NOTES AND EXCERPTS

N-1 Notes on discussion with J. Floyd on 3/27/80.

N-2 Notes on RCS Inventory procedure ST 2301-3D1.

N-3 Notes on discussion with K. Hoyt on 3/27/80.

N-4 Notes on discussion with B. Smith on 3/27/80.

N-5 Notes on errors in Leak Rate Test procedure.

N-6 Excerpts from transcripts of Hartman interviews.

N-7 Excerpts from transcripts of Hartman interviews.

N-8 Excerpts from transcript of Hartman TV interview.

N-9 Excerpts from Hartman interviews dealing with allegations and concerns.

N-10 Miscellaneous notes and calculation of effect of the weight of the hydrogen in the MUT on Leak Rate Calculation.

N-11 Notes relative to leak rate allegations.

N-12 Notes relative to leak rate allegations.

N-13 Early list of plant records needed by investigation.

N-14 Notes on Safety Concern Handling.

N-15 Notes on Tech Spec requirements.

N-16 Notes on allegation relative to estimated critical position.

N-17 Notes on Reactor Coolant Drain Tank Operations.

N-18 Notes of Preparation for 3/22/80 Interview of Harold Hartman.

N-19 Memorandum Summarizing Understanding of the Concerns and Allegations of Harold Hartman, 3/24/80.

N-20 Notes for Conduct of 4/10/80 Interviews.

N-21 Draft IE Bulletin - Reactor Coolant System Leak Rate Testing in PWRs.

N-22 Excerpts from NUREG-0680, Supp. No. 1 related to Investigation.

N-23 Memorandum Summarizing Investigation Effort as of 1/20/81.

N-24 Excerpts from NUREG-0680, Supp. No. 2 related to Investigation.

N-1

JIM FLOYD - OPERATIONS SUP - 3.27.80

- reason for resignation
  does he advise to submit

safety valve leaked yesterday

BCP
alarm typewriter may should show a
3 decade alarm

Emergency Feedwater System

Safety Concerns

RCS Inventory, ST 2301-3D1, Rev 3

1. Adding water to MUT is supposed to be accounted for in calculation. In fact, X gal pumped in expand at MUT & RCS temperature conditions, inserting a non-conservative bias to results. (6.3 & Computer Program) (NUREG 0600 relative MUT add)

2.

H-3

3-29-86

Kenneth Hoyt Chief Power
on-Ga. HARTSVILLE

how long employed by Med BO
Has also SHIFT FOREMAN
HOW LONG HARTSVILLE FOR?

Emergency Feedwater Pump surveillance
1. there were problems with flow
rate initially - ISI would
analyze discrepancies and come up
with acceptable figures
ISI - he talked to ISI engineers
about Problems ISI engineers
showed him answers
RCS INVENTORY leak rate
- agrees that were problems getting
accepted leak rates
ICPM leakrate was always a problem
test was performed on a 3 day segment
leak rate in excess - ... supervisor would
go back and recalculate data
Ray Booker D. BOSSICK
H. HARTSMAN

N-4

9:04 AM.
3-27-80

BERNIE SMITH, SHIFT SUPERVISOR

B.P.S. - unsure of Rep Date. - should be in the records.
explanation for change.

leak rate -

hydrogen to makeup tank - no isolation
Parameters -
demonstrate water addition

safety concerns

10.

BRIAN MILLER
ELP - startup

RESIGNATION

about background.

LR

temp error
PZR level error
density correction
MVT level error
RCDT level error
computer error
ident leakage - RCDT + calc + SG leak

6 H_2O addition for which computer not called

5 ALLEGATIONS

(1) During a Plant Startup the reactor went critical below the estimated critical Position (ECP). The supervisor directed action contrary to procedure (5 RC.)

(2) Emergency Feedwater Pump Surveillance test Procedure

(3) Reactor Coolant Inventory Surveillance test to record destruction and falsification

(4) Forced respirator for safety Concern

(5) Management Pressure and no response To safety concerns.

Repeated failures ~~to~~ to satisfy acceptance criteria in the Emergency Feedwater Pump Surveillance test Procedure

TAPED INTERVIEW 3-26-85

MARTIN: Okay, Hal I'd like to move on to the emergency feedwater surveillance, and first I've shown you copies of the procedures for the turbine driven emergency feedwater pump operability test and for the motor driven emergency feedwater pump test and just for our clarification that it's my understanding that it was the motor driven emergency feedwater pump surveillance that was causing the problem.

HARTMAN: That's as I can recall.

MARTIN: Now in that particular procedure it is the reference values and the acceptable values for the sunction and discharge and flows for the pumps that the reference values were changed frequently to make the test come out acceptable, is that correct?

HARTMAN: Uhm uhm. (Yes).

INTERVIEW ON 3-26-80

HARTMAN: As I can recall, yeah we just had problems with it you know and I know that alot of times we'd come up with data at night, we used to try to do them on the mid-shift because nothing was going on, you didn't have many people around and we'd do it at night and come up with unacceptable values and I think to the best of my knowledge the Shift Foreman would go down with him and try to get the reference values and they couldn't meet the acceptance criteria or the flow would be wrong, so he'd bring it back up and set it on the desk and says hey look you know this is what we got, I don't know what we could, you guy's try and run it and then the day shift would take it and they would see what they could do with it and after a few days it would disappear and then apparently you'd just assume that it was done and then it would surface up somewhere in the completed surveillance files as being completed and within, the next procedure would always have a little TCN stating the new reference values.

TAPED INTERVIEW 3-26-80

MARTIN: Alright Hal lets continue, what was your opinion why this test wouldn't come out the same twice since we'd indicated or you indicated in earlier interviews?

HARTMAN: I don't know really I was baffled, I just didn't know, you can only speculate on stuff like that, I'd hate to even make a speculation except the fact that maybe one time the tank would be half full and they could meet this one particular thing but then it would throw some other parameter off or I don't know just the way perhaps a guy would throb a valve to get it to come in, little tricks of the trade so to speak but not everybody has the adeptness to come up with.

TAPE INTERVIEW 3.26.85

MARTIN: Who changed the referenced values and what explanation were you provided for those changes?

HARTMAN: I think it was the ISI group, I think Diane Shamus was one of them, I don't really know for sure and there was another guy but they would look over this stuff and reevaluate it, come up with another set of numbers and then they would just say, I don't even remember what the reasons were but we would always end up with some new reference values and I didn't know why really.

CHRISTOPHER: Do you have any reason to believe that they were manipulating the figures just to get accurate reference values or do you have any bases to believe that they were doing anything wrong, that they were, so called fudging the statistics?

HARTMAN: No I don't have any bases for that.

TAPED INTERVIEW OF 5-22-79

Sometimes in the performance of a test you couldn't get the required results and we'd go back out with the shift foreman and he would get the proper results. Sometimes we'd...

CRESWELL: Excuse me. Could you elaborate on that?

CRO: Well, an example, the emergency feed pumps, running at surveillance, it was a bear. Every time that we did the surveillance that they called for a thrust bearing vibration measurement and it also called for a temperature reading on the bearing and called for a certain differenital pressure, suction pressure had to be between a certain amount. We've never done that test where it came out the same way twice. So we tossed up our hands and we say, you know, what do we do? We can't get the reference values, we can't get the proper data. Okay, well never mind. I'll take this procedure and I'll throw it down at the surveillance... I assign people, the inservice inspection type and they would evaluate the data and then they would come up with a new set of reference data everytime. And of course the surveillance that we did would fall right into that. I never did understand that.

N-7

ALLEGATION

That Hartman was forced to resign for voicing safety concerns

TV REPORTER

Reporter: That opinion doesn't come from any hack of the shop apprentice, but from a senior control room operator here at Three Mile Island. In the first televised interview with one of those who operated the control panels, Hal Hartman says that six months before the accident, he had been warning his supervisors that pipes would break, operation procedures were being violated, and essential safety equipment would fail when the plant went through a sudden change in voltage output, known as a transient. And for his safety concerns, Hartman was harrassed and told that he'd better shut up or be fired.

