

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

In the Matter of:  
IE TMI INVESTIGATION INTERVIEW  
of  
Don K. Croneberger  
Manager, Engineering and Design

Trailer #203  
NRC Investigation Site  
TMI Nuclear Power Plant  
Middletown, Pennsylvania

June 1, 1979  
(Date of Interview)

July 6, 1979  
(Date Transcript Typed)

203  
(Tape Number(s))

NRC PERSONNEL:

Robert Marsh, Investigator

Anthony N. Fasano, Inspection Specialist

ENCLOSURE

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MARSH: The date is June 1, 1979. The time is 9:37 a.m. This is Bob Marsh and I am an Investigator with the U.S. Nuclear Regulatory Commission assigned to Region III at Chicago, Illinois. This morning we are at the facilities of GPU Service Corporate Headquarters at 260 Cherryhill Road in Mountain Lakes, New Jersey, for the purpose of conducting interviews and we have with us at this time Mr. Don K. Croneberger, who I have as Manager, Engineering and Designs, is that correct, Mr. Croneberger.

CRONEBERGER: That's correct.

MARSH: At this time to begin I would like the other individuals in the room to identify themselves, spell their last name and indicate their position.

FASANO: Anthony N. Fasano, Inspection Specialist at NRC out of Region I.

MARSH: Don, if you would just go ahead with spelling of your name and your position.

CRONEBERGER: My name is Donald K. Croneberger, Manager, Engineering and Design, Generation Division, GPU Service Corporation.

1 HOBER: John Hober, Manager, Generation Division Support.  
2

3 MARSH: Thank you very much. This is a correction on the middle initial  
4 from C to K with Mr. Croneberger. Mr. Croneberger, before we started  
5 we discussed briefly this two page memo which I have in front of me. I  
6 am not going to go into any detail on it but I will indicate that it  
7 covers the purpose of NRC's investigation, its authority and the scope  
8 of the investigation as well as the rights of the person being interviewed.  
9 On the second page there appears several questions which I would like  
10 to review at this time and just make them a matter of record on the  
11 tape as well as on the written document. The first question reads - Do  
12 you understand the above, making reference to the two page memo?  
13

14 CRONEBERGER: Yes.  
15

16 MARSH: Secondly, do we have your permission to tape this interview?  
17

18 CRONEBERGER: Yes.  
19

20 MARSH: And thirdly, would you like a copy of the tape and/or the  
21 transcript?  
22

23 CRONEBERGER: Yes.  
24  
25

1 MARSH: They will be provided. There is a fourth question that is not  
2 called out specifically on the second page but is covered in the body  
3 and that addresses your right if you so desire to have a company  
4 representative present during the interview and as my understanding  
5 that is Mr. Hober's position.  
6

7 CRONEBERGER: Yes.  
8

9 MARSH: With us at this time. Good. To begin Mr. Croneberger, I  
10 would appreciate it if you would give us a brief resume of your background,  
11 your experience in the nuclear industry and your duties with GPU  
12 Service.  
13

14 CRONEBERGER: Okay. I have been with GPU Service since April of 1978  
15 in the position initially as Manager of Design, subsequently Manager  
16 of Engineering and Design. In this position I have responsibility for  
17 various engineering disciplines including mechanical systems and  
18 components, electrical power and instrumentation, engineering mechanics  
19 and a design directing group. Prior to being with GPU Service I was  
20 Manager of Structural Engineer for Gilbert Associates having been with  
21 that company from 1963 through 1978. My involvement in the nuclear  
22 industry commenced in 1965.  
23

24 MARSH: Thank you. Tony you have some questions.  
25

1 FASANO: What I would like to do is to get your involvement with the  
2 March 28, 1979 event of, that is when you were notified of the event,  
3 what part you played in it, who you communicated with, any decisions  
4 that you might have made, any suggestions and in general your involvement  
5 with the event of March 29, 1979 at TMI, March 28, excuse me.  
6

