

TMI DOCUMENTS

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TMI STAFF INTERVIEW

Hugh McGovern 0730 Hrs. May 4, 1979

Conducted By: E. F. O'Connor, L. Kripps, B. Center

O'CONNOR: Hugh, would you briefly tell us what your position is here at TMI and when you arrived on site on March 28?

MCGOVERN: I am a Control Room Operator on Unit 2 and I arrived on site about 6:45, I arrived in the Unit 2 Control Room about 6:55.

O'CONNOR: Were you scheduled to relieve the watch at 7 o'clock?

MCGOVERN: No, I was scheduled to be on the relief shift.

O'CONNOR: Can you describe briefly for us what was going on in the control room when you arrived there at 6:55.

MCGOVERN: After I arrived on site as I was going between Unit 1 and Unit 2, I heard the site emergency being passed over the page system. When I got up to the control room, everybody was busy carrying out their duties and alarms were going off. I walked over to the area of the secondary plant and started helping out there. As I recall, the problem at that time was with gland steam and vacuum. It was pretty hectic for awhile.

O'CONNOR: You were involved mostly with the secondary plant?

MCGOVERN: That's where I started out. Lynn Wright was at the secondary plant and I was helping him, then I walked around to the back panels and did what I could. Ed Fredrick asked me to remain behind the panels so that I could operate various valves and switches. I stayed behind the panel most of the time.

O'CONNOR: How did they give you your instructions when you were back there?

MCGOVERN: instructions were given verbally over the panel.

O'CONNOR: Did you get involved at all on the primary side of the plant?

MCGOVERN: Yes, I did. I carried out several functions. I stopped the spent fuel pump and isolated BWST recirc. I was also reading the high pressure injection flow rates on the back panels. The position of the valves are controlled from the front panel, but the flow rate is indicated on the rear panel. We were throttling for 250 gpm.

O'CONNOR: Is that flow recorded?

MCGOVERN: No, it is not recorded.

O'CONNOR: Does it indicate the combined flow rate through all the "16" valves?

MCGOVERN: No, there are four indicators, one for each line, and we were trying to maintain 250 gpm through each line, which is the accepted procedure following ES actuation.

O'CONNOR: Were you trying to maintain that flow rate throughout most of the morning?

MCGOVERN: I don't recall. You're asking me to remember things that happened a month ago. I do remember that several times we isolated one of the makeup pumps and when that happened, we isolated the injection valves on that side, which again is an accepted procedure.

O'CONNOR: In general, do you remember what the approach was for using the HP injection system?

MCGOVERN: In general, they were watching level and pressure. They were probably trying to keep the pressurizer from going solid and they were watching RCS pressure. As far as specifics, I don't really know because I was at the rear panel.

O'CONNOR: How about letdown, how were they operating that system?

MCGOVERN: I really couldn't tell you, after the reactor tripped they shut MUV376 which is the letdown isolation valve, that is the accepted thing to do on a trip, however, I cannot vouch that they did that. So there probably would not have been any letdown flow.

O'CONNOR: What was the general plan of attack to get a reactor coolant pump started?

MCGOVERN: I think they were trying to maintain pressure in a band which would allow them to operate reactor coolant pumps. I can't even remember when they shut them off or if they were off when I came in. Being behind the panels, I had some difficulty understanding the big picture. I was only involved with isolated tasks, for example, operating the makeup system, watching this indicator and that, or operating valves. The guys who were on shift and who were involved with the accident knew what they had to do and they were asking me to assist them. I really walked into this thing blind.

O'CONNOR: At seven o'clock when the relieving shift came on did they take over the watch?

MCGOVERN: No, Zewe's crew maintained the watch. The relieving watch just helped out where they could.

O'CONNOR: So you were primarily taking your directions from Zewe's crew?

MCGOVERN: Yes.

O'CONNOR: How would you characterize the mood in the control room?

MCGOVERN: Hectic. Anytime you have an accident of any nature, things happen fast. It's a moment-to-moment thing, when something happens you make the correct moves to counteract it.