TV REPORTER

Reporter: To save money, the plant supervisors ignored Hartman's safety concerns. Ironically, others say justifiably, the utility now has the highest repair bill in the history of the nuclear program. But rather than being heralded as a profit, things went bad for Hartman after the accident. He was forced to resign according to reliable sources, when a company psychologist said he was too high strung to work in a security area, even though he had been working in one for six years.

DURING A plant startup the REACTOR UNIT CRITICAL BELOW the estimated critical Position (ECP). The supervisor directed action contrary to Procedure BK

TV REPORT

Reporter: Hartman's complaints are not just with the design deficiencies there. He claims that at the most critical period of the reactor's life, when it reaches its heat producing strength, operators inside the control room tampered with that data.

Hartman: I remember this one particular incident, uh. I was making the start up and I went critical less than a half a percent from where we should have gone and when we went critical, I immediately took the rods and inserted the rods. As soon as I inserted the rods, the shift supervisor told me uh "what are you doing?" I said "we went critical 28%, my estimated critical position was 68, my minus a half percent position was 32%, I went critical 4% too early, and to me there is something wrong."

Reporter: In testimony given to the Nuclear Regulatory Commission investigators, Hartman stated that he was told to continue the plant start up even though this would violate the procedures. He told the NRC investigators (quote) "They redid the numbers and somehow they fudged them."

P. 76 ORC TRANSCRIPT

ORIG. TAPED INTERVIEW 5-22-79

CRD: Anyway. Well, just the way they operate. Its, the estimated critical position was something. We have a guideline if you go critical before half a percent less than when you're anticipated to go, you should shut back down. You should put all the rods in until you get the safeties in and then investigate why. So, I wasn't even, I was just getting to the minus .5% position and all of a sudden I looked up and I had an alarm, it was the startup rate rod withdrawal inhibit circuit. The only thing that throws that into count is 3 dpm in the source range. And I looked down and I did have 3 dpm in the source range. It stopped the rod motion. I put the rod stick in and he says, "no, no, no. Just take it down one." I said, "what do you mean. We just went critical here at 28% on group 5." I said, "the ECP called for a half a percent above that or better." Now that's alright. That's alright. We'll calculate a new ECP for where we went critical. Now that's what they did. Now that doesn't show on any log books or anything like that. But that is a fact...

add part for sworn statement

FROM TAPED INTERV

and I was waiting to insure that all
the out limit and stopped and it was
startup rate inhibit alarm on the diar
the main annunciator panel and I looke
dpm startup rate and I think it was 3,
rate and I can't remember if that set p
over the alarm point to the point where
the rod and placed the switch to insert
to drive the rods down to the all safety
words all the regular rods were inserted
a former calculation that the reactor was
started to do that and my, the Shift Super
time, came up to me and said what are you
quote from our context or anything what his
told me basically to stop rod motion, go cr
minus 8 amps and then we'd redo the ECP and
working on it,

N-8

Elimination of Reactor Coolant Inventory Leakrates.

T.U PROGRAM

Hartman says that part of this system was deliberately tampered with and he also says he was the one who did it. The primary leak rate was, uh--every three days we had to determine RCS inventory basically and we would determine it for a one hour period how much water we put into the system versus how much water we detected coming out. If the difference was more than a gallon per minute, the Nuclear Regulatory Commission has a technical specification that said that greater than one gallon per minute unidentified leakage was unacceptable. Uh, there in the later days, we had leaking safety valves and we had a tough time getting a leak rate. We had a tough time getting the computer to print out less than one gallon a minute. We had a tough time getting a hand calculation to come out less than one gallon a minute. There were certain things we could do to make it less than one gallon per minute.

What did you do?

There were certain things; like something simple like adding hydrogen to the make up tank, its a gas, to prevent oxidation in the coolant pipes.

Did you ever fix the statistics?

I didn't do it very often. I did it only if I was watched very closely and was told that I had to have one by six in the morning.

HARTMAN INTERVIEW OF HARTMAN

They knew pressurizer code safeties were leaking on the
Hartman doesn't want to say we fudged it or anythink li
did. We fuged it. You can punch anythink in the comput
type it out in the same format and you can do a hand cal
you can do anything like that. I can remember doing at or
like to do it but you know it was a do or die situation.
we needed it. Alot of times he would do it and say he ju
get one and for the most part thats the way I handled it,
know if I ever did fudge it for a fact. They came on a co
printout, what you could do and it wasn't in a procedure a
it wasn't necessarily tapping and entering the wrong data,
a particular parameter to be one thing did not purposely pu
number in there there was things like opening a valve that
gas to the makeup tank (putting as on closed tank) should'nc
any indication, should change level in the makeup tank but
and we found by opening this valve we could get a leaker to
All the time getting leak rates (all 6 shifts) these valves
they are just ridding over the one gallon per minute set poin
a supervisor and a mechanically oriented person being around
power for all these years know that safety leaks they never ge
they always get worse and here the series is coming up you wan
into commercial operation, you want to make alots of money for
Met Ed, why don't you fix them and I've asked this several time
can't remember the specific answer to that fact except it was p
angled we want to go commercial.

Maximum NRC limit on valves was 1 gallon per minute identified.
If they didn't get a good one out of the computer they just crumb
one up and threw it in the waste can and ran another one, (if ove
gallon) would analyze the data, this change maybe we are in too mu
a transient, have a good one and that is what they do.

ORIG. TAPED INTERVIEW ON 5-22-79

C RO Right. The thermocouples downstream. The electromatic relief valve was the lowest of the three and it had been for 3 months. The other two would kind of weep up and down and they would sometimes maybe every once in a while you'd see them above 200 degrees, but most of the time they stayed between 150 and maybe 180 which before they started leaking they were always down around 100, 105. I know for a fact a leak rate is required every 3 days. That leak rate had to be fudged every time we got, just about everytime that we got it, we had to do something to make it right. We as control room operators on my shift, I know, we kept asking what are you gonna do about these valves. They're leaking. We can't get a leak rate out of the computer. We can hardly even do a hand calculation and have it come out right. We

SWORN TRANSCRIPT

Q Did you ever do that with regard to that particular temperature?

A That particular problem I was -- I never wrote anything down except I -- volumes of water that had to be exchanged, I thought that was testimony enough that we did have a problem.

Q Well, were you --

A But --

Q Go ahead.

A But I did talk to Bernie Smith and Dick Hoyt about this problem, about the leakage out of the valves, and they just said, "Get a good leak rate."

TAPED INTERVIEW ON 3.26.80

HARTMAN: I think it's an operational problem, we obviously couldn't get one and somehow we did get them, I don't think there was a leak rate gotten legally in, at least I know prior to three months to the accident, it wasn't a good one I don't think.

CHRISTOPHER: And you based that on what, Hal, pardon me but I'm not a technical expert so you'll have to give a little more to help me.

HARTMAN: Yeah I used, I had a little thing I did was just add a little nitrogen to the makeup tank or hydrogen to the makeup tank and it was enough to send the level, the level instrument a little screwy and it would indicate slightly higher than, slightly higher than, or maybe not indicate on the chart but to the computer it would show that it was a little higher level in there than there was before and then of course if you don't have that makeup tank level lost, then you haven't leaked out as much water and the thing would, might print good.

TAPE 3 INTERVIEW -3.26.80

MARTIN: How were the unacceptable result handled, the computer prints out an unacceptable result, what to you do with it?

HARTMAN: Oh you had to throw that away, file that in file 13 and you just didn't leave those things laying around.

MARTIN: File 13 is the trash can?

HARTMAN: Trash can, right.

MARTIN: Who would do that Hal?

