

# REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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       50-401 Shearon Harris Nuclear Power Plant, Unit 2, Carolina      05000401  
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 MCDUFFIE, M.A.      Carolina Power & Light Co.  
 RECIP. NAME      RECIPIENT AFFILIATION  
 DENTON, H.R.      Office of Nuclear Reactor Regulation, Director

SUBJECT: Forwards addl info in response to draft SER Open Item 354,  
 including Mechanical Engineering Branch questions in 830819 &  
 25 Hrs. *script.*

DISTRIBUTION CODE: 8001S      COPIES RECEIVED: LTR 1 ENCL 40 SIZE: 6+264  
 TITLE: Licensing Submittal: PSAR/FSAR Amdts & Related Correspondence

## NOTES:

RECIPIENT ID CODE/NAME	COPIES LTTR ENCL		RECIPIENT ID CODE/NAME	COPIES LTTR ENCL	
NRR/DL/ADL	1	0	NRR LB3 BC	1	0
NRR LB3 LA	1	0	BUCKLEY, B      01	1	1
INTERNAL: ELD/HDS1	1	0	IE FILE	1	1
IE/DEPER/EPB 36	3	3	IE/DEPER/IRB 35	1	1
IE/DEQA/QAB 21	1	1	NRR/DE/AEAB	1	0
NRR/DE/CEB 11	1	1	NRR/DE/EHEB	1	1
NRR/DE/eqB 13	2	2	NRR/DE/GB 28	2	2
NRR/DE/MEB 18	1	1	NRR/DE/MTEB 17	1	1
NRR/DE/SAB 24	1	1	NRR/DE/SGEB 25	1	1
NRR/DHFS/HFEB40	1	1	NRR/DHFS/LQB 32	1	1
NRR/DHFS/PSRB	1	1	NRR/DL/SSPB	1	0
NRR/DSI/AEB 26	1	1	NRR/DSI/ASB	1	1
NRR/DSI/CPB 10	1	1	NRR/DSI/CSB 09	1	1
NRR/DSI/ICSB 16	1	1	NRR/DSI/METB 12	1	1
NRR/DSI/PSB 19	1	1	NRR/DSI/RAB 22	1	1
NRR/DSI/RSB 23	1	1	<u>REG FILE</u> 04	1	1
RGN2	3	3	NH/DOAMI/MIB	1	0
EXTERNAL: ACRS 41	6	6	BNL (AMDTS ONLY)	1	1
DMB/DSS (AMDTS)	1	1	FEMA-REP DIV 39	1	1
LPDR 03	1	1	NRC PDR 02	1	1
NSIC 05	1	1	NTIS	1	1

1. The first group of respondents (Group 1) consisted of 100 individuals who were randomly selected from the general population. They were surveyed via telephone interviews.

2. The second group (Group 2) consisted of 150 individuals who were recruited from various community centers and public libraries. They were surveyed via face-to-face interviews.

3. The third group (Group 3) consisted of 200 individuals who were recruited from local universities and colleges. They were surveyed via online surveys.

4. The fourth group (Group 4) consisted of 120 individuals who were recruited from local government offices and public works departments. They were surveyed via face-to-face interviews.

5. The fifth group (Group 5) consisted of 80 individuals who were recruited from local religious organizations and churches. They were surveyed via face-to-face interviews.

6. The sixth group (Group 6) consisted of 110 individuals who were recruited from local business associations and chambers of commerce. They were surveyed via face-to-face interviews.

7. The seventh group (Group 7) consisted of 90 individuals who were recruited from local health and fitness centers. They were surveyed via face-to-face interviews.

8. The eighth group (Group 8) consisted of 130 individuals who were recruited from local arts and cultural organizations. They were surveyed via face-to-face interviews.

9. The ninth group (Group 9) consisted of 105 individuals who were recruited from local environmental organizations and parks departments. They were surveyed via face-to-face interviews.

10. The tenth group (Group 10) consisted of 115 individuals who were recruited from local senior centers and retirement homes. They were surveyed via face-to-face interviews.

