



Carolina Power & Light Company

P.O. Box 1551 • Raleigh, N.C. 27602

JAN 07 1991

SERIAL: NLS-90-266
10CFR50.55a

G. E. VAUGHN
Vice President
Nuclear Services Department

United States Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-324/LICENSE NO. DPR-62
ASME CODE RELIEF REQUEST - SERVICE WATER

Gentlemen:

In accordance with 10 CFR 50.55a and the guidance provided in Generic Letter 90-05, "Guidance For Performing Temporary Non-Code Repair Of ASME Code Class 1, 2, And 3 Piping," Carolina Power & Light Company hereby requests a relief from the requirements of the ASME Boiler and Pressure Vessel Code, Section XI, for the Brunswick Steam Electric Plant, Unit 2. On December 13, 1990, a small through-wall leak was discovered on the Service Water Supply Line to Diesel Generator No. 4. A temporary repair consisting of rubber gasket material secured by mechanical clamps was installed to prevent further leakage. Enclosure 1 contains a relief request which justifies use of this temporary non-code repair until a permanent, code approved repair can be implemented. CP&L will perform the permanent repair during the next Unit 2 maintenance outage, currently scheduled to begin on April 13, 1991.

Please refer any questions regarding this submittal to Mr. M. R. Oates at (919) 546-5063.

Yours very truly,

G. E. Vaughn

GEV/MAT (948BNP)

Enclosure

cc: Mr. S. D. Ebnetter
Mr. N. B. Le
Mr. R. L. Prevatte

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Diesel Generator
Service Water
Relief Request

SYSTEM: Service Water (Supply Line to Diesel Generator No. 4)

Component: The 8" X 6" reducer on line 2-SW-234-6-157 just downstream on inlet supply valves 1(2)-SW-V213.

FUNCTION: This line provides service water to the Diesel Generator No. 4 Jacket Water Cooler.

CLASS: ACME Section XI, Class 3

REQUIREMENT: As mentioned above, this line provides service water to the Diesel Generator No. 4 Jacket Water Cooler. The number 4 Diesel Generator is required to be operable per Technical Specification 3/4.8.1. If it is not operable per the action statement of the Technical Specification, a 7 day Limiting Condition of Operation (LCO) must be declared after which time (if operability is not restored) HOT then GOLD unit Shutdown must follow.

RELIEF REQUIRED: This request is being written to allow a temporary non-code repair of a through-wall leak on the referenced line. The through-wall leak was identified on the Service Water Supply Line (2-SW-234-6-157) to Diesel Generator No. 4 Jacket Water Cooler. The leak was discovered on December 13, 1990, at which time a Maintenance Work Request for the temporary repair of the through-wall leak was initiated and Tracking LCO T1-09-2456 generated in accordance with BSEP Procedure OI-4. The leak is located on the reducer referenced above in the "Component" section at the bottom weld no. FW-B80B as identified on FP 9527-22356, Drawing No. 2-SW-IS040. The through-wall leak is characterized as a hole approximately .25" diameter. Based on past experience, it is believed that the through-wall failure was caused by corrosion in an area exposed to the salt water through a flaw in the cement lining. A temporary repair consisting of rubber gasket material secured by mechanical clamps has been installed to prevent further leakage. The soft rubber patch represents a non-code temporary repair to be justified by this relief request. Refer to Attachment 1 for a diagram of that repair.

BASIS FOR RELIEF: P&ID D-02274, Sheet 2, and Spec. No. 248-117 indicated that line number 2-SW-234-6-157 is Class 157 (design pressure 80 psig to 150 psig and design temperature 103F), Group IIB, ISI-Class 3 and therefore the requirements of Generic Letter (GL) 90-05 apply to any repairs performed on this piping. This request is based on the guidelines set forth in that letter. Those guidelines will be spelled out in subparagraphs listed below with appropriate action by CP&L listed:

1. Document the character of the flaw cited - An Ultrasonic (UT) Non-Destructive Examination (NDE) was conducted on December 13, 1990. The actual through wall leak is characterized as a .25" hole with localized wall thinning adjacent to it along a section approximately 4 1/2" included as an attachment to this relief request (See Attachment 2).