HARTMAN: Oh I would or I'd just rip it up and say here is another bad one or the second one I'd get just to show them that there's what we get, throw it in the Shift Supervisor, Shift Foreman's office and they would do it.

11-9 45-6

Went critical before ECP and calculated new ECP where went critical.

55-12

Emergency Feedwater Pump surveillance
was not taken

The passenger code safeties were taking for
at least 3 months before the accident

Had to pump RCDT at least 4x per shift for
about 5 min at about 100 gpm (≈6000 gpd)
People I had to report to didn't even understand
the seriousness

The leak rate had to be judged every time we got it.

Lack of effective separation between EFW areas and between these areas and spaces in the Control Building

Hot licensed operators are trained to take NRC exam and not to operate the plant. They have copies of NRC test and at least one transcript of a walk-through.

(1)

Concern.

1. Concerned that Met. SO did not have top ~~notch~~ notch instructors. Unable to put together a program for AUX Operators

Have found EFV12A & B shut before, but don't know why or how got shut, or even whether the plant was at power.

TMI 2 damaged 4 HPI pumps

CONCERN

Hartman opened that test Program was to make sure that things worked and worked as designed. but there were many areas not covered by Test Program that didn't work. Sup operators and supervisors were aware of problems but were not interested enough to pursue.

No specific areas are identified here.

Met-Ed put the reactor into commercial operation before it was ready.

List of Problems & Design Deficiencies

Secondary Safety Valves Malfunctions
Condensate Polisher Bypass Valve Control Mode
Condensate Polisher Discharge Valve Failure Mode
Condensate Polisher Capacity
Condensate Reject Valve Sizing
Condensate Hotwell Level Instrument Malfunctions
Atmospheric Steam Dump Bellows Rupture
Pressurizer Heater Cabinet Location
Main Steam Line Support Adequacy
Valves with Extension Failure Rate

Burns and Roe never designed a PWR plant before.

TMI-2 Reactor Building construction had to be rotated 90° to accomodate the fuel handling building, since the plant was originally designed for a plant in N.J. Forked River 40 mile SE of

Results:

Piping runs length would be increased to compensate for azimuthal displacement

15 year old design would

Light bulbs on valve indicators had to be changed by electrician to avoid

shorting out brass and causing trips

TMI-2 design which made operation difficult.

Feedwater control is very sensitive

Pressurizer was to small

MUP & water valve [per BWST] controls on back panel

Valves out of reach

Control room to large & ~~beyond~~ complicated beyond any tech ability to operate & maintain it

Some shifts had there sleepers

High Rad Area Valves with extension frequently would not operate and actually added to exposure of operators.

CONCERN/statement
during testing Hartman felt things were so caotic that he and other operators never knew what they would be doing and had tentative schedules posted to follow. Main concern is operator preparation for specific test.

Met-Ed was famous for performing a
evolution 20 months before shift relief (and)
turning the plat over in total chaos

To many losses and to much pressure on CRO. Some would provide to close a expression

Concern
Felt he was too emotionally drained to work overtime when working. the panel bat was often asked to work over. H. felt this was detrimental to safety and didn't do it.

To many claims with to many ammunition
and malfunction ad supervisors not
responsive to need to correct these distinction

Balance of plant, non TS, surveillances
were sometimes not done, but were
signed off, if time for performance
of the surveillance was not available

69-15

SB LOCA communication headsets were not always checked once per shift as was required

Plant baked teamwork with everyone trying to place the blame for problems on other organization

Operators he had to relieve were not of
the same quality as those on his shift.

They bring in a Navy captain to be Unit Supt just because Jack Herbein want to be Capt in reserves

$$1\,l \times \frac{10^3\,ml}{1\,l} \times \frac{1\,cm^3}{ml} \times \left[\frac{1\,in}{2.54\,cm} \times \frac{1\,ft}{12\,in}\right]^3 = \frac{28.32\,l}{ft^3}$$

✳ Shutdown Request Form

Chawostek - 1 week before

$$\frac{gal\ H_2O\ equiv}{D\ psi\ H_2} = \frac{\pi r^2 h_{H_2}}{14.7\ psi} \times \frac{7.48\ gal}{ft^3} \times \frac{1\,l\,H_2O / 1\,kg\,H_2O}{\frac{22.4\,l\,H_2}{2\,gm\,H_2} \times \frac{10^3\,gm}{kg}}$$

worst case 0.0091 gal/hr

LEAKRATE - ALLEGATION H_2, H_2O, RCDT NEAR ACCIDENT

1. EFFECT OF H_2 ADDITION
   WET & DRY REF LEG, LEG FILLING
   VINCE THOMAS
   BAILEY

2. FAILING RECORDS WORE ↓

3. 72 HOURS BETWEEN GOOD ONES / 6 HR ACTION

4. COOPER'S STATEMENT

5. PRESSURE TO FALSIFY

6. INDEPENDENT REVIEW
   210 REPORTS & CORRESPONDING LOG ENTRIES
   8 H_2O
   7 H_2
   0 RCDT

7. COMPUTER PROGRAM PROBLEMS
   RCDT / MUT TEMP
   1 HR ERRORS LARGE

LEAK RATE

1. Which LR T.S. requirement was not being passed
2. How did Safety Valve Leakage effect that
3. Frequency of test, how unacceptable results were handled.
4. When would Local calculation be done
5. What computer inputs were required for how done.
6. Period of non-compliance
7. Was problem spreading down, or just out of out failure
8. How was data judged
9. How or did he do it, and why did it work
10. How, who, when, why did others do it.
11. Did his supervisors force him to judge data, and if so, how did they force him and who was it.

12. Who was South supervisor that said "Get a good Leak Rate" and what did he mean. (How does he know that)

13. What did he mean when he said "I didn't do it very often; I did it only when I was watched very closely and was told I had to have one by 6 in the morning."

14. What did reporter mean when he said you said. "part of the system was deliberately tampered with and he was the one that did it."

15. You said during last 3mo, prior to west had leak on SV that caused problems in passing LR. When did you first complain to management about this problem and who to.

16. Who were other operators who had trouble with this procedure. Who were people on his shift

17. Were supervisors aware records were being falsified; and if so, how did he know it.

HOLD HOT N-13

★ Pri Chemistry Logs $\rho = 46.4\ \#/ft^3$ 557°F

Computer Program

S/R & T/R Status Chart

CRO by 4/22 & 4/23/75 12/20/78 → 3/20/79

PORC Meeting - not remainder of 72, but 6hr

Sump Level
Pzr Level
MUT Level MU-14-LR 4578? SCA-0008 SC-0010

RCDT Level

Pri Plant Wallpoint Temp Recorder
Pzr, MUT, RCDT

Hourly Computer Log Power

Leakrate Calc Sheet

RCDT Flow to RCBT WDL-FR-3100

BAMT
Deacon
RCBT
} Levels on floors

Operations which invalidate result
chem addition
sampling
venting or draining of MU Filter
changing DM or Filter
boration or deboration

Test at other facility

E.

SAFETY CONCERN HANDLING

1. What concerns were passed to supervision (Palisades/Fermi) (LR, prior ETN prob, ECP, compliance)

2. Who in supervision (Smith Hoyt Mahler) received these concerns and what was your relationship to them

3. When and how were these concerns communicated and in what circumstances (DATE)

4. Why were these concerns not passed to NRC

5. What action was taken on these concerns

6. Smith
   Mahler
   Hoyt

7. Does the company provide a formal mechanism for communicating safety concerns; and if so, did he take advantage of them; and if not, why.

