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COUNSEL

December 5, 1979

\*NOT ADMITTED IN D.C.

George Frampton, Esquire  
NRC/TMI Special Inquiry Group  
Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear George:

In response to the request of John F. Dienelt during the deposition of Sydney W. Porter, Jr. on October 5, 1979, enclosed is a transcript of Mr. Porter's tape recordings previously provided to the NRC Office of Inspection and Enforcement investigators.

Sincerely,

Matias F. Travieso-Diaz

JFW:rt

Enclosure

cc: J. F. Dienelt, Esquire (w/o encl)  
S. W. Porter, Jr. (w/o encl)  
D. A. Ridgway, Esquire (w/o encl)

POOR ORIGINAL

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Item 300  
Provided 7/19/79  
Acquired by Eng. Kylan

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Item 300 X  
provided 7/19/79  
Requested by Jim Ayden

As early as 2:00 or 3:00 AM in the morning the TMI Unit #2 Operations Staff knew that there were some problems with the plant. Between 2 AM and 6:40 AM in the morning, the situation steadily deteriorated, finally resulting in the uncontrolled release of noble gases from the Unit 2 Auxiliary Building vent, which was released out via the main vent of Unit 2.

At approximately 8 AM in the morning I was called by Michael Buring, who is the corporate health physicist located at Metropolitan Edison Headquarters in Reading, PA. Mike asked me to make preparations to expand the off-site radiological environmental monitoring program. ..(indistinguishable) recall the expanded regime.\* Early the next morning I increased the expanded regime into the present emergency sampling regime, which essentially monitors air iodines, and milks and water at all downstream drinking water intakes on a daily basis. I talked several times during the morning of March 28 to Mike Buring, gave him the answers to several specific questions that he asked, and then called him about 11:30 AM and asked if they specifically needed my services at Three Mile Island plant. He said that as far as he knew they did not need my services.  
XX

Then at about 11:30 I called and when I was told that my services as far as he knew were not necessary, I asked permission to go to the Salem Nuclear Generating Station to meet three or four people who had flown all the way from Canberra Industries in Connecticut to meet me at Salem and were down there waiting for me. I then drove to Salem, which takes about an hour and three-quarters. When I arrived at Salem there was a note waiting for me saying that I should go immediately to Three Mile Island Nuclear Plant. The telephone call came from Jim Seelinger, who is the Unit 2 Superintendent at Three Mile Island. I called Jim and talked to him and he requested that I take a helicopter and get there within a half hour. Unfortunately, his request came just after the two helicopters that were at Salem Nuclear Generating Station had already left to go back to Newark. I decided that I could be much more useful to them if I had the flexibility of an automobile so I drove which took me approximately 3 hours. I arrived at Three Mile Island Nuclear Station in the neighborhood of 7:00 PM. I had arranged when I was at Salem to have 150 respirators with about 500 iodine cartridges sent up by Salem Nuclear Generating truck to Three Mile Island plant. I also arranged to have James Gueller, the Supervisor of Health Physics at Salem Nuclear Generating Station and three of his best men come up in the Salem emergency van and bring with them complete monitoring equipment which includes calibrated survey meters for each person, an air sampling pump, and a dual channel analyzer for the analysis of iodine in air in the field. ~~imm~~

Immediately upon arriving at Three Mile Island, I ~~XX~~ quickly found out that the two top health physicists, Dick DuBiel, who is head of the department, and Tom Mulavey, who is ~~in~~ in charge of the #2 plant, were both completely dedicated to the Unit 2 plant and did not have any time at all to think about a) the problems of #1 plant, or b) any of the people or equipment that were needed to help handle the emergency. These two fellows were under extreme pressure in Unit 2 Control Room to follow very carefully and exclusively the condition of the plant and to help respond to all problems in attempt to put the plant into a safe condition.

With these two key people out of the operating organization and for many hours at a time out of contact with anybody offsite, it was very important that I try to fill the ~~breach~~ breach ~~and~~ until we could get together an organization which could cope with all t

\*Michael Buring asked me not to leave the office but to be ready to go to Three Mile Island on a moment's notice. I of course complied with this request.

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problems and with all the support that was needed. We faced a number of severe problems on the first two days. The first problem was that there was high levels of noble gases and we suspected that there possibly may be also radiohalogens that were escaping from the Unit 2 vent. These were producing high radiation fields on site, as high as 200 or 300 mR per hour around the warehouse at times. There was a very low wind speed, the noble gases were being taken into the plant vent of both units 1 and 2 and we had the condition where we were just dumping out noble gases and then pulling them back in our plant intake vents - plant air intakes, and essentially contaminating our plant with our own discharge. There was also probably some low level leaks from the Aux. Building out into the turbine building and from one turbine building in Unit 2 to turbine building in unit 1. I am not sure about this latter pathway, but it is suspected of having been present.

When I arrived, all of the normal health physics staff were in a state of near exhaustion. They were very tired, they were having difficulty - some of them making good decisions, and they just needed help, so that they could think more about the problems that they were specifically assigned to.

One of the first things I did was to take the Salem people who arrived about a half hour after I did, and to put them out in one of the four emergency teams which were outside the building, usually three offsite and one onsite.

It is now the 8th of April and we have had a minimum of three emergency teams monitoring outside of the TMI plant on and offsite around the clock with no stop for all these days since the 28th when I arrived. One of the first things that I did was to try to make arrangement to have replacement people for these teams. I called Bill Allen at Pennsylvania Power & Light ~~xxxxxx~~ Susquehanna Station located in Berwick, PA and asked Bill to come down with four to six of his best people which he did. The next thing I did was to establish a protocol for a routine series of measurements that needed to be made the on and offsite teams so that there was a little bit of order in priority for which samples they should take when. After that - and this was all happening on the 28th - and it ran into the 29th, I didn't go to bed for about 52 to 55 hours at that point. The next item was to start sampling air. When I arrived at Unit 1 Control Room everyone in the Control Room was on respirators, which is very, very difficult for these people try to assess the situation, run the offsite monitoring teams, watch the effluent discharge and act as the emergency command center. I got air samples taken and evaluated which was later to become a great problem in the Lithium drifted Germanium detector evaluation of samples, I might add.

After we went through several cycles of on-respirator, off-respirator, I set up a SAM-2 dual channel analyzer system in the Control Room and whenever the background would go up quite high because of noble gases, we would run an air sample and count the air sample right there on the Sam-2 and on the results of that we would release people from respirators and then we would send the charcoal over to the GeLi detector to get it counted and verify the fact that the Sam-2 analysis was correct.

One of the early technical problems that we had was the fact that the noble gas levels were so high in the charcoals ~~xxxxxxx~~ and gave so much dead time to the Sam-2 counting system that the Sam-2 counting system essentially was giving false positive information the amount of iodine in the air. I did devise a way to check to see if this was the case but there was no time to train each and every one of the monitoring teams which were run for 12 hours, each monitoring team was out for 12 and off for 12, and so because of this I decided that except in cases of very unusual circumstances we would have all the charcoal brought back and counted. We got a helicopter to ferry over people to the westshore for

monitoring teams on the westshore of the Susquehanna River and to bring these air samples back for counting at the station's gamma spectroscopy laboratory.

One of the big problems was that the noble gases in the unit 1 building were so high that they essentially wiped out the ability of the station's lithium drifted germanium to count the air samples. Probably more than 90% of the time in this system was useless during the first couple of days.

I sat down after having been there three or four hours and made a list of things that had to be done in order to be able to continue to make an analysis of both the plant conditions and environmental conditions. It was immediately obvious that the GeLi system within the plant had to be moved outside of the plant. It was also obvious that there had to be additional lithium drifted germanium gamma spectroscopy systems bought in from the outside and set up. Since we had both electricity and communications at the observation center, which came to be known later, by the way, as Trailer City. At last count it looked to me like there were at least 30 trailers there - it was obvious that this was where the counting system should go. ~~It was about 8:00 PM of the March 28th~~

In view of the events in the first week and a half of the Three Mile Island Nuclear Power Station incident which began on March 28, 1979 in Unit #2 plant. The date today is the 8th of April and this is my first break, by the way, from the strenuous routine of trying to render all these systems that I possibly can during this emergency period. I might add I have averaged about four hours sleep a night as I arrived many nights not getting any at all. Talking about some decisions which I made approximately at 8 p.m. which is only about an hour after I arrived at the Three Mile Island Station. After getting things squared away, getting reliefs for the on and off-site monitoring team, setting up the sampling machine and trying to find out about sample-taking, I called RMC on their emergency line and requested that they have their whole body counter set up the next day at 6:30 a.m. so that the oncoming shift at 7 could be counted and that some of the people leaving that had extremely high exposures could also be whole body counted. I also requested that the emergency van which had been designed for all types of emergency monitoring be set up with a Lithium drifted Germanium detector and that this be also delivered the next morning at the Three Mile Island site. RMC and its usually poorly-run fashion jerked around in great confusion and didn't give much response at all. We got a call about 6 a.m. the next morning or so from Fred Rocco saying that at 8 a.m. the whole body counter would be there and at 10 a.m. that the counting system would be there. After talking to him and seeing who he planned to man it with, it was obvious that Rocco was really not capable of making the decisions which needed to be made as to who should man this thing so I insisted very strongly that if anybody from RMC was going to arrive on the scene that Frazer Bronson was going to be <sup>the one</sup> ~~on~~. It was obvious that he did not have people of proper technical quality - ~~he~~ didn't know Rocco it, ~~but~~ it was obvious to me that there was nobody of proper technical quality to be able to count samples for gamma emitters in the presence of high, changing background fields which you get from a noble gas plume. This is a very difficult thing to do and you have to have somebody that is extremely capable to be able to handle these kinds of changing background conditions. Thus, I insisted that Frazer Bronson be there and he did come up. Amazingly enough, Frazer arrived just about 2 in the afternoon of the 29th and the ~~van~~ <sup>van</sup> still wasn't there. Rocco blew it again! and apparently Kim blew it on the whole body counter because the whole body counter didn't start counting until late in the afternoon because the jerks locked themselves out of the thing and couldn't start it and there were all kinds of

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The 29th of March I had the filters removed from the stack vent installed PM Radiation Monitoring System HPR 219 from the auxiliary vent RMS Channel HPR 228. Both of these monitors read after the massive filter bank that has been so effective in ~~knock~~ <sup>knock</sup> out the halogens. I set up a regime for counting these two filters and later on suspected ~~the/possible~~ possibly something was that

coming from the fuel handling building so I started a regime about three or four days later of maybe four or five days later of counting HPR 221 B which is after the fuel handling building massive filters. All of these charcoals have been counted with the exception of two or three of them that were so poorly mislabelled that we don't know how to figure out when they were on and when they were off the system with the exception of one of them - a very critical HPR 219 charcoal filter - that was lost. Because of the loss and because of the near loss of two or three others, it was obvious that something had to be done with sample coordination, that is, getting the sample from the plant site to a staging area and from the staging area out to the counting laboratory. Since there are correct a

four GeLi Detectors, two on-site and two off-site, this is/fairly complicated thing to do. It is further complicated by the fact that the charcoal was taken from HPR 219 sometimes read as much as close to 100 Mr/hr gamma on contact. It is difficult to take activities that are this high off-site. Ever since I was looking for high sensitivity for Iodine 131, and the V&W and TMI counters were off and knocked out with an extremely large noble gas plume, it was necessary to take them off-site most of the time. I preferred to have them go to RMC for counting all the time, however, this message just never got carried out especially in the early morning hours. Even so, I was there and trying to follow. It is very difficult to follow all the actions all the time. Because of all these problems, I set up a sample coordinating system and got Jim Roy to come in and be my assistant and to follow this sample coordination system. It required having coordinating efforts of about four to six people per shift and then became more complicated when things moved from two shifts to three shifts a day so we were trying to coordinate eighteen people when you don't work for the companies it is an extremely difficult thing. This problem finally got resolved by having the chief chemist from GPU come in and assign sample coordinators that were very high quality people mostly from his own laboratory thus, he had control of the people and we had high quality people who we could depend on. Hopefully, we won't lose any more samples and will see that they are properly labelled at the time they arrive at the processing center for distribution. The procedure took a long time to write, by the way, the sample coordination procedure and the coordinating of the samples to the labs and the data back to the control rooms. I spent a long time on the first draft. Jim Roy worked on the second draft and Lex ~~Garris~~ <sup>Garris</sup> got into it and put it all together in even better shape and Lex and Jim drew a flow diagram and then we had the whole thing blessed by Charlie Harpman and finally by Dave Roth. We are out of the woods on this one item. I hope I am not repeating myself here. One of the next problems was that of ~~the/State~~ Pennsylvania State ~~PA~~ water quality people calling and saying that they understood that there was some radioactivity in our industrial waste treatment system and that we were to cease and desist dumping this water into the Susquehanna River. That we were told not to release anything into the Susquehanna River. This had a negative effect upon the plant because then all the sumps started backing up. We didn't realize that        did say that they would allow us to dump into the River except that they

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Syd: "It was about 8:00 PM of the March 28th."