O'CONNOR: Was it still that way three hours after the initial trip?

MCGOVERN: Yes, most of the day. The supervisors got together in the office around 10 or 11 o'clock and they started to collect their ideas and formulated a general plan of attack. Before that time, we seemed to be just reacting to one occurrence at a time.

O'CONNOR: Did you participate at all in carrying out the emergency plan?

228 351

MCGOVERN: No, when I got on site, the onsite emergency had already been declared and after some time they had enough help without me. I did not get involved with the E S or any of the calculations. I was mostly involved with the panels. However, about 4 or 5 o'clock when Fred Scheinmann, Bill Zewe, Ed Fredrick, and Craig Faust were relieved, I did become involved with front panel operations. Both TH's were both pegged high. We knew we had bubbles in the hotlegs and we were using HP injection to try to work them out. We did manage to break down the bubble in the A side.

O'CONNOR: Could you explain the flow path and how HP injection was able to break up the bubble?

MCGOVERN: HP injection goes into the suction of the reactor coolant pumps in both loops. We were injecting into the A side and the flow was going into the cold legs, through the reactor coolant pumps, through the core and into the hotlegs thereby allowing us to condense the steam into the hotlegs. After continuing that, for quite some time, we finally saw our hotleg temperature drop off and we thought we were moving the bubble through. We also saw indications on the pressurizer; pressurizer level came back on scale, as we were collapsing the bubble in the hotleg. The volume was shrinking and pressurizer level came back on scale.

O'CONNOR: While you were doing that, were you using just one makeup pump or two?

MCGOVERN: Just one. And as I recall, the injection valves were throttled to about 200 gpm each.

O'CONNOR: You were putting in about 400 gpm; were you taking out an equivalent amount?

MCGOVERN: At that time, I believe they were still popping the electromatic relief valve to the RC drain tank.

O'CONNOR: I'm curious, why weren't you using the letdown line?

MCGOVERN: They probably were, I'm having difficulty remembering what happened over a month ago.

O'CONNOR: How much flow will the letdown line handle?

MCGOVERN: 150 gpm.

O'CONNOR: You were putting in 400 gpm with the high pressure injection system and only taking out a maximum of 150 gpm with the letdown system, so you had to use the electromatic relief valve to take out the difference.

MCGOVERN: I think that was the criteria we were going by.

O'CONNOR: Do you recall what time that approach was being taken?

MCGOVERN: Five or six o'clock in the evening. I think the notes that I dictated to Bubba Marshall the morning of March 29 are a lot more detailed than what I can remember now. It was a good idea taking those notes down at that time because the events were still fresh in my mind.

O'CONNOR: Were those notes taken in lieu of a log since a log was not kept during the accident.

MCGOVERN: Yes, basically Marshall pulled us aside one by one and took a transcript down. It was about 3 o'clock in the morning when he did mine.

KRIPPS: Regarding the reactor coolant drain tank did you turn on the leakage coolant pumps?

MCGOVERN: Yes, we tried to cool the drain tank which was very hot. I think it was in the neighborhood of 200°. It was obvious that the drain tank had flashed, and the rupture disk had blown.

KRIPPS: Are the leakage coolers normally operated there?

MCGOVERN: On an ES signal the suction for the pumps close off. The pumps had to be restarted several times.

KRIPPS: Are you talking about the isolation valves on the...decay heat coolers.

MCGOVERN: DC-V-103

KRIPPS: I guess it's not clear if you are talking about...the isolation going out...

MCGOVERN: ... It's the decay heat to the leakage closed system.

KRIPPS: You were unisolating those valves? You say that those things isolate not only on the building isolation but also on the...

MCGOVERN: I think it's just on the building isolation. There were just two building isolations.

KRIPPS: Did you get any response when you turned those leakage coolant pumps on?

MCGOVERN: Yes, the pumps would run but the discharge pressure was not normal. It was obvious that the pump suction were flashing. So we tried bumping them one at a time to avoid overheating them but at the same time getting some flow.

KRIPPS: What is the normal way of transferring water out of the reactor coolant drain tank?

