



NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20535

K. V. Seyfrit
RT

FEB 15 1978

NUCLEAR

MEMORANDUM FOR: K. Kniel, Chief, Light Water Reactors Branch No. 2, NRR

FROM: K. V. Seyfrit, Assistant Director for Technical Programs, IE *NCIOE*

SUBJECT: PIPE STORAGE PRACTICES AT LIMERICK GENERATING STATION, UNITS 1 AND 2

REF: (1) K. Kniel Ltr Philadelphia Electric Co., July 14, 1977, same subject
(2) Memorandum from R. T. Carlson to K. V. Seyfrit, April 31, 1977, same subject (*ARTS F1212641*) *(K) (st. sed)*
(3) Philadelphia Electric Co. Ltr to K. Kniel, November 4, 1977, same subject

Your letter (Ref. 1) directed the licensee to discontinue the practice of outside storage of carbon steel piping without protective end caps in that such practice deviated from 10 CFR 50 Appendix B, Criterion 13 and Regulatory Guide 1.38 requirements. This decision was partially based on the determination by IE field inspections that the licensee's onsite corrosion study was not sufficiently conclusive to justify such storage practice (Ref. 2). The licensee's response to DPM (Ref. 3) stated that outside storage of uncapped carbon steel piping would be continued and transmitted certain corrosion test data to support their alternate storage method.

We have reviewed the licensee's corrosion test data along with the inspector's original field notes, annotated copies enclosed, and offer the following comments for your consideration in resolving the issue.

A comparison of tables 2, 3 and 4 of the licensee's response with the inspector's field notes (Enclosures 1 through 6) shows certain corrosion study results which was presented to IE initially and rejected due to poor data correlation and inconclusive results. Within this context four additional tables presented to IE originally for review were omitted from the November 4, 1977 letter to DPM (Enclosures 7 through 10). Notably, Enclosures 7 and 8 reflect limited thickness measurement studies which show a calculated corrosion rate double that for uncapped pipe versus capped pipe. Similarly,

CONTACT: W. J. Collins, TP
49-28180

78-06

FEB 15 1978

Enclosures 9 and 10 reflect coupon weight-loss results which also indicate a doubled corrosion rate for uncapped versus capped pipe. However, further inference can be drawn from the data that pipe corrosion losses are minimal and the required wall thickness is not compromised irrespective of environmental exposure conditions with respect to time. It is worth noting also that an evaluation of the potential for pitting damage, an essential parameter, was apparently not taken into account in the studies. It is generally recognized that corrosion pitting is an autocatalytic process and its self-stimulating behavior can lead to localized corrosion rates having a much greater damaging effect in comparison to the general corrosion wastage evaluated. Moreover, pitting attack due to its localized nature occurs without significant metal losses (as a function of depth of penetration) and therefore, conventional weight-loss tests cannot be used for evaluation or comparison purposes. Of further concern, such degradation can be relatively obscure to detection and evaluation by customary visual inspection techniques. This would be especially true when considering accessibility restrictions due to pipe spool sizing and/or configuration variability.

The licensee indicates (Ref. 3) that an alternate storage method for uncapped carbon steel piping has been implemented which calls for "inspections" of pipe conditions during storage and after post-storage cleaning prior to installation. We note, however, that certain piping spools will have rain hoods installed which does not eliminate the risk of water intrusion and entrapment. In view of this fact and the questionable variance in the corrosion study results, we believe the licensee should consider ultrasonic examination (corrosion evaluation/thickness gaging) in conjunction with post-storage cleaning of these pipe spools on an evenly distributed sampling bases with particular emphasis on areas inaccessible for visual examination. Procedures appropriate to U.T. performance should be established and examination results properly referenced to pipe spool inspection reports. We feel this examination can be performed effectively and would be a practical Q.C. measure in resolving this issue.

Karl V. Seyfrit, Assistant Director
for Technical Programs
Division of Reactor Operations Inspection

Enclosures: As stated

cc: G. W. Reinmuth, IE
C. J. Heltemes, NRR
M. Kehnemuyi, SD
D. T. Tibbitts, NRR
✓ R. T. Carlson, RI



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

Return to Durr

February 24, 1978

DN 50-352
50-353

MEMORANDUM FOR: W. J. Collins, Division of Reactor Operations Inspection,
E:HQ *NOLOZ*

FROM: R. C. Haynes, Chief, Engineering Support Section No. 1,
RC&ES Branch, RI *NO&R/C*

SUBJECT: PIPE STORAGE PRACTICES AT LIMERICK GENERATING STATION,
UNITS 1 & 2

REFERENCES: (1) K. Kniel Ltr PECO, 7/14/77, same subject
(2) Memorandum from R. Carlson to K. Seyfrit, 4/31/77,
same subject. (AITS #F12126H1)
(3) PECO Ltr to K. Kniel, 11/4/77, same subject
(4) Memo R. Carlson to K. Seyfrit, 2/15/78, same subject

As agreed during our telephone conversation on February 23, 1978, regarding the above subject, the following is submitted for your review and communication to NRR:

1. Prompt resolution of this issue is needed so that Region I can determine if the licensee is in compliance with applicable regulatory requirements.

2. NRR is encouraged to communicate to the licensee those areas -- where additional assurance is required before NRR can conclude that the licensee's pipe storage practices are acceptable, -i.e., the practices are conducive to providing adequate confidence that the pipe will perform satisfactorily in service. Achieving this confidence requires the licensee to show that during the storage phase: (a) deleterious pipe corrosion is not experienced; (b) harmful substances are not introduced into the pipe; and (c) unacceptable foreign material will not collect in the pipe which may not be removed during subsequent cleaning operations.

With respect to the corrosion concern, the licensee's response should address both general corrosion and localized internal pitting corrosion as you previously pointed out. A program of pipe wall thickness gaging using ultrasonics may be used to show that a pipe did not experience deleterious general corrosion. However, as we discussed, this technique has limited usefulness with respect to pitting corrosion since its quantitative measurements of pit depth are unreliable. This was demonstrated during the torus wall inspections at Oyster Creek.

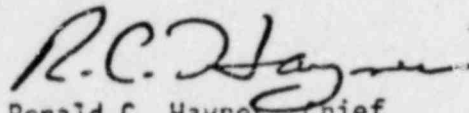
CONTACT: J. P. Durr
488-1292

Durr
1904 270608
2/24

W. J. Collins, IE:HQ

2

Your continuing efforts to get this issue quickly resolved is appreciated. Please advise Region I immediately if NRR determines that the licensee's present pipe storage practices do not fully meet regulatory requirements so that we may initiate corrective enforcement actions.



Ronald C. Haynes, Chief
Engineering Support Section No. 1
Reactor Construction and
Engineering Support Branch

cc: F. A. Dreher, IE:HQ