



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

Gentlemen:

The enclosed circular is forwarded for appropriate action. No written response to this circular is required. If you have any questions related to this matter, please contact this office.

Sincerely,

James P. O'Reilly
Director

Enclosures:

1. IE Circular No. 81-08
2. List of Recently Issued
IE Circulars

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May 29, 1981

Addresses

In Reference To

- | | |
|---|--|
| <p>1. Carolina Power and Light Company
 Attn: J. A. Jones
 Senior Executive Vice President
 and Chief Operating Officer
 411 Fayetteville Street
 Raleigh, NC 27602</p> | <p>50-400 Harris Unit 1
 50-401 Harris Unit 2
 50-402 Harris Unit 3
 50-403 Harris Unit 4</p> |
| <p>2. Duke Power Company
 Attn: L. C. Daff, Vice President
 Design Engineering
 P. O. Box 33189
 Charlotte, NC 28242</p> | <p>50-491 Cherokee Unit 1
 50-492 Cherokee Unit 2
 50-493 Cherokee Unit 3
 50-488 Perkins Unit 1
 50-489 Perkins Unit 2
 50-490 Perkins Unit 3</p> |
| <p>3. Duke Power Company
 Attn: W. O. Parker, Jr.
 Vice President, Steam Production
 P. O. Box 2178
 Charlotte, NC 28242</p> | <p>50-370 McGuire Unit 2
 50-413 Catawba Unit 1
 50-414 Catawba Unit 2</p> |
| <p>4. Florida Power and Light Company
 Attn: R. E. Uhrig, Vice President
 Advanced Systems and Technology
 P. O. Box 529100
 Miami, FL 33152</p> | <p>50-389 St. Lucie Unit 2</p> |
| <p>5. Georgia Power Company
 Attn: J. H. Miller, Jr.
 Executive Vice President
 270 Peachtree Street
 Atlanta, GA 30303</p> | <p>50-424 Vogtle Unit 1
 50-366 Vogtle Unit 2</p> |



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May 29, 1981

6. Mississippi Power and Light Company
Attn: N. L. Stampley
Vice President of Production
P. O. Box 1640
Jackson, MS 39205
50-416 Grand Gulf Unit 1
50-417 Grand Gulf Unit 2
7. South Carolina Electric and Gas Company
Attn: T. C. Nichols, Jr., Vice President
Power Production and System
Operations
P. O. Box 764
Columbia, SC 29218
50-395 Summer Unit 1
11. Tennessee Valley Authority
Attn: H. G. Parris
Manager of Power
500A Chestnut Street Tower II
Chattanooga, TN 37401
50-438 Bellefonte Unit 1
50-439 Bellefonte Unit 2
~~50-296 Browns Ferry Unit 3~~
50-518 Hartsville Unit 1
50-519 Hartsville Unit 2
50-520 Hartsville Unit 3
50-521 Hartsville Unit 4
50-553 Phipps Bend Unit 1
50-521 Phipps Bend Unit 2
50-328 Sequoyah Unit 2
50-390 Watts Bar Unit 1
50-391 Watts Bar Unit 2
50-566 Yellow Creek Unit 1
50-567 Yellow Creek Unit 2
12. Virginia Electric and Power Company
Attn: J. H. Ferguson
Executive Vice President-Power
P. O. Box 26666
Richmond, VA 23261
50-404 North Anna Unit 3

Distribution for IE Circular No. 81-08

(INFORMATION)

May 29, 1981

Addresses

In Reference To

- | | |
|--|---|
| 1. Alabama Power Company
Attn: R. P. McDonald
Vice President-Nuclear Generation
Post Office Box 2641
Birmingham, AL 35291 | 50-342 Farley Unit 1
50-364 Farley Unit 2 |
| 2. Carolina Power and Light Company
Attn: J. A. Jones
Senior Executive Vice President
and Chief Operating Officer
411 Fayetteville Street
Raleigh, NC 27602 | 50-325 Brunswick Unit 1
50-324 Brunswick Unit 2
50-261 Robinson Unit 2 |
| 3. Duke Power Company
Attn: W. O. Parker, Jr.
Vice President, Steam Production
P. O. Box 2178
Charlotte, NC 28242 | 50-369 McGuire Unit 1
50-269 Oconee Unit 1
50-270 Oconee Unit 2
50-287 Oconee Unit 3 |
| 4. Florida Power and Light Company
Attn: R. E. Uhrig, Vice President
Advanced Systems and Technology
P. O. Box 529100
Miami, FL 33152 | 50-335 St. Lucie Unit 1
50-250 Turkey Point Unit 3
50-251 Turkey Point Unit 4 |
| 5. Florida Power Corporation
Attn: J. A. Hancock, Assistant
Vice President Nuclear Operations
P. O. Box 14042, Mail Stop C-4
St. Petersburg, FL 33733 | 50-302 Crystal River Unit 3 |

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(INFORMATION)

Addresses

In Reference To

- | | |
|--|--|
| 6. Georgia Power Company
Attn: J. H. Miller, Jr.
Executive Vice President
270 Peachtree Street
Atlanta, GA 30303 | 50-321 Hatch Unit 1
50-366 Hatch Unit 2 |
| 7. Offshore Power Systems
Attn: A. R. Collier, President
P. O. Box 8000
Jacksonville, FL 32211 | 50-437 FNP 1-8 |
| 8. Tennessee Valley Authority
Attn: H. G. Parris
Manager of Power
500A Chestnut Street Tower II
Chattanooga, TN 37401 | 50-259 Browns Ferry Unit 1
50-260 Browns Ferry Unit 2
50-296 Browns Ferry Unit 3
50-327 Sequoyah Unit 1 |
| 9. Virginia Electric and Power Company
Attn: J. H. Ferguson
Executive Vice President-Power
P. O. Box 26666
Richmond, VA 23261 | 50-338 North Anna Unit 1
50-339 North Anna Unit 2
50-280 Surry Unit 1
50-281 Surry Unit 2 |
| 10. Institute of Nuclear Power Operation
Attn: R. W. Pack
Lakeside Complex
1820 Waterplace
Atlanta, GA 30339 | |
| 11. Southern Company Services, Inc.
ATTN: O. Batum, Manager
Nuclear Safety & Licensing
Department
P. O. Box 2625
Birmingham, AL 35202 | |