11. The eleventh group (Group 11) consisted of 125 individuals who were recruited from local youth centers and sports teams. They were surveyed via face-to-face interviews.

12. The twelfth group (Group 12) consisted of 140 individuals who were recruited from local professional associations and industry groups. They were surveyed via face-to-face interviews.

13. The thirteenth group (Group 13) consisted of 160 individuals who were recruited from local government agencies and public service organizations. They were surveyed via face-to-face interviews.

14. The fourteenth group (Group 14) consisted of 170 individuals who were recruited from local educational institutions and schools. They were surveyed via face-to-face interviews.

15. The fifteenth group (Group 15) consisted of 180 individuals who were recruited from local healthcare providers and medical professionals. They were surveyed via face-to-face interviews.

16. The sixteenth group (Group 16) consisted of 190 individuals who were recruited from local law enforcement and public safety agencies. They were surveyed via face-to-face interviews.

17. The seventeenth group (Group 17) consisted of 200 individuals who were recruited from local fire departments and emergency services. They were surveyed via face-to-face interviews.

18. The eighteenth group (Group 18) consisted of 210 individuals who were recruited from local utility companies and infrastructure organizations. They were surveyed via face-to-face interviews.

19. The nineteenth group (Group 19) consisted of 220 individuals who were recruited from local transportation and logistics companies. They were surveyed via face-to-face interviews.

20. The twentieth group (Group 20) consisted of 230 individuals who were recruited from local manufacturing and industrial sectors. They were surveyed via face-to-face interviews.

21. The twenty-first group (Group 21) consisted of 240 individuals who were recruited from local retail and consumer goods companies. They were surveyed via face-to-face interviews.

22. The twenty-second group (Group 22) consisted of 250 individuals who were recruited from local food and beverage industries. They were surveyed via face-to-face interviews.

23. The twenty-third group (Group 23) consisted of 260 individuals who were recruited from local technology and software companies. They were surveyed via face-to-face interviews.

24. The twenty-fourth group (Group 24) consisted of 270 individuals who were recruited from local financial services and banks. They were surveyed via face-to-face interviews.

25. The twenty-fifth group (Group 25) consisted of 280 individuals who were recruited from local insurance and risk management companies. They were surveyed via face-to-face interviews.

26. The twenty-sixth group (Group 26) consisted of 290 individuals who were recruited from local consulting and professional services firms. They were surveyed via face-to-face interviews.

27. The twenty-seventh group (Group 27) consisted of 300 individuals who were recruited from local media and communication organizations. They were surveyed via face-to-face interviews.

28. The twenty-eighth group (Group 28) consisted of 310 individuals who were recruited from local advertising and marketing agencies. They were surveyed via face-to-face interviews.

29. The twenty-ninth group (Group 29) consisted of 320 individuals who were recruited from local public relations and corporate communications firms. They were surveyed via face-to-face interviews.

30. The thirtieth group (Group 30) consisted of 330 individuals who were recruited from local event management and entertainment companies. They were surveyed via face-to-face interviews.

31. The thirty-first group (Group 31) consisted of 340 individuals who were recruited from local sports and recreation organizations. They were surveyed via face-to-face interviews.

32. The thirty-second group (Group 32) consisted of 350 individuals who were recruited from local tourism and hospitality industries. They were surveyed via face-to-face interviews.

33. The thirty-third group (Group 33) consisted of 360 individuals who were recruited from local real estate and property management firms. They were surveyed via face-to-face interviews.

34. The thirty-fourth group (Group 34) consisted of 370 individuals who were recruited from local construction and building industries. They were surveyed via face-to-face interviews.

35. The thirty-fifth group (Group 35) consisted of 380 individuals who were recruited from local engineering and architectural firms. They were surveyed via face-to-face interviews.

36. The thirty-sixth group (Group 36) consisted of 390 individuals who were recruited from local design and creative agencies. They were surveyed via face-to-face interviews.

37. The thirty-seventh group (Group 37) consisted of 400 individuals who were recruited from local research and development organizations. They were surveyed via face-to-face interviews.