2. Assess the structural integrity of the flawed piping by flaw evaluation. Evaluate for the design loading conditions - the visual and UT NDE examinations were evaluated for structural integrity by the Nuclear Engineering Department (NED) Structural Engineering utilizing the "Through-Wall Flaw" approach as outlined in GL90-05. NED concluded that the leak did not reduce the structural integrity of line 2-SW-234-6-157 and the line satisfied the criteria of the "Through-Wall Flaw" approach (See Attachment 3 for calculation which justifies that use of this piping through 1 full year of continued service. This takes into account wall thinning at the rate of .020" per year (stagnant condition, that being the normal condition of the water in this line).
3. Assess the overall system degradation by an augmented inspection (5 needed) - These are attached (Attachment 4) to this relief request and are all acceptable by minimum wall criteria as set forth in the minimum wall calculation found in Attachment 3. Inspection locations are shown on Attachment 1. All inspections were found acceptable when compared to the .053" minimum thickness called out on page 3 of the referenced calculations.
4. Assess the integrity of the affected piping at least every 3 months by a suitable NDE method (UT or RT) - A UT NDE will be performed on this piping every 3 months until the permanent fix is installed.
5. Perform a periodic qualitative assessment of leakage through the temporary non-code repair - Weekly surveillance has been scheduled to monitor for leakage from this pipe in accordance with Generic Letter 90-05.
6. Determine the impracticality of performing a code repair - Due to the location of the through-wall leak and that Diesel Generator No.2 was inoperable at the time the through-wall leak was discovered, a unit shutdown would have been required to perform a permanent repair. Since Diesel Generator No.2 was in a 7-day LCO concurrent isolation of Diesel Generator No.4 would have placed the unit in a 12-hour (to hot shutdown) LCO. The permanent repair could not have been performed within a 12-hour period. Since there were no operability concerns that would have required unit shutdown, a temporary repair was justified.

Brunswick Unit 1 is scheduled to restart from its present refueling outage in early February 1991. The Unit 1 startup Auxiliary Transformer is presently out of service for inspection for 30 days. During this period if a Diesel Generator should be taken out of service the unit would immediately be placed in a 12-hour LCO. As shown by the calculations provided the non-code repair will cause no detriment to the integrity of the pipe and in turn to plant operation for the next year. It would not be prudent to perform the permanent repair now as it would require that a safety system be taken out of service to perform the

repair. CP&L intends to make the permanent repair during the next scheduled Unit 2 outage now scheduled for April 1991.

7. Perform a root cause determination - The through-wall leak on line 2-SW-234-6-157 has been temporarily repaired using a soft rubber patch. Since the actual condition of the cement lining of the pipe cannot be determined, data contained in CP&L Metallurgy Unit Memorandum, MSL No. 10-108 (Attachment 4) was used in the analysis. NLS No. 10-108 addressed the cause of pipe joint leaks in cement-lined service water piping. The affected line is cement-lined service water piping. The affected line is cement-lined carbon steel pipe. The conclusion of MSL No. 10-108 stated, "Leakage at the joint is due to the improper condition of the cement lining". Based on previous experience it is believed that the through-wall failure was caused by corrosion due to the area being exposed to salt water from a flaw in the cement lining in combination with a normally stagnant water condition. This won't be confirmed until metallurgical examination is complete.