7 CRONEBERGER: I became aware of the incident at TMI 2 after having  
8 arrived at work here on that morning approximately 8:30 to 9:00 a.m.  
9 My first involvement was to participate in a meeting of a small group  
10 of engineers at which time we were acquainted with the facts as known  
11 at that time. These facts were those that were given to Mr. J. P.  
12 Moore by R. F. Wilson first thing that morning. The immediate discussion  
13 was what engineering support we could provide. The results of that  
14 meeting were selections of specific engineering personnel which could  
15 be sent immediately to the site to provide support to the staff.  
16 After having taken that action a group of five engineers sent to the  
17 site. The balance of the day, commencing sometime after 12:00 noon  
18 involved participation with meetings with R. F. Wilson initially and  
19 subsequently with R. C. Arnold as additional information was conveyed  
20 to us; from the plant site and either directly or through the solicitation  
21 of support from engineering department personnel; providing some  
22 understanding as to the system designs; why certain findings or data  
23 that was being received; what it might have meant and simply providing  
24 general support to those two managers.  
25

1 FASANO: Going back to your meeting you had been given facts. About  
2 what time was this meeting in the morning.  
3

4 CRONEBERGER: Between 9:00 and 9:30 is my recollection.  
5

6 FASANO: And do you recall what facts you had available to you so that  
7 you could make some analyses or decisions.  
8

9 CRONEBERGER: The facts as I recall them that were available was the  
10 fact we did have a turbine trip and a reactor trip. We did not know  
11 specifics on the transients but we did know it was necessary that one  
12 of our engineers who was familiar with transients that might occur  
13 with the turbine or reactor trip should be made available to acquire  
14 additional data. We did know there was a problem with the instrument  
15 air system. We did know that the problem, the initial reactor trip  
16 occurred as a result of the condensate pump trip, consequently we  
17 wanted some engineer to be made available who understood the secondary  
18 plant systems. We were aware at that time that the reactor coolant  
19 pumps had tripped. To my knowledge we did not know, at that time, any  
20 information relative to radiological consequences.  
21

22 FASANO: Based on the information then you had someone look at the  
23 instrument air system or how did that involvement.  
24  
25



1 CRONEBERGER: The first decision that was made was that two of the  
2 engineers who were sent to the site, I think you got their names, one  
3 was James P. Moore, the other one was George Lehman. Both of those  
4 engineers were cognizant of secondary plant systems, including instrument  
5 air system, condensate feedwater system. Their selection to begin to  
6 go to the site was as a result of our knowledge there was a problem in  
7 that area.

8  
9 FASANO: Okay, you got...you decided to send five of your, five engineers  
10 were sent to the site.

11  
12 CRONEBERGER: That's correct.

13  
14 FASANO: Do you recall what time they were sent.

15  
16 CRONEBERGER: My recollection was that they all five left immediately  
17 after our meeting broke up and I would anticipate that occurred somewhere  
18 between 10:30 to 11:30 a.m.

19  
20 FASANO: Once they arrived on the site were they able to give you  
21 further information for your group here to continue to participate or  
22 were they then participating on their own at the site.

23  
24 CRONEBERGER: I do not recall on the 28th of March having received any  
25 telephone calls from any of those personnel. To my knowledge all of

1 the communications that I was aware of that were occurring with the  
2 plant were those which were occurring via Mr. R. C. Arnold. Again  
3 that is my recollection, I do not recall having received any telephone  
4 communication.

5  
6 FASANO: Okay. You mentioned that they were get some meaning from the  
7 data as related to systems. What was the result of this involvement?  
8 Were you kept notified or were you, ... was it Mr. Wilson, Mr. Arnold.

9  
10 CRONEBERGER: Mr. Wilson and Mr. Arnold were those who were directly  
11 receiving indications and I was aware of those communications simply  
12 by being present in the offices while those communications occurred.

13  
14 FASANO: Okay, so then your participation was mainly being informed,  
15 attending a meeting, selecting your knowledgeable individuals and then  
16 having these people sent to the site.

17  
18 CRONEBERGER: Up through that day, that was essentially it, yes.

19  
20 FASANO: Following... what was your involvement.