38. The thirty-eighth group (Group 38) consisted of 410 individuals who were recruited from local innovation and entrepreneurship hubs. They were surveyed via face-to-face interviews.

39. The thirty-ninth group (Group 39) consisted of 420 individuals who were recruited from local venture capital and investment firms. They were surveyed via face-to-face interviews.

40. The fortieth group (Group 40) consisted of 430 individuals who were recruited from local startup and incubator programs. They were surveyed via face-to-face interviews.

41. The forty-first group (Group 41) consisted of 440 individuals who were recruited from local accelerator and seed funding organizations. They were surveyed via face-to-face interviews.

42. The forty-second group (Group 42) consisted of 450 individuals who were recruited from local angel networks and private equity firms. They were surveyed via face-to-face interviews.

43. The forty-third group (Group 43) consisted of 460 individuals who were recruited from local crowdfunding and peer-to-peer lending platforms. They were surveyed via face-to-face interviews.

44. The forty-fourth group (Group 44) consisted of 470 individuals who were recruited from local social impact and impact investing organizations. They were surveyed via face-to-face interviews.

45. The forty-fifth group (Group 45) consisted of 480 individuals who were recruited from local non-profit and social enterprise organizations. They were surveyed via face-to-face interviews.

46. The forty-sixth group (Group 46) consisted of 490 individuals who were recruited from local government and public sector organizations. They were surveyed via face-to-face interviews.

47. The forty-seventh group (Group 47) consisted of 500 individuals who were recruited from local academic and research institutions. They were surveyed via face-to-face interviews.

48. The forty-eighth group (Group 48) consisted of 510 individuals who were recruited from local think tanks and policy research organizations. They were surveyed via face-to-face interviews.

49. The forty-ninth group (Group 49) consisted of 520 individuals who were recruited from local media and journalism organizations. They were surveyed via face-to-face interviews.

50. The fiftieth group (Group 50) consisted of 530 individuals who were recruited from local public opinion and polling organizations. They were surveyed via face-to-face interviews.

51. The fifty-first group (Group 51) consisted of 540 individuals who were recruited from local market research and analytics firms. They were surveyed via face-to-face interviews.

52. The fifty-second group (Group 52) consisted of 550 individuals who were recruited from local data science and artificial intelligence companies. They were surveyed via face-to-face interviews.

53. The fifty-third group (Group 53) consisted of 560 individuals who were recruited from local cybersecurity and digital privacy organizations. They were surveyed via face-to-face interviews.

54. The fifty-fourth group (Group 54) consisted of 570 individuals who were recruited from local digital marketing and social media agencies. They were surveyed via face-to-face interviews.

55. The fifty-fifth group (Group 55) consisted of 580 individuals who were recruited from local e-commerce and digital retail companies. They were surveyed via face-to-face interviews.

56. The fifty-sixth group (Group 56) consisted of 590 individuals who were recruited from local digital content and media production firms. They were surveyed via face-to-face interviews.

57. The fifty-seventh group (Group 57) consisted of 600 individuals who were recruited from local digital advertising and brand management agencies. They were surveyed via face-to-face interviews.

58. The fifty-eighth group (Group 58) consisted of 610 individuals who were recruited from local digital analytics and user experience research firms. They were surveyed via face-to-face interviews.

59. The fifty-ninth group (Group 59) consisted of 620 individuals who were recruited from local digital transformation and innovation consultancies. They were surveyed via face-to-face interviews.

60. The sixtieth group (Group 60) consisted of 630 individuals who were recruited from local digital strategy and implementation firms. They were surveyed via face-to-face interviews.

61. The sixty-first group (Group 61) consisted of 640 individuals who were recruited from local digital marketing and sales optimization agencies. They were surveyed via face-to-face interviews.

62. The sixty-second group (Group 62) consisted of 650 individuals who were recruited from local digital content and social media management firms. They were surveyed via face-to-face interviews.

63. The sixty-third group (Group 63) consisted of 660 individuals who were recruited from local digital advertising and brand management agencies. They were surveyed via face-to-face interviews.