8. When saw no action being taken on concerns, what action taken by him Was there a mechanism.

9. Did he feel expressing his concerns jeopardized his job; if so how; was he harassed and by whom.

T/S 3/4.6.1 Primary Containment

3.6.1.1 Containment Integrity shall be maintained [Modes 1, 2, 3, 4]

Restore in 1 Hr or be in at least HSTBY with next 6 hr + C S/D with following 30 hrs

(3) (5)

SA-V-20 Required to be locked closed

KUNDER

SA-V-20 - CIV

Mode 3

1/14/79 Open 2210 start 1hr clock

2309 ↓ ↑

1/15/79 0009 ↓ ↑

0109 ↓ ↑

0130 ↓ locked

Trailer 14

SA-KL-3732 [A] → ↑

Pointer Leyot [illegible] Manual Op

Opened to supply air for [illegible]

N - 16

ECP - Critical below minus 0.5% $\Delta k/k$ estimate

1. Date, Time info — Oct Nov — MID

2. His actions — To all S/D announce 1% S/D

* 3. Supervisor's name & Actions (1 dpm on -1.0% $\Delta k/k$) — Brown Mellor — Ray Boyer, CRO — Dick ~~Quarre~~ Hoyt, SF — ~~Went~~ Went to 15%

* 4. How was ECP altered & why did it have to be

5. How can we identify records for that S/U — Only S/U ~~##~~ in Power Ascension

6. Why ~~wasn't~~ wouldn't error appear in records

7. Why wouldn't this be reported

8. How can we verify his version of event

9. Were you under pressure to change results

10. Who else present in CR when occurred

11. Who actually altered ECP

12. Who did he inform that procedure had been violated

Date	Time	RCDT in	
12/23/78	20:49:27	76.858	
	21:49:27	77.006	
• 12/24/78	17:36:59	76.25[illegible]	12/24 ≈ 0300 "Chmst" RCDT Pump 12/24 ≈ 1240 "Chmst" RCDT Pump 12/24 ≈ 1920 "Chmst" RCDT Pump
12/25/78	18:36:59	76.[illegible]21	
	1:40:51	76.875	
	2:40:51	77.022	12/25 ≈ 0735 "Chmst" RCDT Pump
12.25.78	7:52:45	76.[illegible]	
	8:52:45	76.0[illegible]	
1/11/79	21.53.28	75.933	
	22.53:28	76.[illegible]10	1/12 ≈ 0230 "Chmst" RCDT Pump
• 1/12/79	7:37:54	77.[illegible]57	
	19:37:54	77.125	1/13 ≈ 1930 "Chmst" RCDT Pump
1/25/79	8:24:30	76.787	
	1:24:30	77.2[illegible]	
1/30/79	22:6:59	74.471	
	23:6:59	75.146	
• 2/2/79	0:55:33	76.130	1/31 0570 CHANGE DOMES 2/1 1941 PUMPED DOWN RCDT
	1:55:33	77.042	2/2 0335 "Chmst" RCDT Pump
2/2/79	14:31:59	76.090	
	15:31:59	76.953	2/2 1615 "Chmst" RCDT Pump
2/3/79	5:17:53	78.125	
	6:17:53	78.028	

Date	Time	RCDT [illegible]
2/10/79	4:41:16	76.[illegible]
	5:41:16	77.[illegible]
2/11/79	2:40:15	76.12[illegible]
	3:40:15	76.3[illegible]
[illegible]	[illegible]	[illegible]
	15:[illegible]:41	[illegible]
2/12/79	21:20:19	75.902
	22:20:19	[illegible]
[illegible]	[illegible]:58:26	77.[illegible]
	[illegible]:58:26	[illegible]
2/23/79	11:9:59	75.992
	12:9:59	75.99[illegible]
2/25/79	20:2:41	75.905
	21:2:41	77.9[illegible]
3/17/79	2:48:13	76.172
	3:48:13	77.[illegible]
3/19/79	0:57:43	77.7[illegible]
	1:57:43	81.255
3/21/79	1:14:56	71.9[illegible]
	2:14:56	77.44[illegible]

2/10 Pumped RCDT 2220

2/11 1522 Pumped RCDT

2/11 2050 Pumped RCDT
2245 Pumped RCDT

2/12 1345 Design CHG

2/23 0302 Pumped RCDT

2/23 1330 "Check" RCDT Pump

3/18 1030 Pumped RCDT

3.22.80

NORM MOSLEY -
Contact Bozeman committee for info.

1) - subject is quoted on show as saying - as saying he was ordered to falsify calculations of leakage on the Primary coolant system and that they would manipulate the numbers in the calculations to comport with the correct leak rate specifications. mentioned the name of a shift supervisor

(2) (Bernie Smith) who he had discussed this with

3. reactor very shaky exhibit and missed red spot on 4 70. Hartman states shutdown and Mehler said don't shutdown we'll make the loop come out right

P. 4C.

P. how were these closed out in the initial investigation

Talk to Hartman - anything new or different

OMPA Vandenberg, Lawrence R.

HAROLD Hartman - said he lecs in Lynchburg
on 28 1952. spent 3 days later

LARRY VANDENBERG - was present
with Ornstein on taped interview

3/3/2280

VANDENBERG, LAWRENCE

DR. ORNSTEIN - first interview of Hartman
was. Vandenberg and Dave EVANS. at
a motel in Lancaster
- they were looking at the
rush to completion issue for
marketing reasons.
both he and Evans are of the opinion
that he thought he was more important
than he was.
He and Evans did not believe he had
anything to substantiate the rush
to get commercial issue.
Hartman told them about the
leak rate - = he and Evans told
Ornstein of the information regarding the
fudging of the records. Did not get

into it any further because it didn't relate to the rush to Commerce interviewed on OCT. 29, 1950.
- impression was that he wanted to feel important and tried to build up what he knew. NOT necessarily believable as a single source.

test fudge - said Hartman mentioned it. C. had a lot of questions regarding the rush of tests. Hartman didn't want to talk about fudging the results of tests to he and EVANS.

Reserve code fudge - Hartman said he fudged some classified records.
Hartman talked gen. leakage no specifics
Hartman didn't appear to conduct leakage. together.
Hartman would say something was fudged but they couldn't get him to say he was ordered to fudge records

Vandenberg.

Red Alcorn
Rick Buttler } Hartman said these guys would know if anyone was being forced to do anything this was followed up by Bruno Nothing developed

last part of the interview was a brief session for Hartman. Never acted specific

they didn't find anything from Hartman that was useful enough to put in the report

Brian Nahelen - Nahelen was the one who forced him to work over.

JOE ORNSTEIN - entered Sep. 29
was on special inquiry group
23 Sep. - found him in LANCASTER

On Regions file - there is a copy
of the his testimony and also
off the record tape.

Hartman said he had been
is assigned to take leakage rate
on safety valves - test specs
required specific leakage rate.
He said that he was constantly
manipulating the calculations to
make things come out right - told
him a supervisor -
He has in the archives and
he does have an extra copy of the
deposition and another tape of
a second interview with NRC.

Thinks he will say that the
management treatment cat told them
to pass on ~~the valves~~ valve
he believes known recommendation was made to allow

~~Hagan~~.

not sure of [redacted] deposition

has the impression that nothing else was done other than reccomendation for protection to come forward.

interview took place at Quality Inn at Lancaster. - Hartman had an attorney with at the time.

Has all that - in office

in their transcripts there is no indication of threats or reprisals

$ - also may come -

he has copies of the handouts with exams for licensing etc.

they were fined for this $155,000

not sure of other

N49

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

MAR 24 1980

MEMORANDUM FOR: N. C. Moseley, Director, ROI

FROM: J. M. Allan, Deputy Director, RI

SUBJECT: CONCERNS AND ALLEGATIONS OF A RESIGNED TMI-2 CRO

References: (1) OIE TMI Investigation Interview, Tapes 254 and 255.
(2) Resigned TMI-2 CRO Taped Non-Oath Interview Transcript.
(3) Resigned TMI-2 CRO Deposition Transcript.