Dubiel: "Fairly low concentration stuff and then they ran out of ? waste so they turn over and start processing a ? tank and they put in the high concentration stuff on the top and your recircuit sense is off the bottom and we're not committed to two ? volumes or anything like that."

Syd: "For <sup>recirc.?</sup> research."

Dubiel: "Right - we recirc for - well, I guess we recirc for about a half a tank volume but of course we are recircing all the time we're filling so the only time we ever get to the last stuff, the last couple gallons is in the first six thousand or four or five thousand gallons and we had that happen and what happens is that they take a sample and the low activity . . ."

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...The Three Mile Island incident. The date of today is the 9th of April and I'm dictating what's happened in the previous 12 days. Obviously something had to be done to calm the Pennsylvania Bureau of Water Quality down, and to give them some confidence that we knew what we were doing on the island. It is also obvious that we could not tolerate a negative press release about the dumping of water. The Bureau of Radiological Health has been our friend throughout the whole thing, in that they've been understanding - they've been tough and they have protected the public's interest, however, and they ~~were~~ were going to let us dump but they were going to put out a press release telling everyone about this and notifying the downstream water companies. This would have caused a panic which would have been, in my opinion, would have led to mass hysteria and I believe, so that I made the decision that we would not...under the conditions that the press release was going to go out. This is backed up by Herbein and it turns out that the Governor called and said that ~~there~~ they were not to dump any more water.

Last Tuesday a meeting was set up with the Pennsylvania Bureau of Water Quality, the Pennsylvania Bureau of Radiological Health, the NRC, GPU, I represented Metropolitan Edison. For some strange reason there were a number of people from FDA Bureau of Radiological Health there, which I never understood. Walter Lyon, Chief of the Bureau of Water Quality in Pennsylvania, attended this meeting. He had a number of questions wanting to know where all the discharge pipes were on the Island, and wanting to have a form set up where he would be notified of all the radioactivity leaving the Island, not only from the normal radioactive discharge tanks, but also from the \_\_\_\_\_ waste treatment systems, and the sumps leading to the river. We answered all the questions we could in a two hour meeting on Tuesday and then last Wednesday we had another meeting at 10 AM. Tuesday and Wednesday I had my office in Ardmore to prepare a series of handouts; also bring up maps and Environmental Report and other data that I could be prepared to give an in-depth technical presentation of just what was happening and how we intended to notify the state of all the information it was asking for. Walter Lyons seemed very appreciative of both meetings, especially the second one, and put very much at ease after we set up all the communications. He was briefed on what the radiological environmental monitoring program was doing as far as water sampling was concerned downstream, he was told how he could obtain the information which is being sent

routinely to the PA Bureau of Radiological Health. The outcome of this meeting on Wednesday following, which was a week from the start of the incident, was that the NRC, that is Collins, the PA BRH, Bill Dornsife, Walter Lyons and some of his staff from the PA Bureau of Water Quality,        Potts representing Met Ed and of course, me representing Met Ed, agreed that the data from the, not only from the normal radiological pathways but also from the industrial waste treatment system and industrial waste filter system, would be transmitted on an approximately 4 hour basis to the PA Bureau of Water Quality. It also agreed that the industrial waste treatment system and the industrial <sup>WATER</sup> filter system since they were presently not normally ~~maximized~~ monitored pathways of radioactive materials to the radwaste pit, that these would be monitored every 2 hours. Every 2 hours we are monitoring the IWTS and the IWFS, and calculating the percent of maximum permissible concentration after dilution with the cooling tower blowdown. This is calculated by dividing the industrial waste blowdown flow by the industrial waste pump flow into the blowdown. this dilution factor is applied against the actual IWTS or IWFS concentration of radionuclides. This was done for about the first 12 days of the incident for iodine and then it was agreed that this would be discontinued, since all the iodine-133 has decayed out. It is now presently being done ~~fast~~ very carefully for iodine-131 and has been since the start of the incident. This data is relayed once every 4 to 8 hours from when appropriate to the PA Bureau of Water Quality via the telecopy machine of the PA Bureau of Water Quality which is located up in the PA BRH's office, which is manned around the clock. ...telnet which is open to the Bureau of Radiological Health around the clock is located in TMI Unit 1 Control Room, which is the emergency operations center for this event. Important data is transmitted to the BRH via this telephone hotline and then is reconfirmed on the telecopier with specific data. (Today is early morning, Friday the 13th of April had to stop to fix a flat tire). (I did not transcribe this word for word!!). In case it didn't come through clearly before, as of the 29th of March, my two most important duties were clearly outlined by Jack Herbein to be the following: (and, by the way, also personally reinforced by Bob Arnold): #1 to, on a daily basis if possible, <sup>calculate</sup> ~~rate~~ the radioiodine source release term from the station vent, ~~#2 to~~ #2 to update our analysis of the total gaseous noble gas discharge from the station vent

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via back calculating from TLDs.

We are also getting occasional grab samples and analyzing those. The grab samples are gotten infrequently because the dose associated with grabbing the sample and also because of the fact that they are not really that representative of what's going out the stack on a continuous basis.

#3 job is to continue to follow the liquid discharges and to prepare a summary every other day for Arnold and Herbein on the radionuclides that have been released, the specific activities of the radionuclides, and the percent of maximum permissible concentration in water that leaves the plant. These are done for all release pathways including the IWFS and the IWTs. ...the neutralizer tank.

My #4 job is to resolve the differences in the different lithium drifted germanium detection counting labs or the differences between the different lithium drifted germanium detection counting laboratories.

I have also been working on resolving the differences between the RMC and SAI labs with the NRC labs. It should be noted that the NRC counting laboratory has inferior equipment compared to SAI and RMC, who are both working for Metropolitan Edison right now. I had Charlie Pelletier and Frazier Bronson personally talk to the NRC about the discrepancies in some of the water data. Luckily the water was sent down to the Maryland Department of Radiological Health and was given a third & independent analysis, which backed up the SAI data and showed that some of the NRC data was in fact incorrect. j

My #5 job, which was actually given to my home office, to Dr. Steven Gertz, to perform, is to review the offsite radiological environmental monitoring data and to present a daily summary report which talks about trends rather than actual data. The actual data is transmitted from the Ardmore office of Porter-Gertz Consultants to the Metropolitan Edison Reading headquarters office, where Barbara Beck and other people in Jim Mudge's group assemble the data, give it a very cursory review, and teletype it out to the NRC via Mike Buring in the TLD Trailer in Trailer City. The data is then quickly disseminated to the BRH, the NRC, me, and to any other interested government agencies that know to go over to the NRC trailer to review the data. ... Jack Herbein has made it quite clear that all data is to be disseminated to all parties as quickly as possible, with nothing withheld, and that

Herbein only wants to know about something that is unusual and is liable to get the attention of the press, so that he ~~xx~~ can be informed about it so that he can answer questions about it.

#6 - review the installed unit 2 radiation monitoring system data and attempt to interpret this data. It should be noted that one of the things that I did early on into the accident was to write a radiation work permit request to analyze the background contributions to the iodine channels of the stack discharge monitors, that is HPR 219, HPE 228, and HPR 229. What we did was to remove the iodine cartridge from all three of these monitors and with the pump off, to take a look at the levels, and it turned out that the levels were the same with the cartridge in and the cartridge out, which shows us that it is the ambient background and/or internal contamination of the system, that is giving us these extremely high numbers.

#7 - To perform a preliminary organization of the distribution of samples from the plant to the 4 lithium drifted germanium gamma spectroscopy systems for gamma analysis of each sample. Obvious problem was ~~xxxxxxx~~ the sample distribution program, where the wrong samples were going to the wrong labs, and samples often been cycled without being counted. We had a lot of this in the first few days, and the thing was reorganized several times. Jim Roy spent a great deal of his first 3 or 4 days at TMI working on this problem.

#8 - Assist the Unit 1 Control Room Emergency Director in interpretation of on and off site radiological data, and also I set up a format for the industrial waste treatment and filter systems discharge data and set up the formulas for performing the MPC .....

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... looked at in much more depth and the necessary investigations would be performed and followed very closely by me.

#9 - To follow the offsite environmental sample analysis program results and to advise Herbein and/or his replacement of any unusual results.

#10- To review the overall onsite health physics program for Dick DuBiel and make sure that any special requirements are immediately forwarded to the onsite health physics support group for performance. These special requirements include such things as special surveys for ~~alpha~~ alpha, for tritium, for the increased use of extremeity TLDs, and for making sure that ~~that~~ any significant TLD results are corrected for the Xenon-133 exposure.

#11- The data from the on and ~~off~~ offsite emergency survey teams was reviewed by me very carefully for the first 3 or 4 days, and then much less carefully as the data began to become less and less significant. To review the data, I looked at the data to see: a) whether it seemed reasonable, b) to try to calculate some source terms which was very difficult because of the variation in levels from hour to hour, and c) I took a look at the data to make sure that if anything was very high that we went back and tried to take another sample there to reverify whether or not the situation was continuing and ~~we~~ also to take downwind air samples at significant times. I set up a system where ~~a~~ helicopters took teams over to the west shore of the river and then would ferry back the charcoal cartridges so that they could be counted in one of the GeLi systems so that we could get accurate information about the ... air exposure to <sup>iodine</sup> halogens from TMI releases. We did get some false positive numbers using the SAM-2 kits because of the massive amount of Xe in the cartridges. I analyzed this problem and ~~what-happened-was-that~~ the result of the analysis was that so much Xe-133 on these air cartridges that the small sodium iodide crystals in the Eberline SAM-2 dual channel analyzer portable kits were being swamped by the Xe-133 and giving us false positive readings <sup>up</sup> ~~up~~ in the iodine region. We had all of the readings that we made in the field checked with GeLi detectors and found that there was absolutely no measurable amount of iodine-131 being released even so we thought at first that there was. I did set up ~~the~~ during the second day of the incident, as proced

for checking the dead time of the SAM-2 kits. The problem was that there-wa since we had such a large number of people being rotated through the emergency <sup>study team</sup> monitoring jobs, that it was impossible to train all these people in a new procedure which involved looking at the dead time to make sure that we could use the SAM-2s to begin with for field monitoring of radioiodine in the air. Thus it was necessary just simply to transmit the cartridges after the air sample was taken back to the offsite GeLi detectors at SAI and R for analysis. In looking at two weeks worth of data we saw absolutely no radioiodine in these short term grab samples, all of which were taken downwind in the highest part of plume.