MCGOVERN: The leakage coolant pumps recirc the RC drain tank. There is a tap off line that goes through WDLV1118 which has job valve control, and then it is discharged into the RC bleed tanks in the auxiliary building.

KRIPPS: Was that line up shut at the time?

MCGOVERN: Pumping the RC drain tank is a manual operation, it is not done automatically. You have to go back and physically do it. The pumps run continuously recirculating the tank. The valve must be opened manually.

KRIPPS: So you have to physically open a valve? To the best of your knowledge, was that ever done?

MCGOVERN: No it wasn't.

KRIPPS: The flow chart recorder which records flow through that line has some spurious indications on it. After 8 o'clock there are all sorts of spurious signals early on that recorder and one would believe that there was flow going through that line.

MCGOVERN: To the best of my knowledge, that tank was never pumped down.

KRIPPS: In the notes, that you dictated to Bubba Marshall, you indicated that you were involved with isolating the B steam generator around 8 o'clock or 8:30.

MCGOVERN: As I mentioned before, I was behind the panel and the valves that I isolated were MSV 4B, 7B, 15B, the tap off for the main steam header and tap off for the bypass valves.

KRIPPS: The alarm printer indicates a ten or 15 minute time lapse between the time you shut 4B and 7B and the time you shut 15B.

MCGOVERN: Shutting 15B was an afterthought but I didn't think the delay was 10 or 15 minutes. The 4B and 7B valve was shut immediately and it seemed like the 15B valve was shut shortly thereafter.

KRIPPS: What about the feedwater side of the steam generator?

MCGOVERN: That's all on the front part of the panel, I was in the rear.

KRIPPS: What would you normally do in that?

MCGOVERN: It would have been isolated at the same time, as far as I know.

KRIPPS: During the day, there were two reactor building isolations on at about 0800 and one when you get the spike, once you get a building isolation is it normal procedure to check the indications and see if all the valves that should have shut were shut?

MCGOVERN: Yes, there is and both times we had that we made up a list of everything that went into the isolation position. It was a list of everything that did not close.

KRIPPS: Did you reopen anything after that?

MCGOVERN: Yes. Nuclear Services to the reactor coolant pump intermediate closed cooling water to the CRD's, and probably others which I don't recall.

KRIPPS: Would there have been any reason to reopen the reactor building sump pump line or any of the ventilation lines out of the reactor building?

MCGOVERN: Not only was there no reason to do it, they were not reopened. Certain lines were open for specific purposes for example cooling water to the reactor coolant pumps, cooling water to the control rod drives...

KRIPPS: I'm just trying to define which one of those would have been reopened. Although your indicating that some of these things did not isolate.

MCGOVERN: Before we go to far on that.... I don't remember any specifics, but there

wasn't anything major that didn't isolate. I think one of the things was one of the Control Bldg chillers didn't start but there wasn't a large hole through the reactor building.

KRIPPS: We could limit our investigation quite a bit if we could assume that the isolation valve was shut at 8 o'clock and that pathway was never reopened. So that's a good clue to us as far as trying to designate leakage paths.

Regarding the reactor building purge system, the strip chart shows some very low scale indications of flow. It could be just thermal currents but initially there was nothing and somewhere between 6 AM and 8 AM there are some little spurious signals like something was going on, could someone have been playing with the dampers.

MCGOVERN: At no time did anybody go back there and play with the purge dampers, especially under a LOCA condition.

CENTER: Part of this time was before there were any radiation alarms. Do you think anyone was playing with those dampers before the alarms came in?

MCGOVERN: I only came in after there were radiation alarms so I would not know. But I can't imagine anyone...

KRIPPS: Shortly after the initiation of the accident wasn't there, some discussion of making preparations for a reactor building entry? Would it have been normal to start up the purge system in preparation for building entry?

MCGOVERN: No absolutely not. You don't use the purge system even for a routine entry. First, you would take a reactor building sample and after an analysis is performed, you get permission; there is ten tons of paper work that you must process first before you open those valves.