The attached is our current understanding of the concerns and allegations of the resigned TMI-2 Control Room Operator (CRO). This understanding is based on our review of the references, discussions with each individual involved in the various interviews, and an interview with the CRO at his home on March 22, 1980. Each item is our condensation and interpretation of his concerns or allegations. Where appropriate, each item is followed by additional information determined by our investigation team involved in this effort.

An investigation report will be written. If you have any further questions relative to this matter, please contact me or T. Martin (488-1255).

James M. Allan
Deputy Director

Attachments: As Stated

bcc w/attachments:
T. Martin
F. Smith
K. Christopher
J. Sinclair, OIA

ATTACHMENT

CONCERNS AND ALLEGATIONS OF A RESIGNED TMI-2
CONTROL ROOM OPERATOR (CRO)

1. During a plant startup, the reactor went critical below the estimated critical position (ECP). The supervisor directed action which was safe but contrary to procedure, and further caused a new estimated critical position to be calculated; the latter action demonstrating the reactor had behaved as expected (45-6).

COMMENTS

a. The CRO states the action directed by the supervisor was to reduce the startup rate to 1 dpm and establish critical conditions, vice inserting all control rods, as required by procedure.

b. The performance of an ECP calculation prior to an approach to criticality is a licensee requirement and not a Technical Specification requirement, except as that document requires procedure adherence.

c. The CRO believes the boron concentration was found to be in error and the ECP was re-calculated, based on this new information.

d. Reportedly, the supervisor and others on that shift denied the allegation when questioned by Mr. Rosen, a reporter.

2. Inadequacies in the requirements of the Emergency Feedwater Pump surveillance test procedure, coupled with differences in how each shift performed the test, resulted in repeated failures to satisfy acceptance criteria. Test results were subsequently found to be acceptable leading to changes to the acceptance criteria (55-12).

COMMENTS

a. The CRO stated the procedure didn't cover everything and that each shift had their own way of performing the test, within the discretion allowed by the procedure.

b. The CRO stated he was never coerced into falsifying these records. The results were presented to the ISI test coordinators who held lengthly discussions with the shift supervisor. Test discrepancies were analyzed away or the test rerun.

c. Pump flow and head characteristics were usually the parameters which failed to satisfy acceptance criteria. Analysis frequently lead to changes in the acceptance criteria, based on engineering judgement, which then appeared in subsequent procedure changes. Explanations were offered, by the ISI test coordinators, but could not be recalled by the CRO.

3. The Pressurizer Code Safeties had leaked excessively for at least three months prior to the accident (14-23).

Water transfers from the Reactor Coolant Drain Tank and additions to the Makeup Tank were excessive (up to 6000 gpd) (18-19).

The Reactor Coolant System leak rate calculation frequently failed to satisfy acceptance criteria. Operators developed techniques to obtain acceptable values (15-20).

COMMENTS

a. The OIE TMI Investigation determined the licensee was aware that one or more Pressurizer Code Safeties and/or the EMOV were leaking since the Fall of 1978.

b. Technical Specifications allow identified leak rates of up to 14,400 gpd.

c. The OIE TMI Investigation determined the unidentified leak rate as calculated by the licensee frequently approached the 1 gpm limit. Technical Specifications require the Reactor Coolant System water inventory balance to be run once per 72 hours, during steady state operations. The computer could calculate a leak rate about once per hour. Normal data scatter might cause some of the results to exceed the leak rate limit. The CRO stated calculated values exceeding the limit were considered "bad" data and the computer was just instructed to repeat the calculation. If a "good" leak rate was computed, the clock was re-zeroed and they had 72 hours to get another "good" leak rate.

d. The CRO stated he was never directed to forge data, but felt he was under a great deal of peer pressure (shift to shift competition) to get "good" leak rates.

e. The CRO stated each shift had its little trick to get good results and his shift increased Makeup Tank pressure. The increased pressure didn't change indicated level and the CRO didn't know why it sometimes seemed to work, but he was convinced that it did.

f. The CRO stated he knew for a fact that demineralized water was added to the system at least once, to make the leak rate appear acceptable, but was unable to name names or times.

g. The CRO interpreted a supervisor's statement to "Get a good leak rate," to mean to fudge the test results. He appeared genuinely surprised when it was suggested another interpretation might have been to make sure the plant was stable and to get an accurate result.

4. The rupture of an Atmospheric Steam Dump bellows, during a Turbine trip transient, demonstrated inadequate separation between the Emergency Feedwater Pump rooms and between these rooms and the Control Building (25-13).

COMMENTS

a. The OIE TMI Investigation confirmed this concern in the Summer of 1979 and expanded on it. Many redundant safety related components are subject to simultaneous exposure to adverse environments (fires, floods, steam, etc.) from single sources in any one of these areas.

b. The OIE TMI Investigation unresolved item related to this matter was passed to RI for ultimate followup in a memorandum from R. Martin to E. Brunner.

5. The quality of training programs for Auxiliary Operators was less than that provided licensed operators (non-oath tape).

Hot-licensed operators were trained to pass predictable NRC exams, not just to operate the plant. Licensed operator trainees had copies of NRC questions and at least one transcript of an NRC walk-through (32-3).

COMMENTS

a. The CRO provided copies of NRC test questions and the walk-through transcript which were in his possession to the Special Inquiry Group.

b. The concern raised is one of quality of training, not whether training was provided or not.

6. Emergency Feedwater Isolation Valves EFV-12A & B had been found shut before, but how or why they were shut or even if the plant was at power when they were found was unknown to the CRO (10-22).

COMMENTS

a. The OIE TMI Investigation reviewed several allegations to this effect.

b. None of the allegations were proved or shown to be correct beyond a reasonable doubt. Most allegations were based on heresay.

7. TMI-2 had been rushed to commercial operation before it was ready in order to take advantage of tax incentives (21-13).

The test program did not cover many balance-of-plant areas and multiple known problems in these areas still exist or were only corrected after costly malfunctions (non-oath tape).

COMMENTS

a. The Special Inquiry Group found evidence to indicate Met-Ed would have benefitted from a rush to commercial operations, but no evidence was uncovered to demonstrate that TMI-2 had been pushed into commercial operations before it should have.

b. The OIE TMI Investigation confirmed all the specific problems mentioned by the CRO in the transcript of his interview. The majority of the problems were in the secondary system outside the "safety related" envelope.

8. TMI-2 was the first PWR that Burns and Roe had ever designed (26-11).

The design was 40 years old before commercial operations were reached. Reactor Building internals orientation had to be rotated ninety degrees to accomodate the Fuel Handling Building location, since the original design was for a location in New Jersey. Pipes entering the Reactor Building would have to run an additional 150 feet around the inside of the building to accomdate this rotation (28-8).

COMMENTS

None.

9. The design of TMI-2 complicated operations. Systems were to sensitive. Valves and controls were out of reach. Instrumentation was out of sight or surrounded by distractions. The plant was not designed to be operated by humans (37-7).

COMMENTS

a. The OIE TMI Investigation confirmed the substance of these concerns.

b. The Special Inquiry Group report separately addresses human engineering and recommended changes.

10. Valves located in high radiation areas frequently could not be operated using their handwheel extensions. When the valves had to be operated, the operator received 2-3 times the radiation exposure he would have received, had the extension handles not complicated the ingress, manipulation, and egress (28-22).

COMMENTS

a. Areas currently unaccessible.

b. CRO stated comment was based on his discussion with various Auxiliary Operators.

11. Startup testing was chaotic with to many bosses and to much pressure on the Control Room Operators (42-5).

Many evolutions or transients started late in a shift with subsequent relief personnel receiving the plant in total chaos (35-2).

The number of alarms and the frequency of malfunctioning alarm cards was a distraction; a distraction for which management did not seem to be overly concerned (44-4).

Shift work in the Control Room was emotionally draining (non-oath tape).

COMMENTS

None.