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It's of importance to note that this observation has been reinforced by the fact that the amount of iodine in milk has been extremely low, far, far below the Chinese weapon of about a year to a year and a half ago, and that the iodine in water has been extremely low to negligible, and that the iodine in air has been extremely <sup>low to</sup> negligible, and these long term samples that we're talking about, where we have much more accuracy than the term samples taken by the on and off site emergency survey teams.

~~#12~~ - which is certainly not ~~#12~~ <sup>#13</sup> in priority, just about always #1 in priority, is to handle any bullets given me by Jack Herbein. Now by bullets I mean that Jack is the person that veers in on a problem and immediately wants to assign it to who he believes is the best person to answer the problem and wants you to drop everything to work on it and get an answer or solution back to him as soon as possible. Unfortunately, I seem to get a lot of these bullets, after I had already worked 15 or 20 hours in a day, and so then I just had to keep working until I was able to solve these.

#14 - to stay in contact with the PA BRH, that is Tom Gerusky and Maggie Reilly, in order to make sure that they approve, and thus the Governor of PA approves, of any discharges that we're making either out the stack or out the water-pipe discharge.

#15- to check on the high Cs-137 levels that were reported to be in our sewage that was going off site. Since this sewage <sup>which</sup> was about to be taken in tank cars off site, it was generated many days ago, and the fact that more than likely before the incident even started, I absolutely couldn't understand how we had Cs-137 in the sewage. The indicat

problem was when I took a look at the actual gamma scan done by the B&W GeLi detector system. This GeLi detector is located only several hundred feet from the unit 2 vent. It is in line of sight with it. It turns out that at the time that this analysis was made on the sewerage sample, that there was an extremely high background from Xe-133, and that the statistics of the count were within twice background and that the actual computer fit for the peak search was quite poor. It was obvious again here that the sample should have been taken out either to SAI or RMC for analysis and should not have been performed on site where we have these technical problems right now. I got 3 samples from the same tank where we got the positive Cs-137 sample, (which I didn't believe) and had them counted off site. I don't remember whether it was SAI or RMC that counted them - it was one of the two. These 3 samples from that tank where we had the false positive Cs-137 level showed that there was nothing above ~~xxxx~~ detectable limits in the sewerage at all, and that it was perfectly all right to have it taken off site. This little flap caused the another layer of paperwork for the plant, where the plant was required to sample each tank of sewage, wait for the GeLi detector results to get back, and be relayed to the BRH. At that point we had permission to take the sewage off site from the tank that was sampled. This gives you a slight feel for the morass of paperwork for everything that we have to do at TMI right now during this incident.

#16- Spend a little time reviewing the use of respirators. I noted that there were an awful lot of paper cartridges being used, which is the wrong cartridge for radioiodine, which was the only reason we were using respirators to begin with. If

If I didn't mention before, ~~rx~~ during the first day of the outage I set up the SAM-2 dual channel analyzer portable kits in each of the 2 control rooms so that they could monitor the air samples for radioiodine to give us some relief ~~to~~ from being on respirators in the control rooms. It was extremely difficult to operate a control with everyone in respirators, and so this became a high priority item for a while. Now, of course after the SAM-2 analyzed the air cartridge for radioiodine, the cartridge was sent over to the RMC off site counting laboratory to be reanalyzed for radioiodine to check the results which were obtained with the SAM-2 kit.

See page 2 mentioned before

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#17- Jim ~~XXXXXXXX~~ Seelinger called me and asked me to perform an analysis of the amount of radiiodine which would: a) escape to the sample room and b) escape through the filters to the environment outside of TMI when we were performing our collection of a primary coolant sample. I might add that several days before, Jim asked me to do this. I had given him a five step procedure for collection of the sample which would significantly reduce the exposure to both any one person and the total exposure for collecting these samples. Ed Houser received around 2.9 rem from the collection of the ~~first~~ first primary coolant sample after the incident. The careful analysis of this procedure shows that this exposure should be cut down significantly, and in fact it was. I believe that the five people together received less than 300 millirem for this procedure of collecting this same sample about 4 or 5 days after the first sample was taken. This factor of 10 reduction was performed by using an idea I had to get the lead glass shield which was over at Hershey Medical Center in and pushing this right in front ~~is~~ of the sample sink, so that people had at least the protection factor from the <sup>shield</sup> shield.

Notes

(I want to put these down while my memory ~~is~~ still holds out. With the lack of sleep that I've had over the past 2 weeks - I have had 2 12-hour periods off during this time otherwise I've just simply worked at least 18 hours per day and ~~xxxx~~ slept the rest of the time with no break except for these 2 12-hour periods. The 2 12-hour periods I have received ~~during~~ from the 28th through the 13th of April.)

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We were just about to perform the job of obtaining the second Unit 2 primary coolant sample and NRC Inspection and Enforcement came in and said that they didn't want us to collect the sample, because according to their calculations we were going to exceed the instantaneous ~~xxxx~~ tech spec limit for iodine releases to the airborne environment. This came up at 10:00 the \_\_\_\_\_ of April ~~22~~ 10th, 1979, when I had already worked about 18 hours straight and was headed back to the Howard Johnson motel for some much-needed sleep. I worked till 4 the next morning ~~and~~ in adjudicating the NRC's problems, making sure that everything was going to go smoothly with the sample taking. One of the



~~big~~ big problems was that John Collins wasn't around, and I didn't have anyone from  
his branch that I could get in touch with right away to \_\_\_\_\_ less any iodine re-  
duction factors due to the .....

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... Especially since this procedure looked as if it may have the potential for the release of up to 20 Curies of Iodine-131. This is an extremely conservative number, that I came up with, and the release would not be to the environment where anyone could breathe it - it would be to the water in the sampling rig itself. Then the sampling rig would-fit was fitted out with a series of absolute filters and about 1000 ccs of activated charcoal which was specially set up for removal of both organic and elemental radioiodines. Charlie Pelletier prepared these 2 500 cc charcoal trains and I made sure that the plant had them for this procedure. I talked with John Collins in depth \_\_\_\_\_ the allowable iodine reduction factors in this procedure, and he did agree to what we had discussed and I carefully documented all this. A copy of this analysis and the one from the primary coolant sample taking should be passed-attached to this report along with an awful lot of other documentation.

Misc. Note #3

Tom Mulleavey asked me to go back over the all of the radwaste discharges, or all of the liquid discharges, since the beginning of the incident to make sure that the ones that were in progress when the incident started were in fact properly recorded and that had waste release permits for these. I started on this, saw the enormity of the job, and handed it over to Bev Good. I had some preliminary results that looked fairly good, look like we in fact did have the data that we needed and that it was just a matter of pulling it all together. I haven't talked with Bev Good in the last 3 days, because she was off 2 of the 3, and however, I will soon, and will hopefully pull this together into a report for Tom Mulleavey.

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Misc. Note #4

I should note that Jim Roy, about the 3rd day of the incident, came up from Florida and came in and asked me if he wanted me to have him run a survey meter for the off site emergency teams. I of course said absolutely not, that I needed him to help me perform calculations and to follow, from a professional health physics point of view, many of the operations going on during the incident. And I quickly went to Herbein and got Jim Roy assigned to me full time to help me with this, and he's been a great help. By the way,

Jim is certified by the ABHP and ~~is~~ has a great deal of in-depth knowledge of reactor health physics, and was considered at one time the top health physicist in the US Army health physics program. Three to four days after Jim Roy came on board, I found out the NSS had contacted Gordon ~~kind~~ Liedy at Edgewood Arsenal. Both Gordon and Jim were Colonels in the US Army and the top health physicists during their respective times. Gordon is now retired from the US ARMY and was in the process of moving off of the Edgewood compound and was available for a job such as this. So now I have 2 experienced <sup>physicists</sup> reactor health physicists working for me and they spell each other 12 on and 12 off, approximately. ~~They~~ They're both fine workers and they are working much closer to 18 hours a day than 12 hours a day. j

Misc. Note #5

Jack Thorpe from the GPU office in Parsippany has been given the job of coordinating all health physics consultants. I was asked to report directly to him, of course except the Hebbin and Arnold bulletins. One of the first things that Jack asked me to do was to go to the \_\_\_:30 PM daily NRC HP task force meeting which was at that point held in Trailer City. I did attend one of these, put a fair amount of input into it, and made up a list of action items for Jim and Gordon to follow up on.

Misc. Note #6

The morning of the 13th of April Jack Thorpe came to me and asked me to go with him to meet William Murray, who is the GPU Vice President for Communications. Bill Murray told me that he had the job of gathering data together for the first of the probably many senate committee investigations concerning the TMI unit 2 event. Bill Murray asked me to make up a graph for evidence in the Hart investigation committee probe which lists the following:

1. A list of all the major release times vs data with a short description of each event and try to plot this against the known ~~xxx~~ radioreleases. He said that he was especially interested in iodine levels, so I'm attempting to make up a double bar chart which shows all of this information. It's complicated and ~~is~~ the number of events do not necessarily relate to the amount of radioiodine which was ~~at~~ gone

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complex  
out of the vent. Obviously this is a very complicated mechanism involved and  
it will be interesting to see what the result is.

Misc. Note #7

On the 14th of April we got what's known in Met Ed lingo as a "double-bullet". Both Bob Arnold and Jack Herbein converged on me simultaneously and requested that I give them immediate information concerning iodine releases during the time that the HPR 219, which is the final station vent monitor, had been out of service while they were connecting up the new Everline monitor which will be located outside of the buildings right next to the base of the station vent stack. We proceeded to discuss a short one hour charcoal sample that had been taken on the vent, and then to go with Jim Kline of SAI over to the new Everline monitor and make sure that the charcoal was properly removed using good health procedures that wouldn't contaminate the area, and had it counted immediately and got the report to both Arnold and Herbein. I got another bullet in the middle of that job, which essentially requested me to review a proposal to reduce the emergency monitoring team from 4 to 1. This proposal ~~xxxxx~~ had been forwarded by Les Tsaggaris who felt that we were ~~wasting~~ wasting manpower with these teams. I carefully reviewed Lex's proposal, and saw that we probably were using too much manpower on these jobs. However, I didn't agree with Lex that we should go down to 1 team only. In view of the fact that the ~~xxx~~ radioiodine releases have been steadily increasing over the last 2 or 3 days, I thought that we have at least 2 monitoring teams in the field at all times, preferably one on site and one off site. I also proposed that we have a helicopter available around the clock for logistical support so if the wind changes, the team can be helicoptered over to the west shore, where there will be a truck waiting for them. I wrote out my recommendations, gave them to Herbein, and in time for his 6 PM meeting with Arnold on the 14th. After that I went on up and got the concurrence of both Dick DuBiel, the station supervisor of health physics and chemistry, and also of George Kunder, who is the acting Unit 2 superintendent at the time.

Misc. Note #8

As I was about for what I think is a much deserved rest at home, at about 9:30 in the evening, Sandy Lawyer came over and said that he had to have the calibration

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sensitivities for the new Everline stack vent monitor. I knocked out the calibration sensitivities for the iodine channel and for the noble gas channel, and wrote a short description of what each of the 3 channels was reading and what the <sup>print-out data</sup> printed-matter meant. I also requested, by the way, that the engineering people working on the set-up of this monitor use the available features of this system. By that I meant that programming the iodine channel to read out in c/m integrated over time, or c/m/m. In this way we would be able to monitor the rate of rise integrated by time of the iodine channel and could establish setpoints and alarm ~~set~~points in a meaningful manner. With the microprocessors installed in this fancy new Everline system, one has this capability quite easily, and I think its foolish not to use it.