KRIPPS: Were you at anytime involved with changing the ventilating system line up or controlling the fans?

MCGOVERN: Yes, I was. I remember one time I started the exhaust fans for the auxiliary building and the fuel handling building.

CENTER: Could you shed any light on when the building ventilation systems were turned off and on and when control room personnel were required to put on or take off respirators.

MCGOVERN: No, I really don't have a good feeling for times. No, as I said before, the only thing that I remember is starting the exhaust fans for the auxiliary building and the fuel handling buildings. As far as correlating that with the wearing of respirators, my memory fails me. All I remember is that we were wearing respirators most of the day.

KRIPPS: What does it take to start an exhaust fan? Did you have to override any interlocks?

MCGOVERN: No. The exhaust fans used to be interlocked. The radiation monitors stopped all the fans in the building it was associated with but that has been done away with. Now the exhaust fans continue to run after a radiation alarm, the

supply fans trip. I'm not sure why the exhaust fans were off unless somebody manually shut them down.

KRIPPS: Do those fans occasionally trip on overload?

MCGOVERN: Yes, the fuel handling building especially on thermal overload.

KRIPPS: But you don't remember going back and restarting them at one time.

MCGOVERN: It looked like they were turned on or off, or somebody was playing with them quite a bit that morning.

KRIPPS: You remember being in respirators most of the day in the control room.

MCGOVERN: Yes, almost continuously from about 1000 hrs.

KRIPPS: Were people trying to play with the control room ventilation system? When you went to turn it on did it stay on the first time? If you believe the designers, you folks should have had a pressurized control room and shouldn't have been bothered at all by radiation. Was the control room ventilation on total recirculation?

MCGOVERN: No, the way the system is designed, it draws 1500 cfm from the outside.

KRIPPS: Would you attribute the fact that the control room was not pressurized to there being a whole lot of people there going in and out of the doors, and thereby defeating the pressurization system?

MCGOVERN: Yes, we were hardpressed to keep the control room under a positive pressure.

CENTER: In the notes that you dictated to Eubba Marshall, you indicated that HPR227 was isolated and the time was given as approximately 1100 hours on the 28th. Is that your best recollection of time?

MCGOVERN: If that's what I gave him at the time that was probably as best as I can remember. I did isolate it.

KRIPPS: That seems strange, the reactor building isolation signal first came in at about 8 AM. Why would the monitor have been running at 11 o'clock?

MCGOVERN: I don't know if someone restarted it or not.

KRIPPS: Did someone ask you to shut down the radiation monitor?

MCGOVERN: I don't recall.

CENTER: When you went to the monitor control switch, the indication was that it was running?

MCGOVERN: Yes.

KRIPPS: Did motor controls center 2A and 42A trip when you were there?

MCGOVERN: Yes, and I can give you the exact time, it was exactly when we had the reactor building pressure spike. At the time I don't think anybody thought it was an explosion. We thought that we just lost a bus. The buses that you mentioned are located on the 328 ft. level. We lost the transfer pumps, the oil pumps for the reactor coolant pumps, and various other loads. At the time we thought the spike on the recorder was an electrical spike and not an actual pressure spike.

KRIPPS: When was that motor control center reenergized? One of the other operators that we interviewed indicated that it wasn't reenergized until the following day.

MCGOVERN: That's what was done. There is no way to do it outside the auxiliary building, and at the time the radiation levels in the auxiliary building were extremely high. Besides reenergizing the buses, they stripped all the loads off them, and then they reshut only individual breakers for essential loads. We were afraid that we may lose the entire bus again if a particular component were grounded out.

KRIPPS: One of the loads we're particularly interested in is the rad waste pump sealing water system. One of the things that people have postulated is that with loss of sealing water you could get back flow from the bleed tanks through the pump seals and into the auxiliary building.

MCGOVERN: Yes, that is one of the things that we were thinking about. When I was here during the mid-shift on March 29, that's one of the things they did reenergize.

KRIPPS: From your knowledge of that system, is it possible that the tanks could drain through the pump seals?