12. The Small Break LOCA communications headsets were not always checked once per shift, as was required (69-15).

    Balance-of-plant, non-Technical Specification, surveillances were sometimes not done if time for the activity was unavailable, but were signed off (56-9).

    COMMENTS

    None.

13. The plant lacked teamwork, with everyone trying to place the blame for problems on someone else (59-19).

    The operators and supervisors of other shifts were not of the same quality as those of the CRO's shift (37-7).

    Management's ranks were filled with ex-Navy officers with little management capability (60-7).

    COMMENTS

    None.

1. Introductions
2. Is lawyer here at your request?
3. Completing investigation
4. Understanding of RCS inventory & surv. Test
5. Show any practice source
6. 72 hour policy source
7. Pressure
8. Our findings; why?
9. Reasons
10. From who is law?
11. Sworn statement?
12. This is an ongoing investigation
We therefore request you not discuss the contents of this interview prior to Monday!

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

Martin N-2
Comments plz
by COB 6/13
Thx Ed C

May 15, 1980

MEMORANDUM FOR:
D. G. Eisenhut, Director, DL, NRR
R. H. Vollmer, Director, DE, NRR
D. F. Ross, Director, DST, NRR
S. S. Hanauer, Director, DHFS, NRR
R. J. Mattson, Director, DST, NRR
G. C. Lainas, Assistant Director, SA, DL, NRR
T. Novak, Assistant Director, DL, NRR
R. Tedesco, Assistant Director, DL, NRR
T. E. Murley, Director, RSR, RES
G. A. Arlotto, Director, DES, SD
N. M. Haller, Director, MPA
C. Michelson, Director, AEOD
N. C. Moseley, Director, ROI, IE
H. D. Thornburg, Director, RCI, IE
D. Thompson, Executive Officer, XOOS, IE
S. E. Bryan, Assistant Director, FC, DROI, IE
B. H. Grier, Director, Region I
J. P. O'Reilly, Director, Region II
J. G. Keppler, Director, Region III
K. V. Seyfrit, Director, Region IV
R. H. Engelken, Director, Region V

FROM: E. L. Jordan, Assistant Director for Technical Programs, Division of Reactor Operations Inspection, IE

SUBJECT: DRAFT IE BULLETIN - REACTOR COOLANT SYSTEM LEAK RATE TESTING IN PWRs

The enclosed draft IE Bulletin is transmitted for your review and comment. Any information of previous problems with RCS leak rate determination and their resolution, that would be applicable to this Bulletin, would be appreciated. Comments received by May 27, 1980 will be considered in preparation of the final revision.

E L Jordan

Edward L. Jordan, Assistant Director
for Technical Programs
Division of Reactor Operations Inspection
Office of Inspection and Enforcement

Enclosure:
As stated

CONTACT: D. C. Kirkpatrick, IE
49-28180

SSINS No.: 6820
Accession No.:
8005050045

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

May 15, 1980

Draft IE Bulletin

REACTOR COOLANT SYSTEM LEAK RATE TESTING IN PWRs

Description of Circumstances:

A number of concerns regarding the adequacy of the primary system leak rate determinations in PWRs have been identified. These include inaccuracy in the test results, errors in the computer program used for the leak rate calculations and personnel actions affecting the test results.

A. Variation in the Test Results

A plot of the leak rate test results has shown that the scatter can exceed the allowable unidentified leak rate (usually one gpm). Several causes of potentially large variation have been identified, including:

1. The normal inaccuracy in the instrumentation.

2. Variation in the temperature distribution in the primary system.

3. Variation in the input parameters during the time that the data is being taken.

The test procedure is sometimes conducted over a period of one hour, with the result that a discrepancy of 60 gallons in the water inventory can cause an apparent limiting leak rate. In one example that was reviewed, the makeup tank level oscillated over a level change of about 1-1/2 inches with a frequency on the order of one to two minutes. The beginning and end input data sets consisted of three measurements, taken at one minute intervals and averaged. This resulted in a variation of over an inch in the makeup tank level measurement. Since an inch change in this tank was equivalent to over 40 gallons at reactor temperature, this error alone approached the one gpm leak rate limit. For a one hour test, a 0.5°F error in the difference between the beginning and end averaged RCS temperature will also result in a leak rate error of about 1 gpm in an 80,000 gallon RCS. This value appears to be comparable to the expected error, which is subject to all three of the effects listed above at both the beginning and end of the measurement.

B. Errors in the Computer Program

A number of significant errors have been identified in the computer programs used to perform the leak rate calculations as follows:

1. The use of incorrect or inconsistent densities to convert mass of water to gallons of leakage. In one case, the gross leakage from the RCS was determined by summing the RCS mass changes in pounds (makeup tank included) and multiplying by a gallons-per-pound factor

which is based on the average RCS temperature (.16787 gallons/# at 582°F.) The identified leakage, however, was derived directly from the leakage collection tank level change, converted to gallons. The calibration for this level measurement was based on a cold water density of 62.3#/ft^3 (.12007 gallons/# at 70°F). Since the unidentified leakage is defined as gross leakage less identified leakage this inconsistency led to a positive error in the unidentified leak rate of about 40% of the identified leak rate.

2. A similar failure to correct the volume of water added by the operators to the makeup tank during the test for expansion to reactor density. This omission results in a negative error of similar magnitude.

3. Erroneous tables used to correct RCS average temperature to density. In one example, the tables in the program used to convert temperature to density terminated at 582°F. When the RCS temperature exceeded this value, the density corresponding to 582 F is selected. The test data reviewed, contained temperatures above 582°F resulting in errors as high as one gpm.

4. Lack of a correction for pressure changes in the RCS during the test. Pressure affects the coolant mass determination in several ways, the largest being the change in pressurizer mass due to the

resulting change in pressurizer temperature. The RCS pressure has been observed to cycle over a range of up to 80 psi, resulting in density changes of 0.63 pounds per cubic foot. With an 800 cubic foot pressurizer water volume; this omission could result in an error of about 1.3 gpm.

5. An incorrect RCS volume used in the calculation of the mass change in the RCS.

6. The use of incorrect tables to convert the reactor coolant leakage collection tank levels to gallons of water.

C. Personnel Actions Affecting the Leak Rate Test Results.

Several improper personnel actions which can change the outcome of the leak rate test results were also identified including:

1. The disregarding of test results which indicate leakage in excess of the limit, and continuing to run leak rate tests until a result below the limit was achieved. Some personnel considered the acceptance criteria to have been met if any of these tests met the limit prior to the end of the 72 hour surveillance period. Most plant technical specifications require reduction of the leakage to within

allowable limits within four hours or shutdown tc hot shutdown within the next six hours.

2. The addition to water to the makeup tank during the test, without entering the addition into the computer calculation of the leak rates.

3. Causing an increase in the indicated makeup tank level by increasing the makeup tank hydrogen cover gas pressure during tests. While the level indication is nominally unaffected by changes in the cover gas pressure, the stated increase has been observed. The cause of the indicated level change is believed to have been a manometer effect from condensation in a normally dry reference leg.

Actions to be Take by Licensees of All PWR Facilities With Operating Licenses

A. Error Analysis

Please provide an error analysis of the primary system leak rate calculation based on standard variation. Use the time period normally used to conduct the test. Include in the analysis, the estimated variation in each of the parameters that are used as input data to the calculation. The estimated variation should include:

1. Instrument variation between beginning and final data sets (repeatability). Compare these values to the ranges of the respective instruments.

2. The effect of hysteresis on level measurements.

3. The effect of real variation in the measured parameters during the time period over which a data set is being taken.

4. The effect of temperature distribution changes on the measured average temperatures in the RCS.

5. The effect of any potentially significant changes to the primary system that are not accounted for in the leak rate calculations. In particular, include the effect of temperature variation in the pressurizer, the makeup tank, and the primary leakage collection tank if these are not accounted for by the calculation.