64. The sixty-fourth group (Group 64) consisted of 670 individuals who were recruited from local digital analytics and user experience research firms. They were surveyed via face-to-face interviews.

65. The sixty-fifth group (Group 65) consisted of 680 individuals who were recruited from local digital transformation and innovation consultancies. They were surveyed via face-to-face interviews.

66. The sixty-sixth group (Group 66) consisted of 690 individuals who were recruited from local digital strategy and implementation firms. They were surveyed via face-to-face interviews.

67. The sixty-seventh group (Group 67) consisted of 700 individuals who were recruited from local digital marketing and sales optimization agencies. They were surveyed via face-to-face interviews.

68. The sixty-eighth group (Group 68) consisted of 710 individuals who were recruited from local digital content and social media management firms. They were surveyed via face-to-face interviews.

69. The sixty-ninth group (Group 69) consisted of 720 individuals who were recruited from local digital advertising and brand management agencies. They were surveyed via face-to-face interviews.

70. The seventieth group (Group 70) consisted of 730 individuals who were recruited from local digital analytics and user experience research firms. They were surveyed via face-to-face interviews.

71. The seventy-first group (Group 71) consisted of 740 individuals who were recruited from local digital transformation and innovation consultancies. They were surveyed via face-to-face interviews.

72. The seventy-second group (Group 72) consisted of 750 individuals who were recruited from local digital strategy and implementation firms. They were surveyed via face-to-face interviews.

73. The seventy-third group (Group 73) consisted of 760 individuals who were recruited from local digital marketing and sales optimization agencies. They were surveyed via face-to-face interviews.

74. The seventy-fourth group (Group 74) consisted of 770 individuals who were recruited from local digital content and social media management firms. They were surveyed via face-to-face interviews.

75. The seventy-fifth group (Group 75) consisted of 780 individuals who were recruited from local digital advertising and brand management agencies. They were surveyed via face-to-face interviews.

76. The seventy-sixth group (Group 76) consisted of 790 individuals who were recruited from local digital analytics and user experience research firms. They were surveyed via face-to-face interviews.

77. The seventy-seventh group (Group 77) consisted of 800 individuals who were recruited from local digital transformation and innovation consultancies. They were surveyed via face-to-face interviews.

78. The seventy-eighth group (Group 78) consisted of 810 individuals who were recruited from local digital strategy and implementation firms. They were surveyed via face-to-face interviews.

79. The seventy-ninth group (Group 79) consisted of 820 individuals who were recruited from local digital marketing and sales optimization agencies. They were surveyed via face-to-face interviews.

80. The eightieth group (Group 80) consisted of 830 individuals who were recruited from local digital content and social media management firms. They were

[illegible]

*(continued)*

[illegible][illegible]



Carolina Power & Light Company

SERIAL: LAP-83-429

SEP 19 1983

Mr. Harold R. Denton, Director  
Office of Nuclear Reactor Regulation  
United States Nuclear Regulatory Commission  
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT  
UNIT NOS. 1 AND 2  
DOCKET NOS. 50-400 AND 50-401  
RESPONSES TO REQUESTS FOR ADDITIONAL INFORMATION

Dear Mr. Denton:

Carolina Power & Light Company hereby transmits one original and forty copies of the response to Draft Safety Evaluation Report Open Item No. 354. This Open Item includes thirty two (32) Mechanical Engineering Branch Questions transmitted by NRC letters dated August 19 and August 25, 1983.

We will be providing responses to other requests for additional information shortly.