Based on the analysis of MSL No. 10-108, the cause of the cement lining failure can be described by one or more of the following:

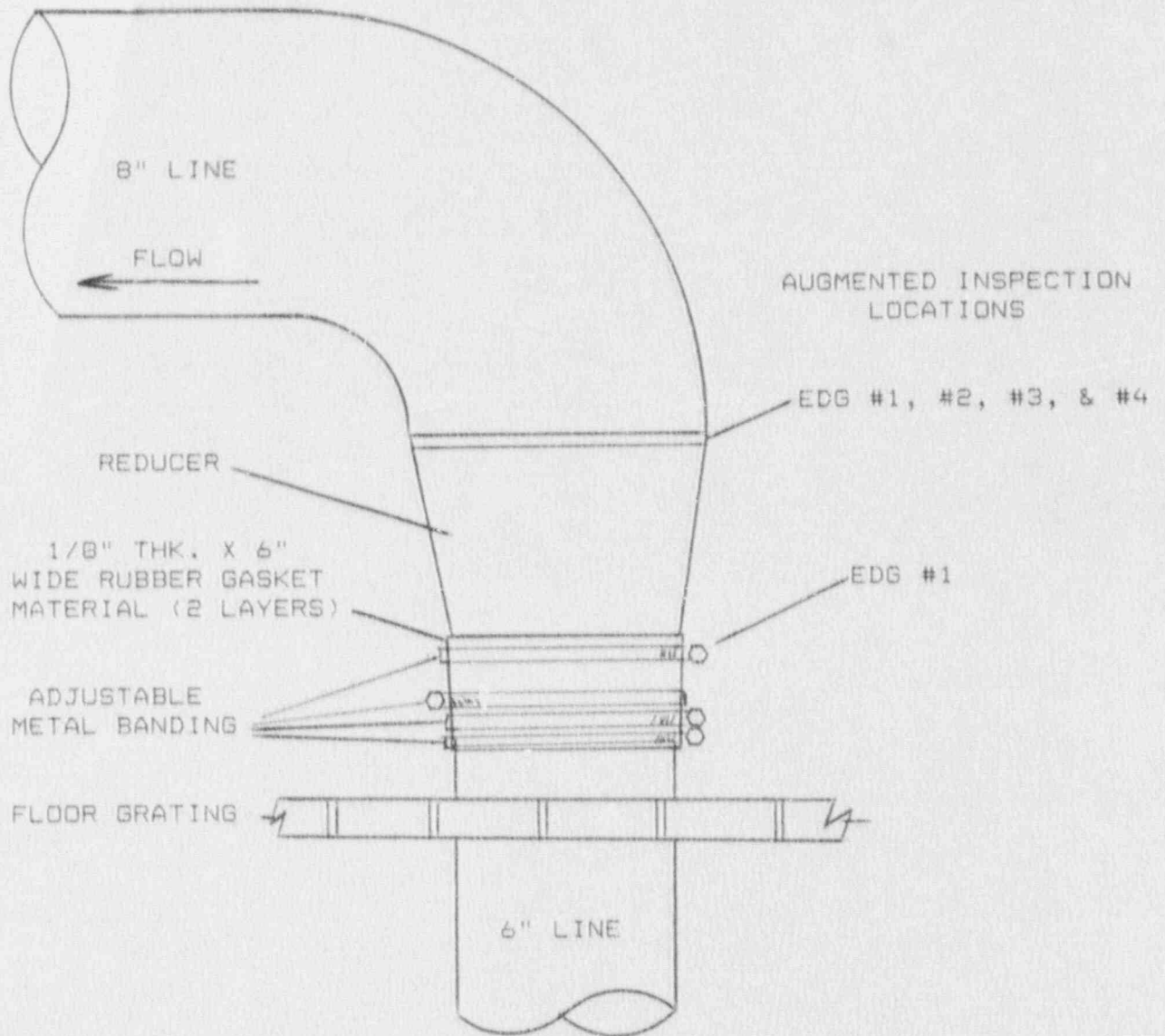
- a. Presence of a crevice between the base pipe and backing ring.
- b. Using porous cement for lining (coating) the joints after they were welded.
- c. Damage in the original cement lining adjacent to the joint due to the heat release during and after welding.
- d. Improper application of the cement at the joints creating rough surfaces causing more severe turbulent flow at the joints resulting in a liner leakage problem in this area.

After the affected area has been repaired, the removed section of the cement-lined pipe will be sent to the CP&L Metallurgy Unit for detailed examination.

