

Fred. pls. Review the CSB responses DRAFT
to Cogol's petition, and send
your comments to me. My mail
stop is P-1000; CSB/DSI/NRR
my extension is 892-9493. Thanks.

My comments are
discussed with
J Huang 12/6/84
and a copy of
this document made
to him 12/6/84

MEMORANDUM FOR: G. C. Lainas, Assistant Director for Operating Reactors, DL
FROM: R. W. Houston, Assistant Director for Reactor Safety, DSI
SUBJECT: PETITION FOR EMERGENCY RELIEF: RE ILRT AT ZION, UNIT 1
(TACS 55267)

- Reference:
1. Petition for Emergency Relief to the U.S. Nuclear Regulatory Commission, Re: Commonwealth Edison Company, Zion, Unit 1, dated June 5, 1984, Submitted by Citizens Against Nuclear Power
 2. Memorandum for D. G. Eisenhower (NRR), from R. L. Spessard (IE), dated September 7, 1984

In response to Technical Assistance TACS No. 55267, the Containment Systems Branch (CSB) has completed its review of the Petition (Reference 1) and attached affidavit by Dr. Z. V. Reytblatt. In essence, the Petition questioned the validity of the containment integrated leak rate test performed on Zion, Unit 1 during March, 1981. As a result, NRC Region III conducted an independent investigation of the 1981^{and 1983} test at Zion, Unit 1. The results of this investigation are documented in Reference 2. The CSB has reviewed the Region III report and concurs in its findings.

The Affidavit attached to the Petition is represented by the Petitioner as the technical support to the allegations contained in the Petition. Therefore, in responding to the Petition, the CSB has responded to the pertinent items (12 through 18) of the Affidavit. These responses are contained in the enclosure. In summary, we have found that most of the Reytblatt comments do not address the most important aspects of the test. Nevertheless, we concur with the general comment that the containment leak rate as stated in the test report could not be verified by the 1981^{and 1983} test results. We, therefore, informed the

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licensee of our concern, and indicated that a demonstration of containment leak tightness ^{was} ~~may be~~ necessary for continued operation of Zion, Unit 1.

On July 18, 1984, Commonwealth Edison Company, of their own volition, shut down Zion, Unit 1, and performed an integrated leak rate test during the period from July 27 to August 1, 1984, under close supervision of the NRC inspectors. This ILRT was found successful and we conclude that containment integrity has been confirmed and verified. We, therefore, consider the subject matter closed.

R. Wayne Houston, Assistant Director
for Reactor Safety
Division of Systems Integration

Enclosure: As stated

cc: R. M. Bernero
D. G. Eisenhut
R. L. Spessard, RIII
F. Maura, RIII
J. Norris
G. Arndt

CSB RESPONSES TO ITEMS 12 THROUGH 18 OF
THE REYTLATT AFFIDAVIT ON THE
1981 ZION, UNIT 1
CONTAINMENT INTEGRATED LEAK RATE TEST

12. Event logs of the 1981 Test, a summary of which is contained in the CECO Test Report, describe the following events on March 12, 1981:

i. From page 10:

"0300 Completed normal ILRT at data set #326."

...

"0429 Began induced leakrate test."

...

"1200 HUT recirc. pump stopped."

...

Reytlatt's Comment:

This quotation means that approximately ninety minutes after the completion of the Basic Test, a Verification Test (the "induced leakrate test") was performed, but it did not yield the expected results. The Verification Test did not validate the satisfactory performance and reliability of the Basic Test.

CSB Response:

A review of the 1981 Test indicates the calculated leak rate from the Basic Test is 0.0158 w/o/day, which is only a small fraction of the allowable leak rate for the Zion containment. A small leak rate is

difficult to verify, especially when the small imposed leak rate for the verification test is also small. This is what happened during the 1981 Zion test. From the available test data, the difference between the Basic Test and the ^{"first"} Verification Test was as high as $0.38 L_a$ rather than within the $0.25 L_a$ limit. ~~Although the first Zion Verification Test did not verify the calculated leak rate from the basic test within the required accuracy, it is not appropriate, then, to further conclude that the Basic Test was unreliable or that its performance was unsatisfactory. It can only be concluded that the leakage rate for the Zion 1 containment atg. The test results showed that the overall CILRT failed to quantify the~~ 0.72

ii. From the same page:

"1400 Re-initialized imposed leak calculations from 369."