21  
22 CRONEBERGER: The involvement after noon was in support of R. F.  
23 Wilson or R. C. Arnold in being able to provide them an understanding  
24 of the system designs so that they might more fully be able to assess  
25 or transmit information to the plant. What the meaning of some of the



1 data which was being conveyed via phone later that day. Specific  
2 examples later that day, we were aware of releases in the Auxiliary  
3 Building area and this did involve a review of the flow diagrams to  
4 gain understanding as to how waters might have been conveyed from the  
5 containment sump out to the Auxiliary Building. That was one specific  
6 example I do recall having both directly as well as with support from  
7 an engineer within the group having investigated.  
8

9 FASANO: Could you relate the results of this? I guess started with  
10 your sump pumps.  
11

12 CRONEBERGER: Yes, that's correct.  
13

14 FASANO: And then I think the sump pumps were turned off but still you  
15 were getting activity. Did you come up with any conclusions?  
16

17 CRONEBERGER: The only initial conclusion that we came up with was the  
18 fact the sump pumps should be shut off. I do not recall that day  
19 being aware that releases were continuing after the pumps were shut  
20 off. I don't recall it.  
21

22 FASANO: Okay. How late did you stay here that night?  
23

24 CRONEBERGER: My recollection is it was 8:30 to 9:00 p.m. that evening  
25 when the general support group in Mr. Arnold's office broke up. We

1 had stayed around until the plant had initiated action to start up the  
2 reactor coolant pumps and after it appeared that temperatures were  
3 reducing in the primary coolant system, that group tended to break up.  
4 That was I believe 8:30 to 9:00 p.m.  
5

6 FASANO: You did mention that you were knowledgeable of reactor coolant  
7 pump situation? They had shut down earlier. Did your people get  
8 further data to evaluate why they were turned off?  
9

10 CRONEBERGER: We did not as I recall get data as to why they were  
11 turned off. We did investigate what would be the startup time to full  
12 speed of the pumps which would give them some indication as to whether...as  
13 to what they should expect when they started...when they tried to  
14 restart the pumps. So our main concern really was giving guidance as  
15 to what to anticipate in pump restart and it did not include investigation  
16 as to why the pumps were tripped.  
17

18 FASANO: On the restart can you fix a time when you were giving technical  
19 advice in this area? Was it late in the afternoon?  
20

21 CRONEBERGER: I would estimate it was late in the afternoon but I  
22 don't have a clear recollection.  
23

24 FASANO: So you remained in contact throughout the afternoon and your  
25 involvement did indeed involve some input for actions?

1 CRONEBERGER: It did involve input but a great deal of my involvement,  
2 such as the question on the pumps, more directly involved soliciting  
3 technical information from people who had been directly involved in  
4 the Three Mile Island 2 engineering such as one of the mechanical  
5 components engineers, who was familiar with the pumps, provided direct  
6 technical input on what to anticipate on a pump start. So I did  
7 provide technical input but I also was primarily to... providing  
8 support through the other specialists within the group to provide  
9 guidance to Mr. Arnold and Mr. Wilson.  
10

11 FASANO: Who would be the individual specialist on the pump?  
12

13 CRONEBERGER: The pump specialist we had was Robert Spragg.  
14

15 FASANO: He's here?  
16

17 CRONEBERGER: Yes.  
18

19 FASANO: Were you knowledgeable of the emergency feedwater situation  
20 or the block valves? I guess the 12A and 12B were closed?  
21

22 CRONEBERGER: I was aware on the 28th that those valves were closed.  
23 I do not recall when on the 28th that information was conveyed to me.  
24  
25

1 FASANO: Do you have people who are knowledgeable in that system? In  
2 that particular feedwater system?  
3

4 CRONEBERGER: Yes. One of the engineers whose name you've been given  
5 as M. P. Morrell, one of Mike's contributions that day was to provide  
6 background on the design of the emergency feedwater system.  
7

8 FASANO: And also the steam generator consequences? I think there was  
9 some talk that there might have been some damage to the B steam generator?  
10 Do you recall if that was talked about?  
11