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Misc. Note #9

I experienced a great deal of difficulty in getting the charcoal filters removed from the stack vent process monitors in a proper manner with all of the data being recorded accurately. As it is, I decided to go in last night on the 13th of April about 11:00 in the evening, and change all 4 stack samples in the Aux Building and Fuel Handling Building. I also decided that as long as I was going to go through the hour to hour and a half preparation of putting on the oxygen breathing apparatus, the two pairs of coveralls, and the plastics on top of them, along with rubber ~~at~~ boots and two pairs of booties and 3 pairs of gloves and 2 hoods, that I should spend enough time in there, that is 2 or 3 bottles of air time, to also perform a preliminary decontamination on one of the iodine samplers to see if I could bring down the extremely high levels of background that we've been seeing on these monitors. This might seem like a rather simple thing to do, but it's extremely awkward and difficult to move with ~~it~~ all of this protective clothing on and wearing the heavy oxygen breathing apparatus with the big bottle of air on your back. It's extremely similar to carrying the very heavy scuba diving equipment that one carries being all ready to jump in the water and then being required not to have the buoyance of the water, but just to simply walk around on land with this whole r on. In any case, I went in, changed the 4 samples which were HPR 223, which is the downstream Aux Bldg vent; HPR-222 which is the upstream Aux Building vent monitor; HPR-221B which is the downstream Fuel Handling Iodine monitor; and HPR-221A which is the downstream

After removing the 4 iodine cartridges from the

from the monitors, I proceeded to decontaminate HPR-228 by spraying the charcoal holder and then the entire inside and the head of the sodium iodide crystal with tri-chloro-ethylene in a spray bomb. After each spraying, I ~~was~~ would wipe it out carefully and I had a bag to put the rags in, and after using up 2 or 3 rags, I would change gloves so that they wouldn't cross-contaminate everything. The results on this decon were very interesting. First of all, the monitor had been reading somewhere around 600,000 c/m. A week ago I performed the experiment of taking the cartridge out, closing up the shield again, and looking at the background, and this didn't change the background - we had the same amount of activity with the cartridge on and the cartridge off. However, I had observed that the ambient background levels had dropped from about 200 to 300 mr/hour all the way down to around 5 to 15 mr/hour. However, with this drop in the ambient background there was no drop in the amount of activity that was ~~showing~~ showing on the iodine process monitor. Thus, I decided that there must be a fair amount of fixed contamination or moveable contamination, that was causing this extremely high reading. The decontamination brought the numbers down from 600,000 c/m all the way down to 20,000 c/m. The numbers stayed at 20,000 c/m for half an hour until the pump was turned ~~off~~ on. Immediately after the pump was turned on the numbers started to rise and it went back up to somewhere between 150,000 to 200,000 c/m in a half an hour. The results are a conclusion ~~is~~ that draw from this decon experience is that there is a great deal of iodine probably plated out on all the sampling lines, and that this iodine is quite mobile. Getting these stack iodine-process monitors back to some kind of normal operations is going to be a long and difficult process.

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Page 20 is billing notes-in invoice file

These notes are dated April 17, 1979, and have to do with items I worked on on Monday the 16th and Tuesday the 17th of April.

I started work at 8:00 in the morning on the 16th of April, working with Gordon Liedy on the gaseous release terms, especially the iodine and also on accumulation of the liquid release data.

In several flaps during the early morning hours of Monday, the 16th, due to a DOE air sample for iodine which had been miscalculated by a factor of, I don't know, some 60 to 100. These people came roaring in, apparently gave the information to the State and also to the Mayor of Middletown, without first a) checking with anyone at ~~the~~ either the site, or checking with the NRC, or b) having anyone even look at that calculation to see if they were correct. It turns out that they made some large arithmetical error and that the whole thing was a paper tiger. However, in the meantime, Tom Gerusky had been ousted out of bed at 1:00 or 2:00 in the morning, Tom of course is the Head of the BRP within DER for PA State. The mayor of Middletown was called in the middle of the night, and apparently everybody got all upset and all ready to take some kind of protective action. At that point, the NRC had checked the calculations of this fellow from DOE and found out that he was all wet and that he had really created a mess on no good data at all. The DOE method is to take a large canister of charcoal to sample through a large canister and then to put this canister in a Marinelli beaker and count it on a GeLi detector in a Marinelli beaker. The problem with this is that no one else, none of the other six lithium drifted germanium detectors, the one NRC and the five that are working for TMI, none of these other 6 are calibrated for counting charcoal on a Marinelli beaker. Therefore, no one can cross-check against DOE for their calibrations. This is poor, and I made a recommendation that DOE be asked to use the same system as the other 5 GeLi detectors use, that is counting the charcoal canister directly, rather than pouring the charcoal in a Marinelli beaker. Even though DOE thinks that they achieve higher sensitivity this way, when one takes the activity which is distributed in the first half centimeter or so of charcoal, and places it right on the detector head itself, and when one takes that and distributes it throughout a whole Marinelli, I'm not so sure that you really gain very much at all by the time you finish this process, and you very well might add

a non-homogenous distribution which means that there is no way in hell that you're going to be calibrated for that.

I gave Dave Lemeroff (?) the series of very specific questions to ask the DOE people about this, and I asked Dave to make sure that he asked these questions in the presence of the NRC, so everybody knew what was going on and everybody knew what our concerns were. I haven't heard back from Dave Lemeroff as to how well he did on this. I kind of wonder if Dave has enough technical knowledge to really be able to properly ask these questions. I wrote them all out for him, so hopefully at least he understood the questions. It's something else again as to whether or not he got satisfactory answers or understood the answers. I will check on the resolution of this question in another week or so to find out what happened.

This whole thing, from the start of this tape, is probably note #10 or #11, I've lost count. [It is actually note #~~10~~<sup>10</sup>, so I will follow the correct sequence - d.k.f.]

Note #11

Early in the morning on the 16th, I got another bullet from Herbein. Jack Herbein called me in and asked that I check on VAR-743, this is the condenser vacuum pump discharge monitor, which is a noble gas monitor essentially. It is set up such that the condenser vacuum pump discharge goes through a sampling panel then through the VAR-743 ion chamber monitor, then through a set of charcoal filters, and from there on out the vent. This VAR-743 is located on the basement level of the Unit 2 Turbine Building. I went down and personally ran through the sample train so that I would understand exactly where the special charcoal samples had been taken, and then I checked on the analysis of the one charcoal sample that I was familiar with and had just been taken off, and found that essentially there was no detectable iodine in that sample. After I got all this together, with the help of the Unit 2 shift supervisor, Joe Swatzik (?), I then gave the data to Jack Herbein. Jack was relieved that there was nothing going out of this flow path, and requested that we set up a continuous charcoal sampler on this condenser vacuum discharge line, and that we change the sampler daily. He wanted it more often, but I talked him into backing down to daily, because of the large sample load. I asked DuBiel to do this, and Dick said he would, however I checked on it about 6 or 7 hours later, and DuBiel had gone off-shift, he



left the site, and had forgotten to do this, so I then checked with Tom Mulleavey, who promised me he would do it, and that he would put it into the HP Ion. I've got to remember to check back on this to in fact make sure that it has been done, and that we are counting this charcoal sample. There are some problems with this charcoal sample, because of the fact, because of the incredible amount of moisture that is in this line. ~~There-needs-to-be-set-up-some-kind-of~~

There needs to be set up some kind of moisture separator so that we don't ruin the charcoal with moisture. DuBiel had some ideas on this and I'll have to check back with him to see ~~whatha-ppened~~, what happened.

NOTE #12

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Late in the morning of the 16th of April, I got another bullet from Herbein saying he wanted me to go over and take a look at the Eberline stack monitor, which is now the new channel HPR-219. I thought that the stack monitor was reading high, and that was unduly alarming. Both the commission and a lot of the plant people that were looking very closely at it. One of the first things that I did is talk to Jim Klein on the phone at this point, and ask him if he would not calculate a setpoint, a rate of rise setpoint that should be in the units of c/m/m for  $\mu\text{Ci/cc}$  of activity. Jim did this and in about I don't know, 6 or 7 hours later, gave me the number of 1.66 c/m/m per  $\mu\text{Ci/cc}$ . However, before he had finished his calculations, we had a trauma on our hands. The HPR-291 went from its usual numbers which were somewhere between 1 and  $5 \times 10^{-7}$  - it jumped up to  $4 \times 10^{-6}$ . As a matter of fact, it had been reading around  $1 \times 10^{-7}$  and then it jumped almost a factor of 20 there. This upset everyone, including the shift supervisor, because of the fact that during the time that this rise took place, they started to vent the make-up tank. In the event of the make-up tank, the gaseous monitors on HPR-228 and also 221-A rose very rapidly. The only thing that gave me a clue that we did not in fact have a large iodine release, even so HPR-219 said we did have one, was the fact that the HPR-228 iodine charcoal stayed absolutely solid and did not move during this entire time, even so the gaseous went way up. It was this piece of information that I was able to show people and calm them down. Harold Denton himself happened to be in the Control Room at the time that HPR-219 started to rise, and he was not upset, but he was anxious about this. Mr. Denton came

over and introduced himself to me, very nicely said that he had heard about the work I was doing from John Collins, and asked me to explain why the HPR-219 was not correct. I spent some time; told him about the flow paths, explained to him that 228 had not seen any iodine increase, and told him that as far as I knew, the calibration that was used HPR-228 was conservative by a factor of ~~womehhaere~~ somewhere between 2 and 3. This seemed to allay some of his anxiety. At this point, I gave the information to Herbein about HPR-228 and ~~that~~ the fact that I didn't believe the 219, and took the charcoal off personally. The charcoal had been running for only about 2 hours and maybe 10 or 12 min. I took the charcoal off, dutifully logged the thing into the sample coordinator on the Unit 2 Turbine Hall Deck, and personally carried it down and first had RMC and then SA count it. The charcoal told us that over the past 2 hours, even so HPR-219 was reading  $4 \times 10^{-6}$  for more than an hour's time, the charcoal told us that in fact the level of iodine as averaged over 2 hours was approximately  $2.9 \times 10^{-7}$   $\mu\text{Ci/cc}$ . It was welcome news, because I was fairly sure that we were not seeing the massive amounts of iodine-133 that Eberline HPR-219 monitor was telling us we were seeing. I immediately telephoned these results to Herbein, actually I didn't get him, but I got one of his aids who took it into him, because he was at that point at the 6:00 meeting. This charcoal was on from approximately 4:00 to 6:00 in the evening on the 16th.

At this point it was obvious that someone had to spend a lot more time with the HPR channel. I sat down with Jim Klein, who had been working on the sensitivity calculation and told him about the problem. Jim seemed upset that I was working on the problem at all and said only one person should be working on this problem. So, instead of getting Jim more upset by saying ~~to Herbein that~~ that Herbein had told me personally to do it, I <sup>simply</sup> told him that he was more than welcome to handle this, and I handed over all the data I had on the charcoal and the data on what the HPR-219 was reading, and asked him if he wouldn't come up, pull the data off for the 1 hour in question, or actually the 2 hours that the charcoal was on, and come up with a specific sensitivity data for that time and then try to get in touch with Eberline to adjudicate the problem. By that time I had called Eberline, gotten the names of the specific people that should be contacted, the most knowledgeable ones in the company concerning this "PING-2" Eberline monitor which we call HPR-219 at TMI.

I gave Jim Klein all this information and he said he would take the ball from there.

Note #13

It was about 8:30 or so, maybe 9:00,\* by the time I got back over to the Observation Center to check in with Gordon Liedy and Jim Roy, who had just come on board. I discuss the problems that we had had with them, and then we sat down and started to work on effluent(?) report data, and we spent some time working on that. I gathered the latest environmental data, and the notes, the daily notes that Steve Gertz has been putting out, which is what I call a quick and dirty summary of the important items in the environmental monitoring regime. This daily summary was given to Arnold. I had left one easy copy for him with an a de of his about 2 days earlier and apparently he never got it. I guess the copy got lost - nobody seems to know where it is now. So Arnold seemed delighted with this quick and dirty summary. The summary has no numbers in it - it just talks about trends. It says 2 things: a) what are we measuring on a daily and on an every-three-day basis, and b) what are the significant results; and so the whole thing is about a half a page at most and Steve Gertz is putting the summary out each and every day. This summary was given to Arnold, he was happy with it. It was given to Herbein, he was happy with it. Then Sandy Lawyer came along and wanted a copy, liked it, and said he wanted a copy for himself and for Jack Thorpe as well as Arnold and Herbein, so now it turns out that we need 5 copies of this thing, plus a file copy. The 5th copy goes to the TMI data center .....