8. Consider system interactions (Flooding, spraying water on equipment, and loss of flow) - The affected area is located just above the grating over a pipe trench. The pipe trench drains tie together and are piped out to the intake channel. Therefore if the rubber patch should fail, flooding would be contained by the drainage system. There is no equipment (such as electrical equipment) located adjacent to the affected areas that could be damaged by spraying of water should the rubber patch fail. The Service Water System is capable of supplying flows greater than required for proper cooling (>350 GPM) and therefore the amount of flow through the 0.25" through-wall leak will not impact operation of the Jacket Water Cooler should the rubber patch fail.

9. Schedule implementation of permanent code repair - A permanent repair shall be implemented by the end of the next scheduled Unit 2 outage, now scheduled for April 1991. The repair will be made before that time if the 3 month UT/RT finds that it is necessary. The permanent code repair will consist of replacing the 8" X 6" reducer and the spool piece directly beneath it.
10. Assure that the temporary non-code repair will not affect the structural integrity of the affected piping and must be reversible - As a temporary repair, the through-wall leak will be sealed and maintained to contain any leakage until a permanent repair can be implemented. The temporary repair of the leak will consist of a soft rubber patch. The soft rubber patch attached by clamps (See attachment 1) does not alter the condition of the affected piping and is reversible; that is, the affected piping can be returned to the as-found flawed condition.

ATTACHMENT 1
RELIEF REQUEST NO.



ELEVATION LOOKING WEST

- SKETCH OF EMERGENCY DIESEL GENERATOR NO. 4 JACKET WATER COOLER INLET PIPING SHOWING 8" X 6" REDUCER AFFECTED BY REFERENCED THROUGH WALL LEAK (NOTE SOFT RUBBER PATCH).
- THIS SKETCH ALSO SHOWS THE LOCATIONS OF 7 SUPPLEMENTAL UTs PERFORMED IN ORDER TO INSURE COMPLIANCE WITH GENERIC LETTER 90-05.