12 CRONEBERGER: We knew that there was a question of a leak on the B  
13 steam generator. As to the specifics of that I do not recall knowing  
14 anything. One of the engineers who was sent to the site was Mr.  
15 Julian Nabramovich and one of the reasons for his being sent to the  
16 site was to provide assistance in understanding what might have happened  
17 to that steam generator. I do not recall any further activities after  
18 that group left in the morning relative to steam generator leak.  
19

20 FASANO: So you did have information that led you to believe that this  
21 would be a concern?  
22

23 CRONEBERGER: That's correct. And that was why that one individual  
24 was selected to go.  
25

1 FASANO: Were you made knowledgeable of the boron sampling that was  
2 done earlier in the morning? When they were getting low concentrations  
3 of boron and would your people be looking into the systems to evaluate  
4 how this could be?  
5

6 CRONEBERGER: I do not recall that as being an area for investigation  
7 that day.  
8

9 FASANO: How about instrumentation with respect to thermocouple readings  
10 or your RTDs on the resistant temperature detectors on the hot leg and  
11 cold leg, were you informed of these problems?  
12

13 CRONEBERGER: I was informed of primary coolant system temperatures.  
14 At no time that day as I recall was there a question as to the accuracy  
15 of the measurements from that instrumentation. The only real instrumentation  
16 and control question that arose that day was on the question of containment  
17 isolation as I recall.  
18

19 FASANO: Containment isolation?  
20

21 CRONEBERGER: Yes.  
22

23 FASANO: At what point was this, the 4 psi or the 28 psi?  
24  
25

1 CRONEBERGER: Both. The question was asked, and this was in support  
2 of Mr. Arnold as I recall, as to when containment isolation occurred  
3 and what the significance of containment isolation would be in the  
4 performance of various systems.  
5

6 FASANO: I gather that one of your decisions or suggestions was the  
7 shutting down of the sump pumps?  
8

9 CRONEBERGER: Yes.  
10

11 FASANO: This would be prior to going to an automated containment, the  
12 actuation of the specific pressure within containment?  
13

14 CRONEBERGER: Yes. One of the recommendations was to shut down the  
15 sump pumps.  
16

17 FASANO: Were you informed at all about their concern on the source  
18 range monitors, the intermediate range monitors which seemed to be  
19 going... increasing count rates, say early in the morning?  
20

21 CRONEBERGER: I do not recall that information.  
22

23 FASANO: They also had some problems with their hot well and there was  
24 instrumentation problems there. Were you informed of this?  
25



1  
2 CRONEBERGER: I was not aware of that, that information.

3  
4 FASANO: Okay, so on the secondary side you were mainly informed of  
5 the Condensate Polishers, Condensate Pump trip, feedwater trip and the  
6 possibility of instrument air having a part in this. Correct?

7 CRONEBERGER: That is correct.

8  
9 FASANO: When were you made knowledgeable of the Reactor Building  
10 peak? I guess that was somewhere about...it happened somewhere around  
11 1:30 - 2:00, do you recall if indeed the first day you were in....

12  
13 CRONEBERGER: I do not recall that having been mentioned the first day  
14 to me.

15  
16 FASANO: So only indirectly the discussions on actuation of containment  
17 you discussed these high pressures?

18  
19 CRONEBERGER: Only relative containment isolation, in fact I do not...when  
20 we were discussing containment isolation was more a question of what  
21 the design basis would be for containment isolation and I do not  
22 recall that 28 pound pressure having been a part of that discussion at  
23 all.  
24  
25

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1 FASANO: Did you...were you involved in any questions on the electromatic  
2 relief valve and its function or the reactor coolant drain tank?  
3

4 CRONEBERGER: I was aware that there was concern about the leaking of  
5 the electromatic relief valve. I was aware that the reactor coolant  
6 drain tank rupture disk had blown. There was no specific engineering  
7 activity which I recall having pursued to determine what could be done  
8 having .....given those facts.  
9

10 FASANO: How early were you given these facts?  
11

12 CRONEBERGER: I believe the fact, relative to the reactor coolant  
13 drain tank rupture disk, was identified in the early morning. I do  
14 not recall when the leaking power operated relief valve first was  
15 identified. I believe it was in the morning also.  
16