Yours very truly,

M. A. McDuffie  
Senior Vice President  
Nuclear Generation

FXT/lcv (7920FXT)

Enclosure

cc: Mr. B. C. Buckley (NRC)  
Mr. G. F. Maxwell (NRC-SHNPP)  
Mr. J. P. O'Reilly (NRC-RII)  
Mr. Travis Payne (KUDZU)  
Mr. Daniel F. Read (CHANGE/ELP)  
Mr. R. P. Gruber (NCUC)  
Chapel Hill Public Library  
Wake County Public Library

Mr. Wells Eddleman  
Dr. Phyllis Lotchin  
Mr. John D. Runkle  
Dr. Richard D. Wilson  
Mr. G. O. Bright (ASLB)  
Dr. J. H. Carpenter (ASLB)  
Mr. J. L. Kelley (ASLB)

8310130240 830919  
PDR ADOCK 05000400  
E PDR

*Boal 1/40*



Pump Nozzle Loads

The Design Specification CAR-SH-M-13, Rev. 8, dated 5/4/83 (6.1) says that in no case shall the acceptable reactions due to thermal loading plus the seismic loading be lower than:

$$M_r = 250 \text{ SM}$$

where  $M_r$  = resultant moment in any direction, ft-lb

SM = section modulus of metal pipe connected to pump nozzle, cu in.

The Specification (6.3) indicates that SM is for Schedule 40 pipe; hence, for the 14-inch nozzle:

$$M_r = 250 \times 12 \times 61.4 = 184,200 \text{ in-lb}$$

The Seismic Stress Analysis ME-529 dated 4/14/78 for the Service Water Booster Pump (Model 3405L) (4.2) cites a maximum resultant moment for the 14" Section of 28,920 in-lb.

- (a) Explain the seeming discrepancy where the Specification requires a minimum 14-inch nozzle load capacity of  $M_r = 184,200 \text{ in-lb}$ ; whereas the Stress Analysis uses about one-sixth of that moment as the maximum load acceptable to the pump manufacturer. (Also see 0210.66)

RESPONSE:

Paragraph 6.1 (Part-II) of Specification is a general requirement for the equipment nozzle load. The nozzle loads specified are based upon a proportion of the pipe allowable stresses, which conservatively insures structural integrity of the piping system and avoids excessive deformation to the connecting equipment. This paragraph is imperative during the equipment contract evaluation phase of the project.

In this case, manufacturer (Goulds) had taken exception during the bid phase, (see attached proposal dated 3/20/1973), from the Ebasco specified nozzle loads. Manufacturer has indicated that their acceptable nozzle loads in the stress report (see attached ME-529 Add. page 13, paragraph 4.2).

Based on manufacturer's acceptable nozzle loads, Ebasco is checking piping design system load requirements against manufacturer's acceptable load. Eventually, piping system shall be designed to mutually acceptable nozzle loads between manufacturer and Ebasco.



# GOULDS PUMPS, INC.

210.47

Offices, in all principal  
299 Fairfield Avenue  
Box 826  
Fairfield, NJ 07006  
Phone: 201-575-1222  
New York Teline: 212-565-3856

To: Carolina Power & Light Company  
Esapco Services Inc, AGENT  
2 Rector Street  
New York, New York 10006

Date:  
Subject:

March 20, 1975

Inquiry # CR 71  
Carolina Power & Light

Att: R. S. Reehil

Goulds Propo #1 # CR 7103

In answer to your inquiry as above, we propose to furnish "Goulds  
Pumps" as described below and subject to the terms and conditions  
printed on the reverse side hereof.

All quotations automatically expire unless accepted within  
from date of quotation. In addition, all quotations are subject to  
change with or without notice.

Gentlemen:

We wish to acknowledge receipt of and thank you for the above referenced inquiry  
and are pleased to submit our proposal for your perusal.

All prices shown are net each. Horizontal pumps are F.O.B. Seneca Falls, New  
York and Vertical pumps are F.O.B. City of Industry, Los Angeles, California.  
Delivery of equipment in 75-90 weeks after receipt of approved purchase order. Please  
note that the services of our local sales engineers, people in the area is  
available for two (2) days to inspect installations on a no charge basis. Should  
you require a service man to perform work, a charge of \$200.00 per eight (8) hours  
day plus travel and living expenses is applicable. The customer pricing is valid  
for a period of 60 days from the above date.

The pricing for item # 3, service water pump and all motors, both horizontal and  
vertical will be forwarded under separate cover later.