NDEP-408

APPENDIX A

WALL THICKNESS MEASUREMENT RECORD SHEET

| COMPONENT: <u>6-2W-234-6-157</u> | | PLANT: <u>BROWNSWICK</u> | UNIT: <u>7</u> |
|----------------------------------|-------------------------------|------------------------------------|------------------------------------|
| LINEAR SPACING: <u>0.3"</u> | RADIAL SPACING: <u>0.5"</u> | NOM. WALL THICKNESS: <u>0.250"</u> | MIN. WALL THICKNESS: <u>0.211"</u> |
| LINEAR INCREMENT: <u>0.1"</u> | RADIAL INCREMENT: <u>0.1"</u> | STARTING AT: <u>12"</u> | ENDING AT: <u>18"</u> |
| INCREMENTS | INCREMENTS | INCREMENTS | INCREMENTS |
| <u>0.5</u> | <u>12</u> | <u>14</u> | <u>15</u> |
| <u>1.0</u> | <u>17.5</u> | <u>16</u> | <u>16.5</u> |
| | <u>20</u> | <u>17</u> | <u>17</u> |
| | <u>22</u> | <u>18</u> | <u>17.5</u> |
| | <u>24</u> | <u>19</u> | <u>18</u> |
| | <u>26</u> | <u>20</u> | <u>18.5</u> |
| | <u>28</u> | <u>21</u> | <u>19</u> |
| | <u>30</u> | <u>22</u> | <u>19.5</u> |
| | <u>31</u> | <u>23</u> | <u>20</u> |
| | <u>32</u> | <u>24</u> | <u>20.5</u> |
| | <u>33</u> | <u>25</u> | <u>21</u> |
| | <u>34</u> | <u>26</u> | <u>21.5</u> |
| | <u>35</u> | <u>27</u> | <u>22</u> |
| | <u>36</u> | <u>28</u> | <u>22.5</u> |
| | <u>37</u> | <u>29</u> | <u>23</u> |
| | <u>38</u> | <u>30</u> | <u>23.5</u> |
| | <u>39</u> | <u>31</u> | <u>24</u> |
| | <u>40</u> | <u>32</u> | <u>24.5</u> |
| | <u>41</u> | <u>33</u> | <u>25</u> |
| | <u>42</u> | <u>34</u> | <u>25.5</u> |
| | <u>43</u> | <u>35</u> | <u>26</u> |
| | <u>44</u> | <u>36</u> | <u>26.5</u> |
| | <u>45</u> | <u>37</u> | <u>27</u> |
| | <u>46</u> | <u>38</u> | <u>27.5</u> |
| | <u>47</u> | <u>39</u> | <u>28</u> |
| | <u>48</u> | <u>40</u> | <u>28.5</u> |
| | <u>49</u> | <u>41</u> | <u>29</u> |
| | <u>50</u> | <u>42</u> | <u>29.5</u> |
| | <u>51</u> | <u>43</u> | <u>30</u> |
| | <u>52</u> | <u>44</u> | <u>30.5</u> |
| | <u>53</u> | <u>45</u> | <u>31</u> |
| | <u>54</u> | <u>46</u> | <u>31.5</u> |
| | <u>55</u> | <u>47</u> | <u>32</u> |
| | <u>56</u> | <u>48</u> | <u>32.5</u> |
| | <u>57</u> | <u>49</u> | <u>33</u> |
| | <u>58</u> | <u>50</u> | <u>33.5</u> |
| | <u>59</u> | <u>51</u> | <u>34</u> |
| | <u>60</u> | <u>52</u> | <u>34.5</u> |
| | <u>61</u> | <u>53</u> | <u>35</u> |
| | <u>62</u> | <u>54</u> | <u>35.5</u> |
| | <u>63</u> | <u>55</u> | <u>36</u> |
| | <u>64</u> | <u>56</u> | <u>36.5</u> |
| | <u>65</u> | <u>57</u> | <u>37</u> |
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| | <u>67</u> | <u>59</u> | <u>38</u> |
| | <u>68</u> | <u>60</u> | <u>38.5</u> |
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| | <u>72</u> | <u>64</u> | <u>40.5</u> |
| | <u>73</u> | <u>65</u> | <u>41</u> |
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| | <u>78</u> | <u>70</u> | <u>43.5</u> |
| | <u>79</u> | <u>71</u> | <u>44</u> |
| | <u>80</u> | <u>72</u> | <u>44.5</u> |
| | <u>81</u> | <u>73</u> | <u>45</u> |
| | <u>82</u> | <u>74</u> | <u>45.5</u> |
| | <u>83</u> | <u>75</u> | <u>46</u> |
| | <u>84</u> | <u>76</u> | <u>46.5</u> |
| | <u>85</u> | <u>77</u> | <u>47</u> |
| | <u>86</u> | <u>78</u> | <u>47.5</u> |
| | <u>87</u> | <u>79</u> | <u>48</u> |
| | <u>88</u> | <u>80</u> | <u>48.5</u> |
| | <u>89</u> | <u>81</u> | <u>49</u> |
| | <u>90</u> | <u>82</u> | <u>49.5</u> |
| | <u>91</u> | <u>83</u> | <u>50</u> |
| | <u>92</u> | <u>84</u> | <u>50.5</u> |
| | <u>93</u> | <u>85</u> | <u>51</u> |
| | <u>94</u> | <u>86</u> | <u>51.5</u> |
| | <u>95</u> | <u>87</u> | <u>52</u> |
| | <u>96</u> | <u>88</u> | <u>52.5</u> |
| | <u>97</u> | <u>89</u> | <u>53</u> |
| | <u>98</u> | <u>90</u> | <u>53.5</u> |
| | <u>99</u> | <u>91</u> | <u>54</u> |
| | <u>100</u> | <u>92</u> | <u>54.5</u> |

LOWEST MEASUREMENT: 0.27" AT LOCATION: (LIN. WELD RAD. 16.5") COMMENTS: LINEAR INCREMENTS ARE
 PERFORMED BY: RE D J DATE: 12/14/90 DOWNSTREAM WELD
 Reviewed: Subongda 12/15/90