17 FASANO: This would be 9:00?  
18

19 CRONEBERGER: Yes. 9:00 - 9:30.  
20

21 FASANO: As...well if you would could you go on with your involvement  
22 with the rest of the day. Let's see we got around 12:00 and then I  
23 asked some questions then later then that and then on into your second  
24 and third day involvement.  
25

1 CRONEBERGER: Okay. The...as indicated from approximately noon on  
2 through 8:30 to 9:00 p.m. I was continuously present with either Mr.  
3 Wilson and/or Mr. Arnold and it was during this phase, when either  
4 directly or support of other people; we were answering questions on  
5 system design. I mentioned the cases I can recall which is; the  
6 design of containment isolation and the question of water being transferred  
7 out of containment, questions relative to emergency feedwater system.  
8 Beyond that I really can't recall specifics that I can give you. As  
9 far as involvement following the March 28th it was very difficult to  
10 communicate with the people at the site, get information. On the 29th  
11 there I have very poor recollection of what occurred on communications.  
12 There was, not on my part, any intense involvement on the TMI 2  
13 activities as I recall. The very intense support commenced Friday.  
14 After we had started getting more complete information back from the  
15 plant and from Friday on I was involved here through April 11th in  
16 providing 24 hour manning of engineering personnel to provide support  
17 to those people at the site.

18  
19 FASANO: Did your people get involved with the setting up of the  
20 hydrogen recombiner?

21  
22 CRONEBERGER: Yes. We were directly involved with providing, both  
23 directly ourselves and through support from the architect, Burns &  
24 Roe, detailed information on how to set up the hydrogen recombiner,  
25 yes.

1 FASANO: When were you knowledgeable that it was even a concern that  
2 hydrogen existed, either in vessel or in containment?  
3

4 CRONEBERGER: It is my recollection that I first became aware of that  
5 May 30.  
6

7 FASANO: Have you been to the site at all?  
8

9 CRONEBERGER: I transferred to the site on April 11.  
10

11 FASANO: Do you have any questions?  
12

13 MARSH: I have no questions.  
14

15 FASANO: I have a general question. Your involvement with TMI 2 would  
16 be in the design functions? You started somewhere in 78?  
17

18 CRONEBERGER: Yes.  
19

20 FASANO: So it would be quite late?  
21

22 CRONEBERGER: Yes.  
23

24 FASANO: Then as far as...what would be your knowledge and also your  
25 function in evaluating or/and recommendation for design corrections

1 with the TMI 2? In particular I am thinking of some of the concerns  
2 of the electromatic relief valve, sensing unit indication, the review  
3 of some of the LERs if indeed they had some indication of design  
4 deficiencies both on the primary side and possibly on the balance of  
5 plant? If you would...maybe you could give me an idea of your history  
6 of the knowledge of these areas?

7  
8 MARSH: Excuse me, before you begin the response I am going to break  
9 momentarily while we turn the tape over. The time is 10:07. I am  
10 reading 472 on the meter.

11  
12 MARSH: The time is still 10:07 reading 473 on the meter. We are back  
13 on.

14  
15 CRONEBERGER: I have been involved with certain TMI 2 modifications  
16 since I have been here. The direct involvement, on my part in the  
17 group, has been in modifications to the secondary plant systems. I do  
18 not recall having participated in, directly in any design changes on  
19 the primary plant systems since I have been here.

20  
21 FASANO: But this doesn't include the modification to the EMOV or  
22 not... the electromatic, not at all?

23  
24 CRONEBERGER: A few examples I can cite. There was some problems on  
25 the stacks from the safety relief valves on the steam lines. I was

1 involved with modifications on that stack design. There were some  
2 changes in the secondary plant heater drain system directly involved  
3 there and not the examples you cited.  
4

5 FASANO: The heater drain system apparently there was one pump out at  
6 the time? Yes?  
7

8 CRONEBERGER: Yes.  
9

10 FASANO: Also on your condensate pumps, condensate booster pumps, in  
11 general there is a automatic manual switch and apparently its usually  
12 on just manual. Are you knowledgeable of this. Do you have any idea  
13 on the reason.  
14