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(INFORMATION)

Addresses

In Reference To

12. Department of Energy
Clinch River Breeder Reactor
Plant Project Office
ATTN: Chief, Quality Improvement
P. O. Box U
Oak Ridge, TN 37830

13. EDS, Nuclear, Inc.
ATTN: E. H. Verdery
330 Technology Park/Atlanta
Norcross, GA 30092

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

May 29, 1981

IE Circular No. 81-08: FOUNDATION MATERIALS

Description of Circumstances:

Insufficient compaction of foundation and backfill materials during the construction of nuclear plants has resulted in excessive settlement of plant structures at a number of sites.

At the Midland Plant, Units 1 and 2, insufficiently compacted backfill was discovered as a result of excessive settlement of the diesel generator building. The results of extensive subsurface investigations subsequent to settlement of the diesel generator building identified that fill materials beneath portions of the auxiliary building, feedwater isolation valve pits, essential service water intake structure, borated water storage tanks, and plant area utilities were not compacted to specification requirements.

Other specific nuclear power plant sites and identified problems are listed to illustrate the extent of the problem.

North Anna	Service water pumphouse settlement
Summer	Service water pumphouse settlement
Shearon Harris	Inadequate moisture control in fill material
Cherokee	Inadequate field density control and soils tests
Hatch	Inadequate QC procedures and fill placement
Vogtle	Inadequate compaction, groundwater, and soil erosion controls
South Texas	Inadequate QC procedures and inspection documentation

The above problems necessitated extensive remedial work; for example, removal of large quantities of fill material, underpinning structures, surcharging foundation materials, project delays, extensive reanalysis, and, in some cases technical specification requirements pertaining to settlement monitoring during plant operation.

The causes of insufficient compaction were investigated by NRC, licensees/construction permit holders, contractors and architect-engineering firms. Based on these investigations, the various contributing causes were found to include the following:

1. Soil selection, fill, and compaction activities were not accomplished under the direction of a qualified geotechnical engineer.

2. Compaction equipment was not qualified to achieve the required compaction using the material specified, lift thickness, moisture control, equipment speed, or number of equipment passes.
3. Procedures for control of soil testing were not adequate to assure correct soil identification, selection of laboratory standards, and control of field density tests.
4. Relative density and percent compaction test results fell outside the theoretical limits, indicating an unrealistic comparison of laboratory and field density tests.
5. Soils inspections did not verify controls specified in construction specifications.
6. Quality assurance audits did not identify the procedural inadequacies or the cause of repetitive nonconforming conditions.
7. Design requirements were not properly translated into construction specifications.
8. Design change notices were not issued to reflect changes of construction specification requirements.
9. Settlement calculations based on actual design bases (i.e., load intensity, index of soil compressibility, and type of foundation) were not performed.

Recommended Action for Construction Permit Holders:

1. For those facilities with ongoing soils work activities, verify that quality assurance and quality control measures including procedures, test results, inspection personnel and audits are implemented to assure that the causes identified above do not exist for the soils work in progress or planned.
2. For those facilities with completed soils work activities that have a settlement monitoring program in effect, verify that the measured settlement values are within the projected values. In the event the measured settlement values exceed projected values, it is recommended that an investigation to determine the cause be initiated. In those cases, an evaluation which includes soil borings may be in order.
3. For those facilities with completed soils work activities that do not have an ongoing settlement monitoring program, verify that the quality assurance and quality control measures described in item 1 above were in effect during construction.

Although no specific response is required by this circular, soil compaction construction deficiencies identified and corrective actions initiated as a result of the actions recommended may be reportable in accordance with the requirements of 10 CFR 50.55e.

If you need additional information regarding this matter, contact the Director of the appropriate Regional office.

Attachment:
Recently issued IE Circulars

RECENTLY ISSUED
IE CIRCULARS

Circular No.	Subject	Date of Issue	Issued to
81-07	Control of Radioactively Contaminated Material	5/14/81	All power reactor facilities with an OL or CP
81-06	Potential Deficiency Affecting Certain Foxboro 20 to 50 Milliamper Transmitters	4/14/81	All power reactor facilities with an OL or CP
81-05	Self-Aligning Rod End Bushings for Pipe Supports	3/31/81	All power reactor facilities with an OL or CP
81-04	The Role of Shift Technical Advisors and Importance of Reporting Operational Events	4/30/81	All power reactor facilities with an OL or near-term OL
81-03	Inoperable Seismic Monitoring Instrumentation	3/2/81	All power reactor facilities with an OL or CP
81-02	Performance of NRC-Licensed Individuals While on Duty	2/9/81	All power reactor facilities (research & test) with an OL or CP
81-01	Design Problems Involving Indicating Pushbutton Switches Manufactured by Honeywell Incorporated	1/23/81	All power reactor facilities with an OL or CP
80-25	Case Histories of Radiography Events	12/5/80	All radiography licensees
80-24	AECL Teletherapy Unit Malfunction	12/2/80	All teletherapy licensees
80-23	Potential Defects in Beloit Power Systems Emergency Generators	10/31/80	All power reactor facilities with OL or a CP

OL = Operating Licenses
CP = Construction Permit