 0.4580 | 0.4510 | 0.4800 | 0.4710 |
| G | 0.4900 | 0.4780 | 0.4690 | 0.4730 | 0.4620 | 0.4960 | 0.4540 | 0.4790 | 0.4580 | 0.4620 |
| H | 0.5090 | 0.4890 | 0.4900 | 0.4850 | 0.4980 | 0.4520 | 0.4560 | 0.4520 | 0.4570 | 0.4680 |
| I | 0.4930 | 0.4880 | 0.4450 | 0.4640 | 0.4600 | 0.4380 | 0.4440 | 0.4470 | 0.4420 | 0.4460 |
| J | 0.4840 | 0.4840 | 0.4950 | 0.4500 | 0.4450 | 0.4410 | 0.4620 | 0.4430 | 0.4510 | 0.4520 |
| K | 0.4970 | 0.4740 | 0.4750 | 0.4780 | 0.4750 | 0.4730 | 0.4800 | 0.4990 | 0.4920 | 0.4770 |
| L | 0.5240 | -1.0000 | -1.0000 | -1.0000 | 0.5270 | 0.5250 | 0.5000 | 0.5160 | 0.5210 | 0.5090 |
| M | 0.5270 | -1.0000 | -1.0000 | -1.0000 | 0.4880 | 0.5010 | 0.4980 | 0.5000 | 0.5120 | 0.5070 |
| N | 0.4700 | -1.0000 | -1.0000 | -1.0000 | 0.4660 | 0.4540 | 0.4600 | 0.4550 | 0.4720 | 0.4470 |
| O | 0.4820 | 0.4790 | 0.4590 | 0.4620 | 0.4530 | 0.4830 | 0.4580 | 0.4580 | 0.4580 | 0.4570 |
| P | 0.4540 | 0.4440 | 0.4380 | 0.4440 | 0.4650 | 0.4620 | 0.4590 | 0.4570 | 0.4620 | 0.4540 |
| Q | 0.4540 | 0.4540 | 0.4520 | 0.4380 | 0.4420 | 0.4400 | 0.4580 | 0.4480 | 0.4330 | 0.4350 |
| R | 0.4430 | 0.4250 | 0.4250 | 0.4290 | 0.4370 | 0.4320 | 0.3820 | 0.3820 | 0.3820 | 0.3820 |
| S | 0.4430 | 0.4550 | 0.4180 | 0.4140 | 0.4040 | 0.3820 | 0.3820 | 0.3400 | 0.3400 | 0.3820 |
| T | 0.4400 | 0.4400 | 0.4060 | 0.4180 | 0.3820 | 0.3820 | 0.3400 | 0.2970 | 0.2970 | 0.3400 |
| U | 0.4400 | 0.4230 | 0.3820 | 0.3820 | 0.3610 | 0.3400 | 0.2970 | 0.1540 | 0.1000 | 0.2970 |



| | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|--------|--------|--------|--------|--------|--------|--------|--------|
| A | 0.3400 | 0.3610 | 0.3820 | 0.4360 | 0.4270 | 0.4370 | 0.4300 | 0.4420 |
| B | 0.3820 | 0.3820 | 0.4270 | 0.4390 | 0.4330 | 0.4250 | 0.4250 | 0.4260 |
| C | 0.3820 | 0.4080 | 0.4200 | 0.4130 | 0.3970 | 0.4190 | 0.3990 | 0.4150 |
| D | 0.4790 | 0.4160 | 0.4040 | 0.4060 | 0.4150 | 0.4320 | 0.4190 | 0.4340 |
| E | 0.4590 | 0.4190 | 0.4560 | 0.4390 | 0.4520 | 0.4300 | 0.4320 | 0.4360 |
| F | 0.4640 | 0.4540 | 0.4530 | 0.5120 | 0.4980 | 0.4520 | 0.4670 | 0.4390 |
| G | 0.4510 | 0.4470 | 0.4470 | 0.4450 | 0.4530 | 0.4510 | 0.4540 | 0.4420 |
| H | 0.4520 | 0.4470 | 0.4450 | 0.4390 | 0.4400 | 0.4390 | 0.4370 | 0.4360 |
| I | 0.4530 | 0.4760 | 0.4370 | 0.4730 | 0.4430 | 0.4480 | 0.4430 | 0.4240 |
| J | 0.4520 | 0.4420 | 0.4600 | 0.4410 | 0.4480 | 0.4480 | 0.4380 | 0.4430 |
| K | 0.4840 | 0.4820 | 0.4750 | 0.5220 | 0.4780 | 0.4850 | 0.4900 | 0.4940 |
| L | 0.5170 | 0.5100 | 0.4930 | 0.5020 | 0.5110 | 0.5020 | 0.5960 | 0.5070 |
| M | 0.4880 | 0.4920 | 0.4950 | 0.4800 | 0.4840 | 0.4920 | 0.5280 | 0.4850 |
| N | 0.4670 | 0.4650 | 0.4920 | 0.4410 | 0.4550 | 0.4660 | 0.5050 | 0.5260 |
| O | 0.4620 | 0.4620 | 0.4560 | 0.4510 | 0.5140 | 0.4550 | 0.5030 | 0.4540 |
| P | 0.4540 | 0.4540 | 0.4530 | 0.4730 | 0.4780 | 0.4620 | 0.5000 | 0.4660 |
| Q | 0.4330 | 0.4470 | 0.4540 | 0.4540 | 0.4540 | 0.4560 | 0.4570 | 0.4560 |
| R | 0.4540 | 0.4540 | 0.4650 | 0.4550 | 0.4580 | 0.4570 | 0.4570 | 0.4540 |
| S | 0.3820 | 0.4220 | 0.4620 | 0.4210 | 0.4030 | 0.4270 | 0.4230 | 0.4460 |
| T | 0.3820 | 0.3820 | 0.4110 | 0.4060 | 0.4030 | 0.3990 | 0.4080 | 0.4450 |
| U | 0.3400 | 0.3610 | 0.3820 | 0.3820 | 0.4340 | 0.4540 | 0.4350 | 0.4700 |



Attachment 3

TABLE 1

SUGGESTED FITTINGS

- Closely Coupled Fittings or Configurations
- Entrant Tee, Combining Tee, Splitting Tee
- 90° Elbow
- Reducer/Expander
- Straight Section of Pipe Downstream of:
 - Reducer
 - Flow Control/Throttling Valve
 - Restricting Orifices
 - Multiple Thermowells, etc.

TABLE 2

SUGGESTED PIPING LOCATIONS

- Feedwater Suction
- Feedwater Discharge
- Heater Drain Pump Discharge
- Condensate from FW Heater
- HPCI (BWR)



Attachment 3

TABLE 3

KEY PARAMETERS

- ° C.S. piping & components — major parameter, chromium content
- ° pH
- ° O₂ content
- ° Fluid temperature
- ° Local/Bulk flow rate
- ° Piping product geometry factor
- ° Joint configurations (backing rings, etc.)

NOTE: Information extracted from EPRI Workshop Information
(April 14-15) and EPRI Report NP-3944

100-100000