KDEP-408

APPENDIX A

WALL THICKNESS MEASUREMENT RECORD SHEET

COMPONENT: 2-SW-234-6-157
 UNIT: 2
 PLANT: BRONSWICK
 MAX. SIZE O.D.: 6"
 MIN. WALL: 0.280"
 O.D. SPACING: 0.5"
 RADIAL SPACING: 0.5"
 STARTING AT: 12"
 ENDING AT: 18"
 DATE: 12/15/90
 PAGE: 3 of 4
 ZONE: N/A

| LINEAR INCREMENT | RADIAL INCREMENT | 12" | 13" | 13.5" | 14" | 14.5" | 15" | 15.5" | 16" | 16.5" | 17" | 17.5" | 18" |
|------------------|------------------|-----|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|
| 0.5 | 0.06 | .22 | .22 | .22 | .24 | .22 | .20 | .18 | .14 | .14 | .17 | .20 | .22 |
| 1.0 | 0.06 | .26 | .24 | .24 | .23 | .23 | .23 | .23 | .24 | .24 | .24 | .24 | .24 |
| 1.5 | 0.06 | | | | | | | | | | | | |
| 2.0 | 0.06 | | | | | | | | | | | | |
| 2.5 | 0.06 | | | | | | | | | | | | |
| 3.0 | 0.06 | | | | | | | | | | | | |
| 3.5 | 0.06 | | | | | | | | | | | | |
| 4.0 | 0.06 | | | | | | | | | | | | |
| 4.5 | 0.06 | | | | | | | | | | | | |
| 5.0 | 0.06 | | | | | | | | | | | | |
| 5.5 | 0.06 | | | | | | | | | | | | |
| 6.0 | 0.06 | | | | | | | | | | | | |
| 6.5 | 0.06 | | | | | | | | | | | | |
| 7.0 | 0.06 | | | | | | | | | | | | |
| 7.5 | 0.06 | | | | | | | | | | | | |
| 8.0 | 0.06 | | | | | | | | | | | | |
| 8.5 | 0.06 | | | | | | | | | | | | |
| 9.0 | 0.06 | | | | | | | | | | | | |
| 9.5 | 0.06 | | | | | | | | | | | | |
| 10.0 | 0.06 | | | | | | | | | | | | |
| 10.5 | 0.06 | | | | | | | | | | | | |
| 11.0 | 0.06 | | | | | | | | | | | | |
| 11.5 | 0.06 | | | | | | | | | | | | |
| 12.0 | 0.06 | | | | | | | | | | | | |
| 12.5 | 0.06 | | | | | | | | | | | | |
| 13.0 | 0.06 | | | | | | | | | | | | |
| 13.5 | 0.06 | | | | | | | | | | | | |
| 14.0 | 0.06 | | | | | | | | | | | | |
| 14.5 | 0.06 | | | | | | | | | | | | |
| 15.0 | 0.06 | | | | | | | | | | | | |
| 15.5 | 0.06 | | | | | | | | | | | | |
| 16.0 | 0.06 | | | | | | | | | | | | |
| 16.5 | 0.06 | | | | | | | | | | | | |
| 17.0 | 0.06 | | | | | | | | | | | | |
| 17.5 | 0.06 | | | | | | | | | | | | |
| 18.0 | 0.06 | | | | | | | | | | | | |

LOWEST MEASUREMENT: 0.06"
 PERFORMED BY: W.D. [Signature] AT LOCATION: (LIN. RAD.)
 DATE: 12/15/90
 COMMENTS: LINEAR INCREMENTS ARE UPSTREAM OF WELD
 Asterisks

EER No. 90-0354
 Rev. No. 0
 Page No. 36

ATTACHMENT 2 (cont'd)