Reytblatt's Comment:

This quotation shows that eleven hours after the completion of the Basic Test, a second Verification Test was performed, and again failed to prove the validity of the Basic Test.

CSB Response:

After the licensee thought it had corrected the problem with the "first" verification test, a new "start" time was selected for a new, or "second," verification test. The start time was not to be the same as the first test.

Reytblatt misinterpreted the test scenario; Zion did not perform a "second Verification Test," but rather a second calculation was performed using a different set of data from the same continuous Verification Test. The second ~~calculation~~ ^{test} gave a result within $0.34 L_a$, which again exceeded the required accuracy of $0.25 L_a$.

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iii. From the same page:

"1700 Re-initialized from 367.

1745 Terminated imposed leak test at set 405."

Reyblatt's Comment:

This means that fourteen hours after the completion of the Basic Test, a third Verification Test was started. This Verification Test was completed in forty-five minutes, and was deemed to be a proof of validity of the Basic Test.

CSB Response:

Again, Reyblatt misinterpreted the ^{test} scenario. ^{while the licensee considers to have performed 15 verification tests the NRC considers the} Only one Verification Test was performed, and lasted for about ^{twelve} ~~thirteen~~ hours, and ~~fifteen minutes~~. However, three calculations were performed using three different sets of data from the same Verification Test. The third calculation showed that the result fell within the required accuracy of $0.25 L_a$.

It is acceptable to conduct several verification tests, if valid reasons are given for the unacceptability of previous verification tests. In the case of Zion, however, the Verification Test violated certain principles of statistics. In order to obtain the required accuracy of $0.25 L_a$, the licensee selected, ^{towards the end of the 12 hr test} ~~post-test,~~ the desired data set. Therefore, from a statistical standpoint, the 1981 Basic Test result is not acceptable. The Verification Test data was not

obtained in an appropriate manner for use in demonstrating the acceptability of the 1981 Basic Test leak rate.

iv. From page 15 of the CECO Test Report:

"IW Tank Volume Change

<u>Date</u>	<u>Level</u>	<u>Volume</u>	<u>Added</u>
	inches	inches	gallons"
...			
"3-11-81	20.5	9.5	47.0
3-12-81	21.0"		

Reytblatt's Comment:

This quotation proves that on March 12, 1981 - during the same time period that these Verification Tests were carried out - a procedure known as IW ("Irrigation Water Injection") had been applied to the containment environment. A total of approximately 44 gallons of water was injected, which might have substantially changed the containment environment.

CSB Response:

Reytblatt has drawn conclusions after quoting the CECO Test Report out of ^{penetration} context. Our review of the 1981 test indicates that water ^{from an engineered safeguards real water syte.} was ^{assumed} found to be leaking into the containment during the second day of data taking, and that

this continued until the end of the verification test. Although we do not condone the water leakage problem during the test, we disagree that the containment environment was substantially changed during the verification test. Since water leakage had occurred for seven days prior to the start of the Verification Test, containment conditions should have been comparable during both the Basic Test and the Verification Test.

Reytblatt's Comment:

13. Failure of the first Verification Test proves that the Basic Test had been deficient.

CSB Response:

We acknowledge that the Verification Test result, based on the first data set, did not verify the leak rate of the Basic Test within the required accuracy ($\pm 0.25 L_a$). However, we do not agree that this "proves," a priori, the Basic Test was deficient. *However failure to determine the cause of verification test failure, correct the problem and perform a successful verification test does invalidate the result of the Basic Test. ~~However~~*

Reytblatt's Comment:

14. Failure of the second Verification Test provides further confirming evidence that the Basic Test had been deficient.

CSB Response:

Again, the licensee did not perform a second Verification Test; rather, a second calculation was done using a different data set from the same Verification Test. This calculation also did not verify the Basic Test result. Taken alone, it does not confirm that the ~~Basic Test~~ ^{Containment is unacceptable, only that the overall} was deficient.