Please provide, as part of the submittal, the details of the above analysis, including the estimated variations listed above.

B. Review of Computer Calculation

Please review the computer program used to calculate the RCS leak rate test results. Determine if any of the errors listed in the description of the computer problems above exist in your program. Include a description of this computer program as part of the submittal. Include as part of this description:

1. The basic equations used to calculate the various leak rates.

2. Various constants used in the calculation and their derivation. In particular, include all constants used to convert level and temperature changes in the RCS, pressurizer, makeup tank and RCS leakage collection tank, to volume and/or mass changes.

3. The equations or tables used to derive water density/specific volume from temperatures and (if applicable) pressure.

4. The data collection scheme, including the number of times each parameter is collected, the times of collection relative to the start of the test, and the method of averaging data.

5. List any errors identified in the computer program.

C. Personnel Actions

Please provide information relative to your facilities in the following areas:

1. Any signficant difficulties that you are experiencing in achieving test result accuracies that are commensurate with the allowable limits.

2. Any special treatment of the leak rate test results, such as plotting, trending or error analysis used to assure that leakages are within limits.

3. Your policy on the course of action to be followed when a leak rate test indicates leakage in excess of the allowable limits.

4. Administrative controls to prevent the addition of water to the RCS without entry into the leak rate calculation.

5. The sensitivity of the makeup tank and primary leakage collection tank level measurement to pressure changes. Indicate if actions to change the pressure in these tanks is permitted during a leak rate test.

For all PWR power facilities with an operating license, the information requested in items A, B, and C shall be submitted within 60 days of the date of this Bulletin.

For all power reactor facilities with a construction permit this Bulletin is for information only and no written response is required.

Approved by GAO B180225 (R0072); clearance expires 7-31-80. Approval is given under a blanket clearance specifically for identified generic problems.

N-22

NUREG-0680
Supp. No. 1

TMI - 1 Restart

Evaluation of Licensee's Compliance with the Short- and Long-Term Items of Section II of the NRC Order Dated August 9, 1979, Metropolitan Edison Company, et al. Three Mile Island Nuclear Station Unit 1 Docket 50-289

U.S. Nuclear Regulatory Commission

Office of Nuclear Reactor Regulation

TABLE III.I.6 Percentage of HELERs in "What Went Wrong" Categories

"What Went Wrong" Categories	Industry-Wide Average*	TMI-1	TMI-2
1. Safety equipment on wrong setting or valve in wrong position	22.6	28.0	29.0
2. Safety equipment malfunction	13.6	11.0	0.0
3. Monitoring instrumentation on wrong setting	6.4	0.0	0.0
4. Monitoring instrumentation malfunction	1.4	7.0	0.0
5. Surveillance or maintenance not performed on schedule.	23.1	14.0	43.0
6. Condition out of specification	19.5	16.0	14.0
7. Safety equipment tripped	1.8	0.0	0.0
8. Other	11.6	24.0	14.0
9. Category 1 and 5 above	45.7	42.0	72.0

*For the 31 PWRs included in the data for Table 4 of Appendix B of Reference 2. This was for the 1-year time period between November 1, 1977 and October 30, 1978.

Order Item 10. "Whether the actions of Metropolitan Edison's corporate or plant management (or any part or individual member thereof) in connection with the accident at Unit 2 reveal deficiencies in the corporate or plant management that must be corrected before Unit 1 can be operated safely."

The Investigation into the March 28, 1979 Three Mile Island Accident by the Office of Inspection and Enforcement (NUREG-0600) includes a description of the licensee's management of the accident. Section I-3 of NUREG-0600, "Management Actions During Accident," provides an account of the actions and management decisions undertaken by those members of licensee management who were called to the site to provide emergency direction to cope with the operational aspects of the accident. The section also addresses the additional support that was provided through the licensee organization and by other parties to support the onsite operational activities.

The actions that the plant operators, Met-Ed management, and their advisors either performed or directed during the accident and the major operating decisions that were made and by whom; and their reasons for the decisions were examined in the subsection "Plant Operators Response" of the NRC Special Inquiry Group (SIG) Report, (Refer to NUREG CR/1250, Volume II, Part 3).

During the post accident investigation, a concern was raised regarding whether information, which indicated plant conditions, had been properly transferred to the NRC during the day of the accident at Unit 2. The flow

of information between the NRC and the Licensee during the early hours of the accident is briefly described in NUREG-0600 Section I.3.4.2 "Communications Between NRC and the Licensee." The SIG investigated the information transfer concern and reported the results of its investigation in Section A.5 "Reporting Critical Information to the NRC on March 28, 1979," (Refer to NUREG CR/1250, Volume 2, Part 3). Section A.5 provides a detailed description of communications between representatives of the licensee and NRC and the findings and recommendations of the SIG. The SIG reported that it found no direct evidence suggesting intentional withholding of information by the licensee but that it was not appropriate for the SIG to reach conclusions as to enforcement questions. Therefore, the Office of Inspection and Enforcement is completing the investigation related to information transfer during the day of the accident to determine whether further enforcement action is justified. The findings will be presented to the Commission and a report issued upon completion of the investigation.

A separate investigative effort is being conducted by the Department of Justice (DOJ) in response to concerns regarding falsification of leak rate test data for the Reactor Coolant System (RCS). NRC interviews with plant personnel and records review revealed that continuing leakage from one or more of the pressurizer relief valves had existed since the Fall of 1978. A review of the RCS leakage procedure and a Temporary Change Notice to the procedure "revealed that the basic procedure was in error resulting in miscalculations of the RCS leak rate." The leak rates, recalculated by the Office of Inspection and Enforcement using a corrected procedure on Unit 2 data, exceeded limits allowed by the Unit's Technical Specifications. Additional details regarding the procedure are described in Section I.1.2.3, "RCS Leakage," of NUREG-0600. During interviews with the NRC, the SIG, and the media, allegations were made by a former TMI operator concerning the implementation of the RCS leakage procedure and improper data collection. [redacted] Investigative effort was initially undertaken by the NRC. Subsequently, after consultation with the DOJ, the DOJ convened a Grand Jury which is currently hearing testimony in this matter. Pending completion of the DOJ investigation, the NRC has suspended its inquiry into the matter so as not to interfere with the DOJ investigation.

We can draw no conclusions on this item pending the completion of the two investigations described above. Based upon the outcome of the investigations, further enforcement action, which is under the jurisdiction of the NRC, will be taken if appropriate. At this time, the staff cannot predict when these investigations will be concluded.

Order Item 11. "whether Metropolitan Edison possesses sufficient in-house technical capability to ensure the simultaneous safe operation of Unit 1 and clean-up of Unit 2. If Metropolitan Edison possesses insufficient technical resources, the Board should examine arrangements, if any, which Metropolitan Edison has made with its vendor and architect-engineer to supply the necessary technical expertise."

N-23

MEMORANDUM FOR: John Sinclair, Office of Inspector and Auditor (OIA)

FROM: R. Keith Christopher, Investigation Specialist, RI

SUBJECT: INVESTIGATION; HARTMAN ALLEGATIONS

ADDITIONAL INVESTIGATIVE COVERAGE

On 3/27/80 myself and Tim Martin conducted four interviews relative to the allegations made by Harold Hartman. These interviews were recorded on tape and transcribed by Region I staff. These four interviews are being forwarded to you in this package. The four individuals are:

1. Mr. Jim Floyd, Operations Supervisor
2. Mr. Kenneth Hoyt, Shift Foreman
3. Mr. Bernie Smith, Shift Supervisor
4. Mr. Brian Mehler, Shift Supervisor

Between 3/28/80 and 3/31/80 a total of 14 interviews were conducted of various Met Ed operators and shift foreman. These were a series of screening type interviews and all of the individuals were asked a prepared list of five questions at Tim Martin's request. The five questions asked of these individuals are as follows:

1. Prior to the accident on 3/28/79 were you ever under the impression that your management or supervisor was not interested in and/or did not want to hear your safety concerns?

