

MAR 23 1983

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MEMORANDUM FOR: Robert A. Clark, Chief
 Operating Reactors Branch #3
 Division of Licensing

FROM: Leon B. Engle, Project Manager
 Operating Reactors Branch #3
 Division of Licensing

SUBJECT: TRIP REPORT: WESTINGHOUSE (W) AND VEPCO MEETING WITH
 NRC OBSERVERS AT W POWER TRANSFORMER DIVISION, MUNCIE
 PLANT, REGARDING NORTH ANNA POWER STATION (NAPS) MAIN
 TRANSFORMER FAULTS (MTFs)

Introduction:

On February 9, 1983, NRC representatives and consultants met with W and VEPCO representatives at the W Power Transformer Division, Muncie Plant, Muncie Indiana. The purpose of the meeting was to summarize the areas of investigation conducted by W and known facts surrounding each of the MTFs at NAPS. VEPCO had invited NRC representation to the meeting because of the independent and ongoing NRC Task Force investigation of the NAPS MTFs.

W Briefing:

At the start of the meeting, W indicated that many of the topics to be discussed were of a proprietary nature. Topics discussed during the day's meeting were:

- o Historical Review of Events at NAPS regarding MTFs
- o Summary Chart of Transformer Problems/Bowen and NAPS
- o System Review
- o Gas-In-Oil Analysis
- o Hydraulic Flow Analysis and Results of Field Tests of Artificially Introduced Gas Bubble Flow
- o Discussion of Processing Records and Gas and Moisture Records
- o Test Program to Determine if Gas Evolution Could Emanate From the Lead Insulation
- o Dielectric Test Program of Actual Lead Configuration With and Without Bubbles and Waveguide Effectiveness

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- o Low Voltage Impulse Distribution Tests Simulating High Voltage to Low Voltage Arc and Measuring Resulting Turn-to-Turn Stresses
- o Correlation Analysis Status
- o W status of NAPS MTFs
- o VEPCO status of NAPS MTFs.

New Information:

During the discussion, VEPCO stated that new data had become available since briefing the NRC staff at NAPS on November 29, 1982 and as reported in NRC Trip Report dated December 17, 1982 (memorandum to Robert A. Clark from Leon B. Engle).

VEPCO stated that for W transformers in the voltage range of 345,500 and 765 KV design there have been 353 built since 1965. Of these 353 transformers, there have been 20 serious failures. Three of these failures occurred at the Bowen Plant in Georgia (where three transformers from another vendor also failed) and seven have occurred at NAPS, five (5) at NA-2 and two (2) at NA-1. As noted in the Trip Report dated November 29, 1982, the NA-2 MTs had been in operation at the Bowen facility prior to use at NA-2 (and one NA-2 unit failed at Bowen). Thus, out of the 20 most significant W failures, 50% have occurred at Bowen and NAPS. It is hereby noted that the above information supersedes the same type of information as provided in NRC Trip Report, ated December 17, 1982.

General NRC Observations:

From the discussions regarding the topics as specified above, the following observations are noted.

1. Of the seven NAPS MTFs, only one has a definite known failure cause mechanism. This was attributed to mechanical fatigue of the H.V. bushing assembly.
2. Of the seven original W tranformers at NA-1&2, two have not experienced any operating problems.
3. W's investigation is primarily centered on the change in dielectric strength of the transformer oil attributed to the formation of nitrogen bubbles in the oil. The mechanism of bubble formation and dispersion is also being investigated.
4. W is continuing to investigate other areas such as the insulation taping of the HV lead and electrification (static discharges) of the oil.

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5. Six out of the seven NAPS MTFs have occurred (varying in time from startup) after transformer processing (several of the 1 ϕ MTs that later failed were involved in the 3 ϕ bank when another 1 ϕ MT failed). Processing refers to the refilling of the transformers with oil under heat and vacuum after maintenance or other shutdowns.

At the close of the meeting, the NRC representatives expressed appreciation to W and VEPCO for NRC participation at the meeting and requested ongoing cooperation from W and VEPCO to provide additional information as may be required in the NRC TASK FORCE evaluation of the NAPS MTFs.

Original signed by

Leon B. Engle, Project Manager
Operating Reactors Branch #3
Division of Licensing

Attachment:
Attendance List

cc: D. Eisenhut
R. Purple
G. Lainas
M. Srinivasan
S. C. Rhoads
M. Chiramal
A. Ruff, Reg. II
C. H. Julian, Reg. II
E. Butcher
J. Donohew
J. Selan/K. Dalton, LLNL/Las Vegas
R. Lee

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|---------|-------------|-----------|----------|--|--|--|--|
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| SURNAME | PM Kreutzer | LEngle/pn | RAClark | | | | |
| DATE | 3/24/83 | 3/23/83 | 3/23/83 | | | | |

Attachment No. 1

Westinghouse

Power Transformer Division

Muncie Plant

Site Visit

February 9, 1983

Attendance List

Westinghouse

R. J. Cossaart
J. C. Mesmeringer
E. M. Petrie
R. Ratica
J. W. Skooglund
J. B. Templeton
D. A. Yannucci

VEPCO

O. Compton
R. J. McGregor, Jr.
H. L. Sutton

NRC

L. B. Engle
J. Selan (LLNL)
K. Dalton

MEETING SUMMARY DISTRIBUTION

Licensee: Virginia Electric and Power Company

*Copies also sent to those people on service (cc) list for subject plant(s).

Docket File
NRC PDR
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NSIC
ORB#3 Rdg
ORB#3 Summary File
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BGrimes
RAClark
Project Manager
PMKreutzer
OELD
ELJordan
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NRC Participants

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