POOR ORIGINAL

...the work on the environmental data and the work on the effluent data on the 16th took me up til about 1:30 on the 17th to get everything resolved so I felt that I could go home, get a good night's sleep, and then go to Salem the next day.

Note #14

This note is for the 17th of April, 1979. In the morning I made several phone calls to the site to find out how things were going, how the problems had been adjudicated the night before, I found that things had calmed down a little bit. One of the things I did find out was that the night before actually, was that we needed to be more specific in our liquid effluent path dose calculations to man. We were doing some rough calculations and it was obvious to me that since the environmental levels were essentially non-existent for most nuclides, and quite low for tritium, that there was no real dose to the environment. However, it was obvious that we had to document this in a much more coherent and legible manner for the world to look at. Therefore I spent some time on the phone on the morning of the 17th with Steve Gertz, giving him the format of the data that I wanted, and also telling him specifically what I wanted listed and what references to use, etc. We got all this together and came out with a fairly reasonable document - an actual technical report - complete with references, and all the important data in it, as well as the projected doses to the maximum individual, to the average individual and also ~~to~~ man-rem. It is most important that this be done for the drinking water pathway, which is the one that I think people are most interested in.

NOTE #15

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April 18, 1979. I spent about 4 hours in the office this morning - I only expected to spend 2 (I started at 7:00 AM). Actually, I spent 5 total. I got a series of phone calls from people at the plant and talked back to them. The main thing I did was to rev the format for the continuing dose to man via liquid pathways reports of Steve Gertz's - got that squared away. Also got a number of ~~the~~ other memos out that were, that needed to be gotten out. ~~I spent a fair amount of time on the phone this morning with~~

NOTE #15

I spent a fair amount of time on the phone this morning with Charlie Pelletier

getting things squared away as far as working on the Eberline HPR-219 monitor. Hopefully Charlie's going to take ~~this~~ most of this chore over and get things squared away. We're far from out of the woods on this problem right now.

NOTE #17

I spent a lot of time on the phone talking to Gordon Leidy and getting information on where we stood on the update of the liquid and gaseous effluent data.

NOTE #18

It is obvious to me that we need more help- I spent a fair amount of time talking to the-people Les Slaback last night and he'll work for us for about a week and a half. I'm now pursuing the idea of also having Tom Jenckes come up and work for a week and a half to two weeks. Hopefully the work of these 2 people will take some of the pressure off and make it easier on everyone else so we can begin to work something close to a normal 12 hour day.

It's now about 9:00 in the evening of the 20th of April. An editorial note is that in the last 2 days since I last dictated into this thing, I worked one 20-hour day and one 25-hour day. No, make that 28-hour day, as a matter of fact. So, I'm obviously suffering from lack of sleep now, and have decided just to drive home, even so it's an hour and a half drive, versus 20 to 25 minutes to the motel - just so I can get a really good night's sleep and the phone won't bother me.

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NOTE #19

Les Slaback will be starting 8:00 PM this coming Sunday night. I spent a fair amount of time talking to Tom Jenckes - I talked him into coming, I talked his wife into letting him come. Rosemary was actually very gracious about the whole thing, and thought it would be great experience for Tom, and then Tom said that he was having some problems with his boss at Pacific Gas & Electric. So, I called the boss and spent about a half hour talking to the boss, explaining to him how important it was that we have someone with Tom's knowledge and unique understanding of the TII plant and also the plant staff. However, Tom Jenckes' boss absolutely would not cooperate, and held steadfastly to the opinion that Tom was much more needed there, in order to put out all the brush fires that

the TMI accident was causing them, and he's scared to death that it's going to keep Diablo Canyon from getting it's operating license. There is, of course, a great deal of merit to this argument and I could not convince ~~that~~ him that Tom was needed more where we are than back where he is now. Thus Tom Jenckes will not be coming in the foreseeable future to help me out.

POOR ORIGINAL

NOTE #20

The 18th of April I spent a fair amount of time coordinating the activities of the 5 GeLi detectors now on site. ~~xxxx~~ These GeLi detectors are as follows: Science Applications, Inc. has two at the south end of the island in a trailer with RMC; RMC has one GeLi detector in the SAI trailer; there is a fourth GeLi detector which is the detector belonging to B&W, which is in a trailer which is just northwest of Unit 1, parked right next to the circ water pump house. The fifth lithium drifted germanium detector is the detector that is normally housed in the Unit 1 HP counting lab, and belongs to Three Mile Island-Met Ed, and is now temporarily been moved out of there because of the high Xenon levels during the early days of the incident to the circ water pump house itself. It has a rapidly constructed and not particularly good shield around it. One of the major problems has been that a lot of low level samples have been going to the B&W and the TMI GeLi, which are not at this moment set up for low level counting. The B&W detector is only a 5% GeLi, the TMI is probably closer to a 10%, however, but it doesn't have a good shield around it at this moment, and probably still might be a little bit contaminated from ~~the~~ some of the early high level samples that I was counting. After looking at a number of the results from the counting, it was obvious to me that ~~we~~ TMI is unnecessarily penalizing itself because of the high minimum detectable activities for iodine-131 in water. Therefore I put out a memorandum which was signed by Dave Lemeroff and also by <sup>Don</sup> I can't remember his full last name - it begins with an "H". Don is the supervisor in charge of the GPU chemists and is running all, or is in charge of all of the people who are acting as sample coordinators, who in turn are in charge of all the people that are running samples from the point of taking the sample to the counting labs and returning the data back to the sample coordinators. I set up ~~as~~ a criteria for ~~xxxx~~ siz

of liquid samples, made a long list of which liquid samples were important to be counted down to low levels of iodine-131, set up a criteria that if we were going to count these samples that are going off site they should be counted to at least  $5 \times 10^{-8}$   $\mu\text{Ci/cc}$  of iodine-131. Now setting this as the low level of detection means that SAI, for a ~~1000~~ 1000 milli-liter sample, has to put ~~it-they~~ put the sample through a resin column, which only takes a few minutes actually. RMC must repour the sample into a 3 liter Marinelli beaker and count it that way. Except for these 2 labs, which includes 3 GeLi's together ~~there-are~~ no other GeLi's on site can presently count down to the lower limits of detection needed for water samples being dumped on restricted areas. I wrote a memo concerning this which should be documented as part of this note. The memo was circulated to all persons involved.

NOTE #21

In the middle of my usual 3:00 PM coordinating meeting, which is held in the SAI-RMC trailer each evening, on the 19th of April, another fire drill started. In reviewing the data, which I try to do once a day, review the general data and the results that they're getting, I noticed that the east dike, which is a, just simply that, a dike that receives rain water run-off from the eastern part of TMI, I noticed that the east dike was reading somewhere around  $2 \times 10^{-7}$   $\mu\text{Ci/cc}$  of iodine-131. <sup>I found it</sup> ~~it was~~ hard to believe that this was a correct analysis and requested RMC to recount the sample. As Murphy's law would have it the sample I wanted to be recounted had been recycled back to the processing center and took a while for the thing to return. In the meantime, I had another sample taken of the east dike, and that was counted by RMC, and that one also came out to roughly the same amount - somewhere around ~~xxx~~  $1 \frac{1}{2} \times 10^{-7}$   $\mu\text{Ci/cc}$  of iodine-131. It was hard to believe that this much activity was really there, so I started on a witch-hunt in which over the next hours I never left the SAI-RMC counting trailer. Both SAI and RMC changed the plastic covers of the GeLi detectors, performed bare detector backgrounds. Then I had them both use drinking water in brand new sample containers to check iodine. This is especially important for RMC since they re-used the Marinelli beaker. It turned out, as I ~~suspected~~ suspected, that one of the Marinelli beakers that RMC was using was contaminated. So the

performed a new background check with a brand new beaker with drinking water in it, and we got a reasonable background for iodine-131 at that point. By this time, the new east dike samples had come in, and RMC counted it, got roughly the same activity, somewhere around  $2 \times 10^{-7}$   $\mu\text{Ci/cc}$  for iodine-131, and since I didn't believe that, I then had them split the sample with SAI. SAI took its normal 1000 cc sample and put it through a resin column, so that they can get down to around  $3 \times 10^{-8}$   $\mu\text{Ci/cc}$  as minimum detectable activity. SAI got approximately the same activity - somewhere around  $1.8 \times 10^{-7}$   $\mu\text{Ci/cc}$ . This point, just for a final check, I had RMC recount the sample and perform a 5000 minute count, versus the usual 1000 minute count. Their number came up the same, so at that point I began to believe the number. I walked up and talked to the people in Unit control room, told them what I was doing, and also in Unit 1 control room, had people go out and try to look and see if there was anything running into the east dike from the runoff pipes. The 3 runoff pipes that enter into it were found to be dry at that point, so that was a fruitless venture. I notified Unit 1 control room of this, so that in case the east dike was discharged, one would understand that we had to enter this into the equation for insuring that we do not dump greater than maximum permissible concentrations of water in unrestricted areas. Simultaneously I had samples taken of the east dike runoff which is a little channel between the east dike and the gate valve, and left orders for a sample to be taken at the river side of the gate valve pipe. It turns out that the river was fairly high at that point, the river level was fairly high, and that the sample that was taken at the river side of the pipe was essentially river water and showed that, it was down pretty low - 7 or 8  $\times 10^{-8}$   $\mu\text{Ci/cc}$ . I was still not comfortable with RMC .....

POOR ORIGINAL



This is about 10:00 PM on Friday evening, the 20th of April 1979, and I'm continuing the dictation of S.W. Porter, Jr.'s chronicle of the TMI accident which started early in the morning of March 28, 1979 in Middletown, Pennsylvania.

NOTE #22 [SWP said Note #21, but it is actually Note #22 in proper order. dmf]

About 9:00 in the evening on the 19th of April I was just cleaning up some last minute paperwork, making sure that Gordon Liedy and Jim Roy had plenty of guidance as to what their priorities were, and what needed to be done over the next 24 hours, when I got a telephone call from Jack Herbein. Jack said that it was absolutely essential that I drop everything that I'm doing right now and work on a report of the liquid releases, all the liquid releases from the beginning of the accident, and that this had to be given to Bob Arnold some time this evening. I immediately set about to pull together what we had and I found that, as I suspected, that there were many holes in the data. Luckily, Lex Tsangaris was there and he was a person I could use in order to get the strip charts that were needed in order to fill the holes such as, for the early days what was the cooling water blowdown flow, or the cooling tower blowdown flow, and what was the sump pumps on the industrial waste system flows during the times in question. We were pulling the data together and Bob Arnold himself came down and stayed and gave me more specifically what he wanted. He was very interested in the period from the 28th of March through the 2nd of April. Now these were the early and very hectic days of the accident, and obviously it is very difficult to get all of the information that is needed. We went back over the Unit 1 and Unit 2 Control Logs again and there was a great deal missing from these. So we had to go back to the strip charts, we had to go back and try and search out records. Lex and I worked through the night on this project and at 7:00 the next morning, the morning of the 20th, that is this morning, we finally finished. I put in some 26 to 28 hours straight at Three Mile Island, and was pretty exhausted, went home, slept for about 5 hours and then came <sup>back</sup> in and got embroiled in a couple more fire drills which I'll talk about later.