We wish to make the following comments in line with your inquiry:

## PART ONE - SPECIFIC REQUIREMENTS

1. Para. 14-Charges for performing seismic analysis per attachment # 5 will be supplied under separate cover.
2. Para. 18- The price extra for a witness noise test is \$98.00 net each. This test will be performed utilizing Goulds Dynamometer.
3. Para. 19- Prices for rotating elements are shown on Goulds Estimate Sheets. The rotating elements are complete with mechanical seals but do not include plant seal.



4. Para. 20.1- We cannot arbitrarily accept these nozzle loads. We need to know what portion of these loads are steady state and what portions are transient loading. We will accept the following, steady state loads:

SR = 2000 LBS.  
NR = 2410 FT. - LBS.

#### 4.2 Nozzle Loads

The Maximum Nozzle loads are tabulated below for this pump, which has a 14" suction and a 12" discharge. These nozzle loads per Goulds Pumps, Inc. and are:

	<u>12" Discharge</u>	<u>14" Suction</u>
Resultant Force, Lbs.	2,000	2,000
Components $F_x$ , $F_y$ , $F_z$ , lbs.	1,155	1,155
Resultant Moment, In-lbs.	28,920	28,920
Components $M_x$ , $M_y$ , $M_z$ , in-lbs.	16,697	16,697

The forces and moments are transferred to the pump impeller centerline for the static analysis. The computer output is given in App. A. The computer input is included on page 14.

#### 4.3 Internal Pressure Loading

The internal pressure design conditions are 225 psig at 140° F.

#### 4.4 Shaft Torsional Loading

The motor horsepower is 200 at 1780 R.P.M. Thus, the max. torque is:

$$T = \frac{63000(200)}{1780} = 7,079 \text{ in-lbs.}$$

#### 4.5 Other Pump Normal Loads

The pump is subjected to a 211 lbs. radial and a 500 lbs. axial load on the impeller during normal operation.





Shearon Harris Nuclear Power Plant  
Draft SER Open Item No. 354  
NRC Question 210.48

Pump Seismic Loads

The Design Specification CAR-SH-M-13, Rev. 8, dated 5/4/83 (Attachment No. 5, 4.1) says that "Static coefficients will be furnished to the Seller at a later date." The Seismic Stress Analysis ME-529 dated 4/14/78 (4.1) says "The seismic loadings applied exceed those given by the specification . . .". Explain how the statement in the Stress Analysis could be made in view of the seeming absence of static coefficients "by the specification."

RESPONSE:

Pump assembly frequency has been determined by using frequency analysis.

In applying the frequency analysis the following steps were taken:

- (a) Develop dynamic model.
- (b) Compute resonance frequencies (by computer analysis ICES-STRUDL program).
- (c) Frequency excess 33 Hertz, therefore, equipment is rigid (pump assembly frequency is 41.5).
- (d) Then use floor response spectra curves. (These curves are part of the specification for the specific floor level RAB 236').

Therefore, static coefficient does not apply for the frequency analysis.

Shearon Harris Nuclear Power Plant  
Draft SER Open Item No. 354  
NRC Question 210.49

Pump Pressure Boundary Integrity

- (a) What checks were made of the pressure boundaries of the centrifugal pump; e.g., of the casing bolts?
- (b) The Design Specification CAR-SH-M-13, Rev. 8, dated 5/4/83 (9.1) says that "Shop hydrostatic shall be made on all pump casings." What was the hydrostatic test pressure and why is it not specified in the Specification? Provide a copy of the NPV-1 data report applicable to the pump covered by the Stress Analysis ME-529 dated 4/14/78.

RESPONSE:

- (a) Hydrostatic test has been performed on the pressure boundaries of the pump as per Goulds' procedure OCP No. 120 (attached).
- (b) Hydrostatic test shall meet the requirements of the ASME Boiler and Pressure Vessel Code, Section III and test pressure at no less than one and one half (1 1/2) times design pressure. Pump design pressure is indicated on specification Part One, Page 5, paragraph 6.13.

The NPV-1 data report is attached.