15 CRONEBERGER: No, I do not.  
16

17 FASANO: How did...just, you had someone looking into the air, apparently  
18 the instrument air was being subsidized by the service air, by a  
19 crossover valve? Just for information were you knowledgeable of this  
20 lack of capacity and would this be a concern of your group?  
21

22 CRONEBERGER: It is a concern of my group, I do not recall having been  
23 aware of that until after this incident.  
24  
25



1 FASANO: Did you ever get results as to the initiation of the condensate  
2 pump trip, the cause of it?  
3

4 CRONEBERGER: The study is not complete on that yet but I am... the  
5 tentative conclusions are that the water having entered the instrument  
6 air system did precipitate the condensate pump trip. But as I said,  
7 that is a tentative conclusion. The study is currently underway.  
8

9 FASANO: This would mean that somehow you had water get into the  
10 instrument air which then caused the decrease in air or lack of air,  
11 valve closure on the the Condensate Polishers?  
12

13 CRONEBERGER: Yes.  
14

15 FASANO: ...which then blocked the outflow of your condensate pump.  
16 Is that correct?  
17

18 CRONEBERGER: Yes.  
19

20 FASANO: My understanding is that condensate pump should be, should  
21 continue to operate. It should not... I was wondering if you knew why  
22 it would trip... I mean even under that sequence of events?  
23

24 CRONEBERGER: Under that sequence of events the condensate booster  
25 pump would trip.

1 FASANO: Booster?  
2

3 CRONEBERGER: Yes.  
4

5 FASANO: But the condensate pump was the one I think that was on the  
6 printout?  
7

8 CRONEBERGER: That's correct. We were trying to investigate why a  
9 condensate pump might trip as a result of the booster pump trip.  
10

11 FASANO: This gets back to the AMS switch.  
12

13 CRONEBERGER: Yes.  
14

15 FASANO: That's inconclusive at this time? You don't really have a...  
16

17 CRONEBERGER: One of the engineers is deeply involved with that investigation  
18 right now and his conclusions are tentative, yes.  
19

20 FASANO: As far as the getting of water into the instrument air, would  
21 this have to travel through the service air line?  
22

23 CRONEBERGER: Yes.  
24  
25

1 FASANO: Cross the bypass, actually across a check valve and then  
2 through the dryers, then continue on to the instrument air tank?  
3

4 CRONEBERGER: Yes  
5

6 FASANO: That's quite a tortuous path.  
7

8 CRONEBERGER: Yes.  
9

10 FASANO: Do...in the design function, do you evaluate concerns or  
11 information gathered at other plants similar to TMI 2 or do you specifically  
12 look at just TMI 2 and its design considerations? In particular such  
13 plants as Davis-Besse, other B&W plants, I guess is one, where they  
14 had a similar problem with their... well they might have a similar  
15 problem with their main steam relief valve?  
16

17 CRONEBERGER: My general experience since I've been here is that  
18 personnel within our licensing is screening information that's documented  
19 relative to other plants and my involvement would be limited to responding  
20 to items which they would identify as being potentially relevant to  
21 one of our units such as TMI.  
22

23 FASANO: Okay. At this point I...based on the experience that you  
24 have with this occurrence and again you're here, you're relatively new  
25 to GPU apparently? I would like you to take this time, if you like,

1 to make any kind of self retrospect or the future planning. How that  
2 we have had this experience or possible involvement may be more timely  
3 or more helpful not only here but to other utilities operating with  
4 nuclear power plants.  
5

6 CRONEBERGER: I would simply at my remarks to indicate that our ability  
7 to respond in the beginning was hampered greatly by communications  
8 faults. Simply not being able to understand fully what was happening  
9 at the plant. That's all.  
10

11 FASANO: I gather this would be time response, time data kind of  
12 communication that would be... your suggestion as being more valuable?  
13

14 CRONEBERGER: Yes.  
15

16 FASANO: I have no further questions.  
17

18 MARSH: I have none. So at this time, the time being 10:15 a.m., 625  
19 on the meter we will terminate this tape with just a word of thanks  
20 Mr. Croneberger for coming in.  
21  
22  
23  
24  
25