MCGOVERN: Each pump has two seals. The inner seal is cooled by the process fluids, and so it is quite possible that water could have leaked out of the other seal.

KRIPPS: Would the seals have degraded if they were run without sealing water?

MCGOVERN: The outer seals could have, but the inner seals as I said before are lubricated by the fluid it is pumping.

KRIPPS: If you lost the bus and lost the sealing water system you also should have lost power to the transfer pumps, however, I know there is a notation in the log that they were pumping the D neutralizer tank to Unit 1. Is that pump powered off the same bus as the sealing water pumps?

MCGOVERN: I really couldn't tell you. They may have energized the neutralizer tank pump by that time but not the sealing water pumps.

KRIPPS: One of the obvious leakage paths out of the reactor building is the letdown system. Has there been any history of excessive seal leakage through the makeup pumps?

MCGOVERN: No, that system has been pretty tight.

KRIPPS: The next evening just about the time you were coming back on shift they lost the letdown system. What did they do to try to restore that?

MCGOVERN: Are you concerned about the letdown relief valve? That has had a history of popping. The downstream isolation valves are sometimes shut and the pressure builds up in the line and lifts the relief valve.

KRIPPS: Is this the one that is just downstream of the blocking orifice?

MCGOVERN: Yes.

KRIPPS: Do you know if that relief valve discharge is piped to the bleed tank?

MCGOVERN: I personally don't know that to be a fact. Until I became a control room operator in January of last year, I was an auxiliary operator. I consider myself fairly familiar with the makeup system. Up until that time, the relief valve was not piped to the bleed tank.

KRIPPS: The B&R piping diagram shows it discharging into the bleed tank. As a matter of fact, Bubba Marshall said the same thing that you said.

MCGOVERN: When I was an auxiliary operator, I remember that that valve used to lift on the floor, perhaps they've installed the piping since that time.

KRIPPS: That relief valve is the most obvious source of leakage because it is only set at 80 psi. But what about the ones that are just downstream of the demineralizers? Their set points are higher (in the neighborhood of 130-150 psi's) but according to the drawings, they just feed lift to the pump drains. Could a combination of bypassing of the demineralizers (which apparently they did at one time) and not bypassing the filter which is just downstream of the demineralizers, have built up pressure to the point where the relief valves lifted?

MCGOVERN: I don't really know if they bypassed the demineralizers or not.

KRIPPS: Do you have any feeling for the maximum pressures they saw in that line?

MCGOVERN: I can't visualize a letdown pressure gauge, I don't know.

KRIPPS: When you came back on shift, the morning of the 29th, were you folks venting the makeup tank, through MUV13?

MCGOVERN: Yes, they were. We were having a problem with letdown flow. Pressure in the makeup tank was getting up to around 70 psi. which is far greater than normal. Normally it's around 24, 25 psi. I believe they were venting it off to lower the pressure in the makeup tank and it gave us letdown flow.

CENTER: There are many notations of the makeup tank being vented. The first notation in the log is at 0435 [March 29] but we're trying to look for an earlier time when the tank may have been vented. Does MUV13 have a history of being leaky?

MCGOVERN: We really suspected that. It is an air-operated diaphragm valve and diaphragms do tend to leak. Before this incident, I had never heard anybody say that MUV13 leaks, but there appears to be a correlation between when that valve was pressurized to 70 psi and the releases from the auxiliary building.

KRIPPS: Regarding the waste gas system, which was receiving a lot of gaseous activity at that time, do you have any knowledge of that system not being very tight or not operating properly? Someone has postulated that a slug of water entered the waste gas vent header from the reactor coolant drain tank when it was first pressurized.

MCGOVERN: No, not to my knowledge. I haven't heard any complaints with that system.

O'CONNOR: Would you have any objections if we made a copy of this tape and gave it to the NRC? We will also make a copy of the tape and any transcript for your own personal file.

MCGOVERN: No. The only thing is that I wish you guys would have done this a long time ago while the facts were still fresh in my mind.

O'CONNOR: Thank you very much, Hugh.

Reviewed By: *Hugh McGovern*
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228 359