NDE DRAWING ATTACHMENT

PAGE 4 OF 4

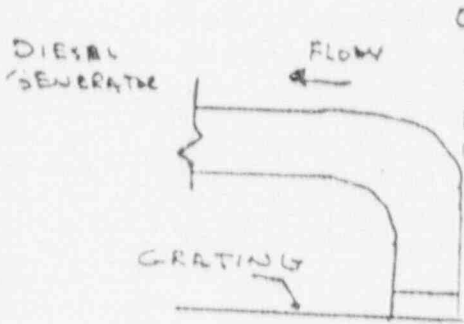
PROJECT BRUNSWICK JOB NO. NA

UNIT 1 2 3 4

DATE 12-17-90

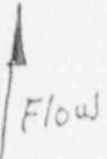
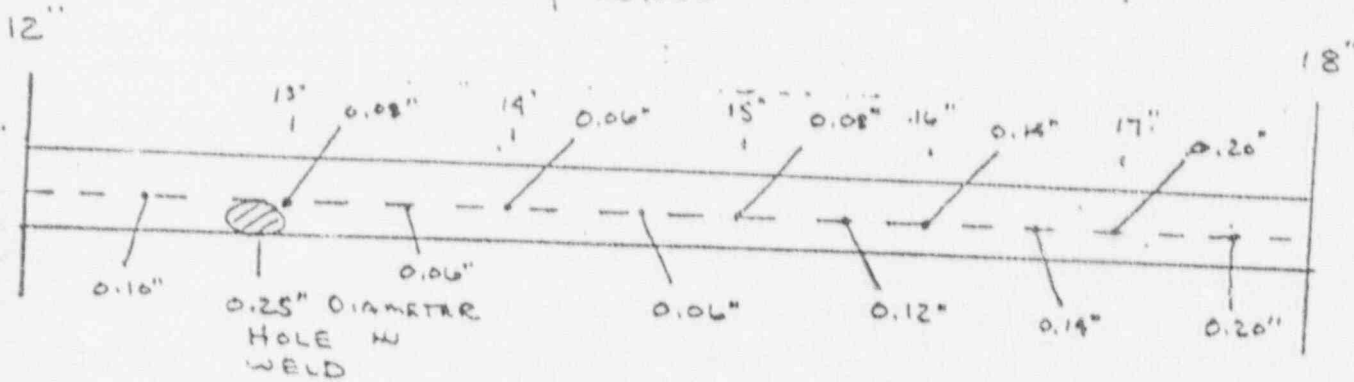
DRAWING NA 2-14-90 SYSTEM SERVICE WATER LINE 2-SW-294-6-157 WELD/ITEM NUMBER FW-8005

FD DWG 002274 SHT 2
 FP DWG 22356
 FSP DWG 02214 SHT 94, 109, 108



L DIMENSIONS DETERMINED BY
 CLOCKWISE DIRECTION, LOOKING WITH
 FLOW.

PLANE VIEW
 OF WELD



Handwritten signature

12-14-90

Reviewed: *Handwritten signature* 12/15/90

ATTACHMENT 3
RELIEF REQUEST NO.

EER No. 90-0354
Rev. No. 0
Page No. 24

CAROLINA POWER & LIGHT COMPANY

OPERABILITY REVIEW FOR

BRUNSWICK - UNIT 2
(Plant)

JACKET WATER
(System)

EVALUATION ID NUMBER: 2-1534A-27B

SAFETY CLASSIFICATION: Q

SEISMIC CLASSIFICATION: I
(CODE CLASS 3 - REF 2)

METHOD OF EVALUATION UTILIZED: METHOD 1: SPECIFIC ANALYSIS/TESTING

METHOD 2: SENIOR STRUCTURAL REVIEW PANEL

WALKDOWN TEAM:

A.M. Wolfe

M.B. Anderson

APPROVALS:

| REV. | BY | Checked | Project Engineer | Approved Principal Eng. | (Method 2 Only) Discipline Manager |
|------|------------------------|--------------------------------|------------------|-------------------------|---------------------------------------|
| 0 | A.M. Wolfe 12-15-90 | <u>[Signature]</u> 12-15-90 | N/A | WES Kim Williamson | N/A |