2. Have you ever raised a safety concern to management's attention, which you felt was not adequately addressed by their corrective actions?

3. Harold Hartman states he fudged RCS inventory calculations because operators were under pressure to get "good leak rates". Are you aware of anyone (including yourself) who falsified leak rates or other surveillance test calculations. And are you aware of any pressure to falsify records or not to report unacceptable surveillance results?

OFFICE	SB					
SURNAME	Christopher/gwc					
DATE	1/20/81					

4. Harold Hartman states he was directed to violate procedures by a Shift Supervisor by being ordered to continue the plant startup when the reactor went critical below an allowable band around the ECP. Are you aware of instances where you or others were directed by plant management or supervision to violate safety procedures?

5. When RCS inventory surveillance test was taken and it failed what was done with the record? And what was done with the plant? Are repeated failures within the surveillance intervals allowed?

The responses by these individuals were recorded in strictly a yes or no manner with very little amplifying information. These answers were correlated on a chart prepared by Tim Martin which is attached also to the report. You should note that some of the affirmative answers to these questions refer to other areas not related to these allegations. The personnel interviewed in this manner are as follows:

1. Martin Cooper, Shift Foreman
2. Theodore, Illijes, Shift Foreman
3. Lynn Wright, Control Room Operator
4. Hugh McGovern, Shift Foreman
5. Craig Faust, Control Room Operator
6. Mark Phillippe, Control Room Operator
7. Mark Coleman, Control Room Operator
8. Charles Mell, Control Room Operator
9. Earl D. Hemmila, Shift Foreman
10. Dennis Olson, Control Room Operator
11. Edward Frederick, Control Room Operator
12. Leonard Germer, Former Control Room Operator
13. John Blessing, Control Room Operator
14. John Kidwell, Control Room Operator

Note: Joseph Congdon was not interviewed in this manner as he was unavailable at the time.

CONTACTS WITH HAROLD HARTMAN

Harold Hartman was interviewed by myself, John Sinclair and Tim Martin formally on two occasions, one which resulted in a sworn statement and the second resulted in the transcribed record of the interview both of which you have. Additionally, Hartman was interviewed on three other occasions by the NRC. The first incident was on May 22, 1979 when he was interviewed by the NRC staff immediately following the accident as part of the original investigation. The second occasion was on September 12, 1979 when he was interviewed under oath by the Special Inquiry Group and the third occasion was on October 29, 1979 when he was interviewed by the NRC regarding allegations of the rush to commercialization for TMI Unit 2. These depositions are also appended to this package.

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SURNAME ►						
DATE ►						

ADDITIONAL INTERVIEWS DURING THE HARTMAN INVESTIGATION

Prior to the termination of active investigation the following persons were also interviewed or in some manner contacted regarding the Hartman allegations. These interviews were largely of a general informative type nature and conducted with Tim Martin and I have not located any formal notes on these individuals

1. M. Benson, Engineer
2. G. Kunder, Engineer

These two individuals were interviewed by Tim Martin largely regarding the methodology and technical aspects of the leak rate calculations. I was not present at those interviews and have no notes regarding that.

3. Thomas Hombach, Director of Personnel for Metropolitan Edison
   This individual was interviewed regarding the circumstances of Hartman's dismissal from employment.

4. Mr. Robert Arnold, Vice President

Total number of individuals interviewed.

With the two engineers noted above, a total of 29 individuals including Harold Hartman were interviewed or contacted during the course of the investigation prior to its termination and referral to Justice. A copy of that list of individuals including the contacts with NRC personnel is also being sent under this cover.

R. Keith Christopher
Investigation Specialist

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N-24

NUREG-0680
Supp. No. 2

TMI - 1 Restart

Evaluation of Licensee's Compliance with the Short- and Long-Term Items of Section II of the NRC Order Dated August 9, 1979, Metropolitan Edison Company, et al. Three Mile Island Nuclear Station Unit 1 Docket 50-289

Manuscript Completed: March 1981
Date Published: March 1981

Division of Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Order Item 10. "Whether the actions of Metropolitan Edison's corporate or plant management (or any part or individual member thereof) in connection with the accident at Unit 2 reveal deficiencies in the corporate or plant management that must be corrected before Unit 1 can be operated safely."

In Supplement 1 to the Evaluation Report, on pages 36 and 37, we referred to an ongoing investigation by the Office of Inspection and Enforcement related to information transfer during the March 28, 1979 accident, and indicated that a report would be issued upon completion of the investigation.

The report, NUREG-0760, Investigation into Information Flow During the Accident at Three Mile Island, was issued on January 27, 1981. This investigation found that although pertinent information was not intentionally withheld on March 28, 1979, information was not adequately transmitted to the NRC or the Pennsylvania Bureau of Radiological Protection.

NUREG-0746, Emergency Preparedness Evaluation for TMI-1, assessed the licensee's communications facilities and plans for communications flow during an accident in accordance with the requirements of 10 CFR 50.47 and the guidance in NUREG-0654. The problems with communications and information flow identified during the TMI-2 accident were reflected in the revised emergency planning regulations and as such the recommendations subsequently contained in NUREG-0760 had already been considered.

The licensee's corrective actions relative to the items of noncompliance cited in the Notice of Violation included in the January 27, 1981 transmittal will be reviewed as part of the NRC's evaluation of the licensee's emergency preparedness. When the licensee's implementation of their revised emergency plan, revised in conformance to the guidance in NUREG-0654, is reviewed during an emergency preparedness exercise, the adequacy of the corrective actions will be verified. There are no management, organization, or staffing issues addressed in NUREG-0760 for which additional licensee action has been identified.

In Supplement 1 to the Evaluation Report, we also presented a brief description of a separate investigative effort conducted by the Department of Justice (DOJ) in response to concerns raised regarding possible falsification of Reactor Coolant System (RCS) leak rate test data for Unit 2. [redacted] NRC's investigative effort was suspended pending the conclusion of the DOJ investigation, at their request, to avoid parallel administrative and criminal proceedings. The DOJ investigation is still ongoing, and the NRC does not possess any information as to when it may be completed. NRC personnel involved in the suspended investigation have been requested by DOJ not to discuss the details of the matter. [redacted] The NRC will resume its investigation of the concerns when DOJ has completed its investigation of the matter. However, the staff has reviewed the information that it has obtained to date on the matter, and has [redacted]

Further, although the NRC investigation is not complete, and [redacted]

[redacted]

Nevertheless, NRC inspectors will be alert to procedure adherence problems, in general, and accuracy of RCS leak rate testing data specifically, should the facility be permitted to restart.

In conclusion, based on our reviews as discussed herein, [redacted] investigation of corporate or plant management actions in connection with the Unit 2 accident [redacted]

Order Item 12. "Whether Metropolitan Edison possesses the financial resources necessary to safely operate Unit 1 in addition to cleaning up Unit 2."

This item will be considered as part of Item 7 of the August 9, 1979 Order which requires that the licensee demonstrate his financial qualifications. Our evaluation of the financial issue will be contained in a supplement to the Evaluation Report.

J. Conclusions

The paragraph in this section on page 38 of Supplement 1 to the Evaluation Report is deleted and replaced by the following:

Based upon our review of additional information and documentation as described herein, we conclude that the licensee has made substantial improvements in the area of management capability and resources and that the licensee is in compliance with Item 6 of the August 9, 1979 Order as amplified by the March 6, 1980 Order, with the exception of the item identified in Section III.E. herein (Q-list).

Item 12 of the March 6, 1980 order concerning the licensee's financial resources will be considered as part of Item 7 of the August 9, 1979 Order which specifically addresses financial capability. The Staff's evaluation of financial capability will be included in a supplement to the Evaluation Report.