NOTE #23

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The first thing I did when coming in at about noon on the 20th, back to Three Mile Island Plant, was to see Dick DuBiel, who I couldn't reach that evening before, nor could

I reach Tom Mulleavy, and get a hold of the 1621 liquid waste discharge permit forms. I knew that these had most of the data on them that I was looking for, and in fact they did. The problem was that there were 3 or 4 of these forms that were missing, that were not in Len Landry's in-box, and were also missing when I went back to the H.P., Unit 1 H.P. lab and tried to find them. There was also the matter of one of the liquid releases, I believe it was #50, in which the chem tech, Mr. Joe Heidel, had crossed ~~the~~ a line through a number which was about  $2.6 \times 10^{-5}$   $\mu\text{Ci/cc}$  of iodine-131 in the waste evaporator condensate tank B gamma spectrum analysis. He crossed out the line and essentially stated that there was no iodine in this sample. I didn't feel that I could take this data out of the list that we had given Arnold the night before without discussing this directly with Joe Heidel. I took about an hour, finally got a hold of DuBiel, tried through several <sup>other</sup> people and no he finally got hold of DuBiel and Dick gave me Joe Heidel's home phone number and permission to call Joe in or at least talk to Joe about it, and give Joe 4 hour's pay for disturbing him during his week's vacation because Joe was off for a week at this point. I was very pleasantly surprised when trying to trace down this apparent discrepancy in the liquid release form at Joe's reaction. I thought he would resent my calling him. To the contrary he felt that his services were needed. I told him what I was doing and how important it was and he said the only way he could adjudicate it, his memory wasn't that good about what had happened back some 18 days beforehand, so he said the only thing he could do was to come in to the plant and go over the record with me. So Joe came in, and 15 minutes later after I talked to him and we met in DuBiel's office. I showed him the records. He said that yes in fact there was, that those numbers were background, which was sort of incredible to me. I knew background was high at B&W, I didn't ~~know~~ <sup>think</sup> it was that high. And so he made a notation on the liquid release form which was the documentation that I needed, that the iodine numbers were in fact inseparable from background. And thus there was no detectable iodine in that sample. Joe Heidel next very kindly helped me find some of the missing liquid release permits. We found all but one, and on that one I was able to find in the Unit 1 Control Room Shift Supervisor's Log, where the liquid had been in fact discharged. So I got the dates and times of discharge, but no analysis. We hunted down, talked to the sample coordinator and couldn't find it in any of the sample coordinator's books, and so we kept hunting

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and went down to B&W labs, and had them look through their logs. X There was no record of this, so we went over to the TMI GeLi and looked through their logs, and there was no record there. At this point I called SAI; who I thought might have done the liquid sample and asked them to look through their log, even so the sample coordinator looked through the results. I could not find that SAI even had a sample logged in for the B waste evaporator condensate storage tank sample analysis. Mr. Heidel was very helpful and in showing me specifically how one has to track all this down, even called down to the radwaste name and had them look down there to make sure that the release form wasn't still down there, and it wasn't. We went back down to the Unit 1 H.P. lab log book at the Unit 1 control point, went through that and found that the release had been logged in, as a matter of fact but had not been, there was no copy of the release permit in the U.P. log book, which there should have been. I will still continue to look for this missing, I believe it's release #53, data which is missing, but that's only one out of about 35 liquid and gaseous release permits that I had gone through during the day, and only missing one out of 35 is a damn good hitting average, if one considers the confusion that a true emergency does generate. What I intend to do is, if after the end of another week or so I cannot find the data here, I just simply am going to average up three or four samples on either side of this in B tank, pick an average, and use the maximum flow for the time that they could have dumped - that's 27 gallons per minute as a maximum that they're allowed to dump these tanks at - I'll use 27 gallons per minute and assume that 27 gallons per minute with this average amount of iodine was in fact dumped out. \_\_\_\_\_ that I don't have to resort to this crystal-balling average method, but if I have to, I have to.

NOTE #24

At about 6:00 I made the mistake of going up to the food tent just to grab a coke and a piece of fruit in order to sustain my stomach on my way home. I didn't even get in the food tent before I had about 5 ten minute conversations with different people wanting information. \_\_\_\_\_ essentially blew one hour before I even got in to get my coke. At that point I didn't feel like a coke and not a glass of milk. On my way out of the food tent, Tom Potter of Pickard & Lowe & Keith Woodward, the <sup>neighbor</sup> ~~unofficial~~ from Pickard & Lowe, bo jumped on me and demanded that I sit and talk to them. I told them that if I sat down I'

never get up again, I was so tired at this point, and so they could talk to me on my way walking over to the car. Well, that didn't work - they still took about a half hour to 4 minutes of my time. The content of this particular flap is that it turns out that RML-7, the liquid radwaste pit monitor, had gone into low alarm or alert alarm somewhere in the neighborhood of 9:15 in the morning on March 28, 1979. This alarm had been noted down in the Unit 2 logbook, and by the way, even though this is a Unit 1 monitor, the liquid from both Unit 1 and Unit 2 are discharged at a single point through this monitor, therefore there is an alarm display in both Unit 1 Control Room and Unit 2 Control Room. \_\_\_\_\_ as if the common background, or the average background, and it's in the neighborhood of a few hundred counts per minute for this channel, however, at about 9:15 the background on 3/28 the background of this channel went up to about 1100 counts per minute briefly, and then dropped back down again. This coincided with a time period where the industrial waste treatment system was discharging. Therefore everyone was afraid that there was a large discharge of iodine in the industrial waste treatment system, which had essentially been unmonitored except for RML-7, and since we had no sample of this, everybody was all upset. Even so this is a, there is a slight possibility of this, I pointed out to Tom Potter that during this time there was a waste evaporator condensate storage tank which had been properly sampled and analyzed, and was being dumped in a proper manner, which had a great deal of cobalt-58 and cobalt-60 in it, in excess of 1000  $\mu$ Ci in the tank of each cobalt-58 and cobalt-60. Since the I-gamma is so large for these compared to other nuclides, such as iodine, it occurred to me that this is probably what RML-7 saw. So I suggested that Tom pursue this a little further, get the response curves for RML-7 sampler, and detector system and work up a story on this, because this looked to me to be the most likely answer to this question. I was so tired then I was about falling on my face, and so I just excused myself from the gentlemen, even so they still had 80 more questions, and asked them to talk to me in the morning, on Saturday morning.

NOTE #25

While I was there, ~~Keith Woodward~~ <sup>Keith Woodward</sup> also picked my brain about MDL-423. This is the condenser vacuum pump discharge gaseous monitor. I didn't really get the full information concerning what the flap was that he was working on. It seemed to me a little unusual that

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a meteorologist that is not at all familiar with the radiation monitoring system within the plant and especially not with one in the Unit 2 turbine building, would be working on a flap concerning that. However, I did answer Keith Woodward's questions concerning this and I alerted him to the fact that there was in fact a charcoal cartridge that was put on in the system prior to the gas reaching the noble gas WDL-728 sampler.

I also informed him that this charcoal was being read out approximately once per day, and that I had checked out and that yesterday I saw the results for the day before, and that essentially as far as I could see for the last 2 or 3 days there had been no iodine released via this pathway, and thus I didn't expect any to be released in the future, since there was no history of this.

NOTE #26

POOR ORIGINAL

Two times today, that is on the 20th, when I was at the B&M gamma spectroscopy lab and also at the TMI temporary gamma spec lab which is in the circulating water pump house, I discovered that there were no samples being counted. I took it upon myself to look in the B&M log for the day and saw that they had only counted a few samples all day long. I relayed this information to the sample coordinator, to the sample coordinator's boss, Don Hetrick, and to Jack Thorne, Jack was very concerned about the problem but seemed not to know which way to go, didn't know step one to take in order to solve it. So I pursued it further, found out that there was in fact, which had mysteriously appeared saying that all air samples and all water samples were to be sent to the PMC and SAI labs. This is a misinterpretation of my earlier statements which I said that all discharge water samples or all water samples for water that is going to be taken off the TMI site, needed to go to those labs so that they'd have a proper MDL, and that I wanted all HPR charcoals to go to those labs for counting so it would have some consistency in this very important sample. However, the other samples, and there are certainly many, many others, could not go to these labs. There was some question in my mind as to whether the B&M lab could count the air samples down to a reasonable one-tenth of MPC<sub>a</sub> for iodine-131 in air, but I certainly think that they should try. I did go back to the B&M lab a third time today and finally caught their gamma spectroscopist, discussed the problem with him, and he promised me that he would change the cover on both his crystals; and the one out in the circ water pump house

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which belongs to TMI, and do backgrounds on both of those and come up with MDLs for me for iodine in charcoal and also iodine in water for the TMI crystal. In the meantime, I talked again to Don Hetrick, and he promised me that a ~~xxx~~ number of samples were being sent over to these laboratories for counting. We have sort of a crisis right now in counting because one of the two SAI GeLi detectors is down, and we have no idea when it will be up again. This is further compounded by the difficulty that the Three Mile Island people are finding in being able to man their own GeLi detector because of the many many jobs going on that require the chem techs supervisors. After in-depth discussions with the B&W people, it turns out that they do have, down in their Lynchburg, Virginia headquarters, a more sensitive detector, and they also have people that can run it, and I think that maybe the thing to do is to get them up here with a couple people to run that so that we have some more capabilities in these areas. I don't really prefer B&W over SAI or RMC, however, RMC still leaves a lot to be desired in their programs that they're using and in the people that they now have running these detectors, now that Frazier Brown has gone back to Chicago. I lean toward the B&W proposal, since they are familiar with plant and the plant people, and since the plant does use the B&W program for their gamma spectroscopy analysis. I also learned that the Unit 2 GeLi system which has never been put on line needs to be cranked up, and I think this will be a great thing for the B&W people to do, is to not only bring their own low level system up, but also furnish the manpower to calibrate and debug the brand new Unit 2 system. The Unit 2 system has been around for some time and has never been set up and proven to operate because of lack of trained manpower to do this. The thing came in just as they were planning their outage I guess, and they just never got around to doing it. I guess there's no time like the present to use the equipment which we have on site already. I will follow up on this and hopefully I can make some progress on this Saturday, which will be the 21st of April. I believe that one of the problems with the MDLs on the TMI presently installed system which is in the cric water pump house is that there is a very poor shield around it and thus the background is high for getting down to low levels. So I asked the B&W chemist, who ~~is~~ he actually be running both of these things often, if he wouldn't get me a background for a liter bottle of water ~~and~~ - I know that they're calibrated for that volume - and take a

look at it and see whether or not shielding was needed in order to get a good MDL for a ~~thousand~~ thousand second count. He stated that he would do that, especially since he was still waiting for some samples to come in for him to count. So when I left, he was checking into this, and also rechecking his own MDLs. First thing Saturday morning I'll go down and see what the resolution of all this is, and see if we can't get some more help, because apparently the sample load is really backed up down at RMC-SAI.

NOTE #27

I got a call today - this is the 20th of April - from Tom Potter asking about the information on water releases. A historical note is that much earlier Tom Potter decided that he would do the dose to man from the gaseous releases and we would be doing it from the water releases. And so I asked Tom what he needed all this information for, and he told me that he had been asked by Arnold, or no by Bob Long, to draw a graph of the daily iodine-131 liquid discharge versus time, so Bob Arnold could understand what all this data was. I told him that we were in the process of doing this, and that it was a little silly to have both people working on this, and he agreed. So, we did have all the data there, and we had some rough things drawn, and I gave the job to Gordon Liedy, told him it was #1 job, reassigned a priority #1 several hours later and nothing had been done on it, and left about a couple hours ago very tired and with the hopes that Gordon would get this accomplished tonight before he leaves. I think he leaves about midnight, gets relieved around midnight, by Jim Roy. So we were charged with the job of a) making this daily iodine into the liquid discharge path summary and then <sup>u</sup>ndating it each day so that Arnold was kept apprised of what's happening. An addendum to this particular note is that I did receive the weekly update of the off site emergency radiological environmental monitoring program from Steve Gertz and distributed this to Arnold and to Herbein. I also received the daily, for the 19th, the daily update of the radiological environmental monitoring program results which are not numerical, but just talked about general trends. So, I did personally give to Arnold and leave on Herbein's desk, both the weekly dose to man in man-rem update which is through the 7th of April, and also the 19th of April verbal update of the trends of the offsite REMR.