Reytblatt's Comment:

15. The Verification Test should be conducted immediately upon conclusion of the Basic Test, so that there will be little risk of changes occurring in the containment environment. However, during the 1981 Test, in fourteen hours since the completion of the Basic Test, two Verification Tests failed, and also, due to the IW application, significant alteration in the containment environment may have occurred. The third Verification Test therefore cannot be considered valid.

CSB Response:

Reytblatt failed to understand that there was only one continuous Verification Test conducted, which lasted ^{about twelve} ~~thirteen hours, and fifteen minutes~~. He also failed to understand that the IW application actually started very early in the test, and was not an event that suddenly occurred during the Verification Test. Therefore, it is not a question of whether the Verification Test should be considered valid, or the Basic Test deficient, but rather a question of whether the Verification Test had verified the ~~reported leak rate of 0.0158~~ ^{capability of the instrumentation to measure} ~~w/o/day for the Zion containment.~~ ^{= small leakage rates given reporting.}

Reytblatt's Comment:

16. By not analyzing the reasons why the Verification Tests failed, and by not repeating the Basic Test, which was certainly necessary under these circumstances, the testing organization violated the Standard.

CSB Response:

Appendix J to 10 CFR 50 requires that if the supplemental test result is not within $0.25 L_a$, the reason shall be determined, corrective action taken, and a successful supplemental test performed. Our review of the 1981 test indicates that the licensee did not establish a valid reason for the inability to verify the Basic Test result after using two data sets from the supplemental test (Verification Test), and failed to perform a subsequent, successful supplemental test. Instead, the licensee made an ^{and} ~~appropriate, post-test~~ ^{side of} selection of data from the same Verification Test to establish the required accuracy of the Basic Test result. ^{This "back-track"} The ~~post-test~~ selection of data is unacceptable from a statistical standpoint. Therefore, we conclude that the 1981 Test did not comply with the requirements of Appendix J in that a successful supplemental test had not been performed.

Reytblatt's Comment:

17. In my opinion, it is inconceivable that the testing organization had no knowledge of the unacceptability of repeated Verification Tests. Moreover, out of three Verification Test results, two of which showed the Basic Test to be deficient, the testing organization selected the third

Verification Test results, although these results were obtained after the containment environment may have significantly changed. In my opinion, such actions can only be described as fraud.

CSB Response

Reytblatt's comment is, as presented, ~~an expressed that is~~ based on a misunderstanding of ^{what occurred during} the Verification Test. Nevertheless, our review of the 1981 test indicates that the testing organization misused the Verification Test data. Consequently, the 1981 Test was judged to be incomplete and inconclusive.

Reytblatt's Comment:

18. In summary, the 1981 test is invalid and provides no assurance whatever that the Zion, Unit 1 reactor containment leak rate is as stated in the Test Report.

CSB Response:

That is a true statement. Because ~~additional~~ problems ~~was~~ found with the 1983 configuration.

The finality expressed in the Reytblatt summary concerning the overall merits of the 1981 Test is an overstatement and somewhat inappropriate. We have judged the 1981 Test to be incomplete and inconclusive, in that the Basic Test result was not appropriately verified, as required by Appendix J. We, ~~therefore~~, informed the licensee of our finding and indicated that a demonstration of containment integrity ^{was} ~~may be~~ necessary for continued operation of Zion, Unit 1. As a result, ^{the licensee} ~~at the licensee's volition~~, the Zion plant ~~was~~ shut down, in

~~August~~^{July}, 1984 and a satisfactory Type A test was performed. NRC inspectors were present as observers throughout the course of the test. A detailed review of the Zion, Unit 1 Type A tests performed in 1981, 1983, and 1984 is presented in the staff report from R. L. Spessard, Division of Reactor Safety, Region III, to D. G. Eisenhut, Division of Licensing, NRR, dated September 7, 1984.