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NOTE #26

It is now early in the morning, 6:00 AM on the morning of Monday, the 23rd of April 1970. On Saturday, (sic-the 22nd was Sunday dkf) the 22nd of April, I spent approximately 4 hours on the phone during the day with both Jim Roy and Gordon Liedy following what was happening at TMI. Things have slowed down considerably, and it looks as if the 3 hours that I spent in the office, plus about the 4 hours I spent on the phone certainly was sufficient - there was no need for me to drive all the way from Ardmore to TMI. The data taking for both the liquid and gaseous releases seemed to be coming along smoothly now, with no great hitches, except for the problem that I spoke about earlier concerning the use of the TMI GeLi. The man that was running the B&M lithium drifted germanium detector did not perform the MDA measurements which I had personally requested him to perform. It was difficult for me to understand why not, since when I last saw him he was just leaving the B&M counting trailer with an empty one liter polyethylene bottle in his hand, and he was about to go fill it with distilled water from the lab and then to count it. He called and left a message that he was leaving early Saturday morning and that he had not performed the MDA measurement because of the fact that "he could not find a Marinelli beaker". I realize that there is a very short supply of Marinelli beakers and that's why I had asked him to use the liter poly bottle. I will be following up on this first thing this morning. I also spoke for about 3 hours off and on ~~xi~~ during Sunday to both Jim Roy and Gordon Liedy just following what was happening and fixing general priorities for their work.

NOTE #27

POOR ORIGINAL

It is now the 25th of April and I am dictating technical note #27 (actually it is #26-dkf) and the topic is the work that I performed on Monday the 23rd of April. I left the house at about twenty minutes before 6 in the morning and drove directly to TMI. Upon arriving, I welcomed Mr. Slaback who had come in the night before, and had completed most of his requirements for a radiation work permit status. Les Slaback is a highly qualified health physicist, being both certified by the American Board of Health Physics and also he is on the American Board of Health Physics panel for recertification of professional health physicists.



Les had many years of experience in reactor health physics, is an extremely competent mathematician, and is a very diligent and hard worker. I feel quite lucky to have him working directly for me. The problem is that he can only give me a week and a half of his time. Jim Roy worked till about 1:00 PM on the afternoon of the 23rd, said his good-byes and left. Jim will not be returning. I spent several hours debriefing Jim Roy and just discussing things with Jim and Gordon Liedy and Les Slaback. Les had only slept about 5 hours the night before and other than that, he arrived at 8:00 PM on Sunday evening, and other than that he spent the whole time simply getting on board with the problems and the routines. As I stated before, Jim Roy left about 1:00 PM and is returning to his Tampa Florida home, where he will try to resume the consulting business that he was starting before he was called up here.

\* NOTE #30

\* One of the newest problems with the HPR-228 and the HPR-221B is that the air flow  
\* seems to be significantly different from the starts and stops of the one or two day air  
\* samples that are taken on those 2 monitors. This points up the fact that probably the  
\* pumps are aging, severely now, and they may be unreliable. My immediate answer to this  
\* question is, use the extremely accurate and reliable gas meters which just about every  
\* electric utility has in their laboratories. I had a discussion with several people about  
\* this on Monday the 23rd and on Tuesday the 24th I had an in-depth discussion with Dave  
\* Lerneroff on this and suggested that he personally pursue this since he does work for Met  
\* Ed directly and that he get at least 5 calibrated air pumps down to TMI immediately. It  
\* would not be too difficult to attach these since there are a number of flexible rubber  
\* hose joints within the radiation monitoring sampling system.

\* NOTE #31

During the drive down, or over to TMI from my Wynnewood home early on the morning of the 23rd, there was a review of a press release made by the Governor of PA in which he stated that he had absolutely no information concerning the liquid discharges from TMI, and further that <sup>when</sup> ~~where~~ he visited TMI, he had not been told or made aware of the fact that they were discharging radioactive material at the time. I feel this is a highly

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\* inaccurate statement, and is contrary to the facts and to the printed record. As the  
\* earlier tapes indicate, I have held maybe half a dozen telephone conversations with Mr.  
\* Walter Lyon, Head of the PA Bureau of Water Quality concerning the data that we are  
\* telecopying approximately every 4 hours to him, so that he always has updated data on the  
\* radioreleases from TMI. We held 2 face-to-face meetings with Mr. Lyons and his staff,  
\* and the HRC attended both these meetings, as well as the PA DER BRH people. This data  
\* is available to both the BRH, who actually have the telecopier and immediately take the  
\* data down to the PA Bureau of Water Quality. Thus on an ongoing basis data is telecopied  
\* to them. This started somewhere around the 4th or 5th of April. Before that time, the  
\* hotline was used, which was manned 24 hours a day to relay data. I called Mr. Walter  
\* Lyons immediately upon arriving at TMI, somewhere around 8:00 in the morning, and dis-  
\* cussed the fact with him that the Governor was down at the senator Hart's committee hear-  
\* ings and that ~~the~~ he was mistaken about this, and that Mr. Lyons should contact the Govern-  
\* immediately and give him the facts on this point. He said, Mr. Lyons said, he would call  
\* me back if he was not able to adjudicate the point. He did not call me back within 2 days  
\* so I assume that this thing has been taken care of.

NOTE #32

POOR ORIGINAL

Investigation of the east dike sample item. We have about 4 or 5 days worth of data on the east dike now, and it's obvious that there is activity ~~of~~ varying from about  $4$  to  $5 \times 10^{-8}$  all the way up to  $2 \times 10^{-7}$   $\mu\text{Ci/cc}$  in the east dike. We have at least 2 samples per day on this dike, and so we know it's real. I got another call from Herbein's office asking for a memo on the east dike problem. We also continue to take samples from the east dike runoff area, which I call the east dike channel, which is the cemented area in between the east dike and the gate valve which allows the water to run through down in the river. My rough assessment of the quantity weeping from the cement dike itself is somewhere between 10 and 100 cc/hour. It looks as if the east dike every day has a little more water in it, and is probably more than likely coming from the Unit 2 cooling tower A, which is the eastern cooling tower, and if the wind is blowing out of the west, it literally blows water just out of the cooling tower onto the ground, and it just simply goes through the water runoffs into the dike, or it could be some of the Unit 2 cooling tower basin spillo-

which also runs into the east dike. The other theory that I have on this is that the, it's possible that when it rained during the high iodine output of the plant, that we had just simply the rain acting as a filter and pulling some of the iodine out of the air, and then it ran off into the east dike. And obviously, the other theory is that when the plume hit the cooling towers, the cooling towers acted as a filter for it, and picked up a fair amount of the iodine in the plume and then of course this part of this makes its way into the east dike. These are only theories, but they are the only possible ones that we can find, or think of at this point. In any case, there is a small weenoff - we know that the gate valve doesn't close completely and so therefore there is a minute amount of iodine-131, certainly below MPCs and a very minute amount, slowly making its way out to the river. Thus I came up with the idea of putting a small 2" fire hose out there and running about one gallon a minute of diluting water in the east channel between the east dike and the gate valve to the river. In this way we use enough water so that we can always get samples of it - we were running out of sample water several times - not more mud than sample in a few of them - and this also allows us to be able to say to the world that we are dumping at below detectable activity as far as these trace amounts of radio-iodine are concerned. I did call Margaret Reilly of the PA State Dept. Environ. Resources BRH, told her about the diluting water that we were putting in, so that we a) could get samples and b) would put it in at very low concentrations - below detectable - and she said that this procedure was fine. We wrote up a memo to Herbein on the topic of the east dike telling him all of the above, and \_\_\_\_\_ to a fairly wide distribution list.

NOTE #33

POOR ORIGINAL

\_\_\_\_\_ Poth (?) brought up the very timely topic of the quality assurance program for the lithium drifted germanium detectors that we now have on site. I discussed this at the daily 8:00 staff meeting that I have with my people and also with the SAI and RMC people that are supervising the lithium drifted germanium detector operations. On the evening of the 24th at 8:00 PM, Les Slaback came with me as well as \_\_\_\_\_ meeting. \_\_\_\_\_ James Klein from SAI, Jack Davis from RMC, Steven Kim, who is the executive Vice President of RMC (I don't know what the hell he's doing here - he certainly isn't contributing anything), and Lee Booth from RMC. We discussed general QA problems and specifically discuss

the definitions that the two laboratories use for minimum detectable activity, how it was calculated, and the specifics involved with this. Jim Klein knew exactly how SAI did this, Jack Davis really didn't have much idea how it was done for RMC and Steve Kim had absolutely no idea and tried to bullshit his way through the questions. The discussion was left with the fact that the people at RMC would not check out the computer program and figure out just what they were doing, because it was obvious that none of them really knew. (I'm discussing just how the computer identifies a peak and what the statistics are for the identification of what's known as a non-peak.). As luck would have it, about midnight or so of the 24th, I got a phone call with some sample results first from RMC, and then I got sample results from SAI, which were a factor of 200 less for the same sample. This is something that obviously has to be resolved. I talked to both of them, asked them to both recount the sample again, get together, find out what the problem was, and get back to me. I left TMI about 1:30 to quarter to two, on the morning of the 25th April, and still had not heard back from them.

NOTE #34

POOR ORIGINAL

I-discussed-the-iodine-species-sampling-at-the-top-of-the-Unit-2-vent

I discussed the sample that's taken for iodine species monitoring at the top of the Unit 2 vent with Jim Klein of SAI. He stated that immediately after the filter change in the Aux Building Plenum, (and by the way, -- one of the filters had 2 days before been changed and The filters a few days ago had been changed in the Aux. Building Plenum, one of the two filters, and the one of the filters has just been changed in <sup>one of</sup> the Fuel Handling Building Plenums. Jim Klein took a species sample off of HPR-219 (that is the new Eberline system) late on the day of the 23rd of April. He didn't have the results typed up yet, but I did see them hand-written and apparently the old mixture which was better than 80% methyl iodide is now changed to only about 30% methyl iodide, and roughly 30% HOI and 30% elemental iodine. Apparently the reason for this is the new filters are much more efficient, and there's no degassing of the new filters as there probably was in the old filters, and the material stayed on the filters for a while long time, changed pH, went to the methyl state and then the methyl was degassing from the old filters as the (that is the theory). Jim has promised to give me a memo that Charlie Pelletier was

composin to me about the different iodine species that he's been finding over the last week and a half or so.

NOTE #35

I had a discussion with Jim Klein on the 24th of April concerning the HPR-219 calibrations. As I had suggested several times, finally someone got on the ball and had Eberline send up a good man who really understood and could debug the new Eberline HPR-219 "PING" stack sampler. Jim claims that the gas monitor is well calibrated and working quite well. I now have to go get some of this data and see if I can work backward to get some kind of feel for the amount of noble gases that are being released from the vent.

Jim Klein states that the iodine monitor is somewhat calibrated, but still is reading off a bit, and needs some more work on it. Hopefully this calibration can be accomplished soon with the new man from Eberline plus the sales manager, Bob Richards, has been up here for almost a week now.

NOTE #36

At the 3:00 HP staff meeting we were tasked with a new item on April the 24th. We were asked to identify all the new iodine release pathways. Specifically asked to review the monitoring that was being performed during the can-gun operations. The can-gun operation is simply a large resin bed that water is filtered through in order to decontaminate it. It's the vent from this operation which needs to be closely controlled. I gave this job to Les Slaback, and on the evening of the 24th of April Les Slaback went out, reviewed the situation, came back, gave me a few of the details and said that he would write a letter or a memo to me concerning this. He seemed to feel that the situation was reasonably well in hand.

NOTE #37

I was asked to evaluate reducing the sample requirements for the GeLi detectors, especially the liquid samples. I again talked to Margaret Reilly about this, and she stated that it was really Walter Lyons' requirements and not hers and that she would be amenable to reducing the IUTS and IUES sample requirements to something significantly less than one sample every two hours. (Which is what we're doing right now). Margaret Reilly promised

to talk to Walter Lyons and see if she could persuade him to go along with a reduction in this sample frequency load. --End of this item for now, I'll pick it up later--

NOTE #33

I was asked by Tom Peterson and also by Fred Grace to evaluate the new proposed procedure for the prophylactic use of KI for stable iodine blockage of the thyroid. I took a look at the procedure, it's essentially the same procedure that Jim Brennan wrote with a few embellishments on it and a few forms. It looks good to me. I see no reason why it shouldn't be implemented immediately. However, I understand that Fred Grace wants to get this thing approved by the TMI lawyers. I'm a little apprehensive about this - it might take us forever.

NOTE #39

I had a call from Steve Gertz at the office who had talked to Michael Buring and also to Barbie Beck concerning reducing some of the frequencies and types of sampling the present emergency radiological environmental monitoring program for offsite TMI. Actually, what was proposed was that we will go from 3-day to 7-day periods for TLD monitoring, and that we would not do gamma scans of the daily milk samples unless - no gamma scans or strontium-90 analysis of the daily milk samples unless the milk contained greater than 10 pCi/l of iodine-131. These ideas seemed reasonable, and proper to me. I was informed that Bob Bores had been contacted concerning these and he was agreeable to all of these. I tried 3 or 4 times during the day to get in touch with Margaret Reilly and was unable to. I finally got her home around 9:30 or 10:00 in the evening, and had a good hour and a half discussion with her. She readily agreed to these changes in the radiological environmental monitoring program and asked me to send her a note about it. I have dictated this note to Dana, and it should have been ~~sent~~ sent off today, the 25th of April. (It was-dkf).

NOTE #40

POOR ORIGINAL

I got a phone call from Al Gryer, who was the chief NRC enforcement and inspection man on site for a while. Al stated that he was now the head of the NRC investigation team. The mission of this team is to gather facts and opinions concerning

NPC called me, I received a call from Bill Darley saying that he wanted to schedule this meeting and that the interviews were whole-heartedly endorsed by TMI management. They asked me if I could come on sometime in the afternoon of .....

POOR ORIGINAL

This is Sydney W. Porter, Jr. Dictating side #9 of the chronicle of the TMI accident starting early in the morning of the 25th of March, 1979. It is now the evening of the 25th of April and I'm recounting the events of the 24th of April.

NOTE #40 - Continued

POOR ORIGINAL

The NRC wanted me to come and talk to them on the 23rd. I balked at that and finally compromised on the , to say that I'd come for the morning of the 24th for a 3 hour session. The session started at 8:00 AM and, actually didn't start until about 8:20 or so, and ~~continued~~ because of the fact that Bill Barley wasn't there and we were waiting for him. The session continued until almost 1:00 in the afternoon, which really shot the hell out of the morning for me. The next scheduled session ~~is~~ was for 12:00 noon on Thursday, the 26th of April. I had worked till about 2:00 AM in the morning of the 24th and then was pretty prompt, I stopped in trailer #115 to pick up some files and notes for and arrived at about ten after 8 at the NRC investigation trailer, which is located just outside of the South ~~is~~ Construction Gate at the south side of Unit 2 on TMI.

Questioners were Thomas Essig, who is in charge of the I&E Environmental inspection people of Region 3, and Dale Donaldson, who is in charge of among other things, emergency planning at Region 1 I&E for the NRC. Also present was an ex-FBI man who was now called NRC investigator. He's the one that had me duly sign a very legalistic piece of information stating that I was willingly giving this statement and that I had no problem with open discussion of all these matters. I had asked that someone from TMI, Metropolitan Edison, be there with me, and Bill Barley was that person who was there with me from Met Ed. All in all, the questions were fairly good. Some of the things I could not remember and they kept asking me and asking me, and I kept saying "I don't remember, I don't remember". But aside from that, those annoyances, the questioning went fairly well and I answered as accurately and honestly as I possibly could. The thrust of the questions as I can remember them is that they were very interested in establishing the fact that I had made assessments of the dose off site individuals and that the PA BRH, DER personnel were aware of all the data that on and off site teams were gathering, because of the fact that this was being relayed through the hotline continually, and especially in the first 3 to 4 days that PA DER was kept up to



date on a continual basis with all the data that we were gathering, that there were no high levels of exposure in the environment from anything coming from TMI, and that we did not even begin to approach 10% of an EPA action level (and by the way, the PA State has adopted in toto the EPA action level as their guidance for when to take protective action). I made the point I believe again and again, that I was amazed that there was an evacuation of people of certain persons within the 5 mile radius, as far as I was concerned and as far as I know the State was concerned, and also as far as I know the Region 1 I&E people were concerned, there was absolutely no reason to take any protective actions whatsoever, at that point. The other major point that came up again and again was the fact that the installed process radiation monitoring system on the stack vent was of little or no use. The only thing that we could use it for during the entire sequence of events up until and including the 3 weeks of the accident, the only thing that we could use it for was the sample pump to pull samples through a charcoal filter and then we would take the charcoal filter off site to a low background area and count it. A number of questions were also asked concerning the availability of the off site radiological environmental monitoring program data. I stated that the samples were taken off at the first time on Thursday the 29th of April and that results began to be available on the morning, or sometime, I wasn't sure when, on the 30th of April. They questioned me carefully about the timing. I told them I'd have to get back to them. Since that time I've talked to Steve Gertz and apparently he called me sometime before 9:00 in the morning and discussed the results of TLDs and the air iodines and air and water with me. He also around 11:00 AM called this data into Bob Bores. During my meeting with the NRC on Thursday at 1:00 PM I will give this timing information to them.

NOTE #41

It was obvious on Wednesday and Thursday of last week that the B&W and the TMI GeLi detectors were not being fully utilized. In discussing this with several people I found that there was a mixup and that they were not being sent any air samples at all. I put a stop to that. However, there was another basic problem and that is that there were not enough people available to run the TMI GeLi detector around the clock. The other problem is that the B&W GeLi detector is only a 5% detector and has a very low sensitivity,

POOR ORIGINAL

and is not useful for about 90% of the samples now being generated from the plant. This is not to say that it won't be useful in the future - there are going to be a lot of hot samples that they're going to have to count sooner or later. In any case, the decision was made, and unfortunately no one talked to me about it at all. Dave Lemeroff made the decision arbitrarily from what I can see, to move the entire TH1 trailer up on the Unit 2 Turbine Hall deck. This disturbed me a bit, because it means that hot samples which are taken down essentially on the ground floor have to be walked through Unit 1 to Unit 2 \_\_\_\_\_ the sample sink and then up the stairs and out on the Turbine Deck floor. For extremely hot samples I think this is taking a calculated risk on having some contamination incidences, and to me it's just poor procedure. However, the decision had been made and the damn thing had been hauled up there by the time I found out about it, so I asked a few people about it and was told that it had been done, so I figured, well there's no use in rocking the boat now. In talking to Don Hetrick it seems that they want to take both the Unit 1 and the Unit 2 lithium drifted germanium detectors and also set them up on the Unit 2 Turbine Deck floor. The one glitch in this whole thing is the fact that the Unit 2 GeLi detector has never been set up and calibrated. It's been sitting in a packing crate for a number of months now. My strong recommendation to Dave Lemeroff and to Don Hetrick on the 24th of April was that they get the people from B&W who wrote the programs and did the original training, get them back here and set the system up. I made it known that I was not available to do this, and that I would not work on the GeLi detector system where I didn't have some access to the program. That's the greatly annoying thing about this program is that you have no way to get in to change it whatsoever. I think these proprietary programs are ridiculous when one thinks of the state of the art of the programs that are available commercially right now that are not proprietary. The other ridiculous point is that the instrumentation which B&W has recommended to the plant is antique as far as its speed is concerned - it takes 20 minutes to count a sample and then another 20 minutes to read out the damn thing. New instrumentation takes less than 5 minutes to read it out, and it's being read out simultaneously while another sample is being counted. Neither the Unit 1 nor the Unit 2 GeLi's are capable of both stirring spectra and simultaneously analyzing spectra. They pay a very dear price for going along with B&W on this,

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and that price is that they tie up their systems much, much longer than is necessary if they would have bought state of the art equipment rather than what B&W recommended. In any case, since they are stuck with this equipment, and they have it and it's needed now, I think the better part of valor is to get some knowledgeable people here from B&W to set up & calibrate Unit 2 and to help man these 2 units around the clock, and if a person were really sharp and well organized, actually one person could run three detectors if ~~xxxxxxx~~ the consoles were close by each other, one could run three detectors simultaneously. In retrospect, I should have done what my common sense told me to about 3 weeks ago, and that is to take Canberra up on his offer of a Scorpio system. The Scorpio system can easily operate 4 GeLi detectors simultaneously from one single console while analyzing a 5th spectrum. Analysis time is usually 5 minutes or less for the Scorpio system. This one person would not be busy all the time and yet <sup>be</sup> running 4 GeLi detectors. The other advantage of this Canberra Scorpio system is that it has enough memory so that one can store about 200 spectra in the memory and thus the more important spectra could be stored and the data could be reanalyzed at a later date and looked at further if important.

\* Enough of that editorial note, and back to the realities. I had mentioned this earlier  
\* and was told, "well, we have , we're not using Unit 1 TMI GeLi much and Unit 2 is still  
\* sitting in a crate - there's no use in buying a new one". Certainly <sup>not</sup> a great deal of practicality to that thought. However, I just hope that they get the B&W people in here to  
\* bring that idea to fruition so that we do in fact have usable systems with qualified  
\* people to run them. The SAI and the RMC people are weary now, and they do need a reduction  
\* in sample load. However, what's actually happened is there has been an increase in sample  
\* load because of the jerking around of the B&W people and the lack of people to run the TMI  
\* Unit 1 GeLi.

NOTE #42

As I discussed in an earlier note about 4 or 5 days ago - Lex Tsannaris and I worked all night in getting a preliminary report to Arnold on the number of Curies dumped from the beginning of the event via the liquid pathway to the environment. This data was rather rough and over the last 3 or 4 days both my people and Lex Tsannaris have been working very hard in refining the data. On Monday night, the 23rd of April, Lex Tsannaris discovered

a very significant error in part of the liquid data, the IMTS and IMFS data which had been summarized for us by the nuclear engineers up in the Unit 1 control room. Apparently the nuclear engineers had not given us what we had asked for. We had asked for the iodine specific activity in the sump samples before dilution. Now they did give us a column marked "iodine-131" however, they did not mark it that this was iodine-131 after credit had been taken for dilution. Thus we went on our merry way, thinking this was undiluted iodine numbers and applied a second dilution factor when it should not have been applied. Thank God Lex Tsaggaris caught this and he reevaluated the numbers and the numbers went up quite significantly. We were somewhere between 10 to 20 milliCuries and it turns out that the round number up to the 17th or 18th of April was somewhere around 200 to 250 \_\_\_\_\_ (tape gets very quiet and indistinct dkf.) Several lessons have been learned \_\_\_\_\_ .....

(Tape ends at #120 or thereabouts. dkf)

POOR ORIGINAL