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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

50-320

PRESS CONFERENCE

Chairman Joseph M. Hendrie

Nuclear Regulatory Commission

5th Floor
East West Towers
4350 East-West Highway
Bethesda, Maryland

Saturday, 31 March 1979

The press conference commenced at 2:45 p.m.

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PROCEEDINGS

MR. INGRAM: Before I introduce Chairman Hendrie, I would like to say that he is going to give you a status report on the situation at Three Mile Island as it currently exists. He will be happy to answer a few general questions related to the status of the facility that you might have.

Afterwards, his time is very limited. I know we have had a lot of difficult technical questions raised up here. We will have a member of our technical staff to follow up after the Chairman leaves to help you out as best he can on those if there are any nitty-gritty type questions.

At this point, may I introduce the Chairman of of the Nuclear Regulatory Commission, Dr. Joseph M. Hendrie - H-e-n-d-r-i-e.

CHAIRMAN HENDRIE: Thank you, Frank.

Ladies and gentlemen, I see we have developed considerable interest in this subject this afternoon, which is certainly appropriate. I ought to comment that the primary information transmittal sources that the Commission has been trying to provide are with Harold Denton and the NRC team down on the site where they are in immediate contact with the plant situation.

It did seem appropriate to try to provide for you at least a general parallel version of that situation up here this afternoon.

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The situation at Three Mile Island is that the reactor is -- continues to be in a stable configuration. The cooling of the fuel is continuing, using one of the main circulating pumps and removing the energy through one of the steam generators.

Changes in this cooling method are not contemplate in the immediate future, by which I mean, I would think this afternoon or tonight at any rate.

We consider it very important that any move from the present status of the reactor be very carefully thought through and agreed upon by the plant operating staff, by the NRC experts who are there, by the state people, so that we have some reasonable confidence in the maneuver when it comes.

It is clearly an intermediate situation with the plant at about 1000 pounds per square inch gauge pressure. It is not a situation which we would intend to hold for a long time, many days, and on out into a long term cooling and recovery mode.

We do need to get that gas bubble out of the react vessel and to get the pressure of the system down to a point where the normal decay cooling circuits can be used. And it is necessary to go to lower pressure for that.

I would say that the principle problem which lies before us at the moment, then, is to work out the means david3

of working with that gas bubble in the vessel and to get down to a low pressure, stable, long term cooling mode.

There have been small continuing releases of noble gas fission product activity. The readings in the neighborhood of the plant are down, as reported last night at the press conference that Governor Thornburgh and Mr. Denton held, in the fraction of an MR per hour or at most the one or two MR per hour range; so that these doses from present emission are quite low.

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We are in close contact here from the NRC Incident Response Center with our team at the site, the State people, other Federal agencies so that the coordination -- and with the Utility, of course -- so that the coordination is, I think, very good.

I talked to Governor Thornburgh several times yesterday. We stay in close contact. Mr. Denton is also in very close contact with him.

I think as a general statement that starts us out. Let's see where the questions take us.

QUESTION: Could you explain to us whether your feeling is that an evacuation would have to take place when you reach the crisis, when you have to make the move that would solve this bubble problem?

CHAIRMAN HENDRIE: It's certainly -- I would regard it as certainly a possibility and one that we will have very much in mind in considering that step. We will be discussing it, of course, with the State people, with the Governor and so on.

It may turn out to be a prudent precautionary measure in the event we feel that the process of getting rid of that gas bubble has some uncertain elements in it.

I guess I would comment with regard to the evacuation situation in general that while the reactor is stable at the moment, and appears well situated to remain so for the near term, that it is our judgment -- and we have recommended to the State people and to the Federal people connected with emergency planning -- that all of the emergency plan staff should remain on an alert status. We have just in mind that if the conditions at the plant should change, we are in effect keeping the need for protective actions on the public behalf as a sort of just constant and continuing consideration in our --

QUESTION: How wide an evacuation would that be?

QUESTION: Yes, if you decide to evacuate, how many are you thinking about? How big an area are you thinking about when you get to that step?

CHAIRMAN HENDRIE: Should evacuation be a recommended course, I would expect that it would be out to distances probably between 10 and 20 miles, and in a quadrant which would be in a downwind direction. That is a concern that you're trying to meet, in an evacuation there is the possibility of a significant release from the plant, a gaseous release. That release then, of course, moves downwind, would move downwind, and people who are upwind are in good shape, and people who are downwind would be better off to be out of its path.

QUESTION: How many people, roughly, would be in that kind of a quadrant?

CHAIRMAN HENDRIE: Well, it depends on the

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quadrant, and I guess I don't have very good population numbers right at hand.

It seems to me that the -- let's see. I see some Staff people close at hand. Does anybody remember what the 10-mile --

MR. INGRAM: I think probably until we get to that point that we shouldn't expect --

QUESTION: Could you review what options are being considered for removing this bubble?

CHAIRMAN HENDRIE: For removing the gas bubble from the vessel?

QUESTION: Yes.

CHAIRMAN HENDRIE: Not in any -- I wouldn't care to try it in any detail. There are a series of options. Each one of them involves starting depressurization. That is a letdown to the primary system into the rest of the -- just into the containment, and in that process to try to sweep out the gas that is now in the head of the vessel.

But these involve --

QUESTION: Is the gas in the head of the vessel, or is it suspended in the vessel?

CHAIRMAN HENDRIE: It would be in the head of the vessel.

QUESTION: What is the possibility of the hydrogen gas leaking out of the reactor and exploding?

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CHAIRMAN HENDRIE: I guess if it would leak out of the dome of the vessel I would be very pleased with it. That is the thing that we would hope to accomplish by the steps that I was talking about a second ago, one or another of these various options, piping connections, valving connections, and so on.

QUESTION: Can you continue that scenario of sweeping out the --releasing the water into the containment? You started explaining the process of this option.

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CHAIRMAN HENDRIE: What I was going to say about these options is that I'm not in a position of tracing through the various piping legs which line would be used at which point and so on. Those things are under intensive study, and they are far from settled sequences.

All of the possible problems and advantages of the individual options haven't been examined, and I don't -- in any event, don't have them in mind to report them to you in detail.

QUESTION: Mr. Denton said this morning -- this afternoon that the primary coolant pump was an integral part of keeping that reactor stable. That pump is now operating at about half its normal design pressure. Is there any danger of that primary cooling pump going down and forcing some quick decision that will not allow all the scientific analysis; something will have to be done immediately?

CHAIRMAN HENDRIE: We always have to recognize the possibility that a piece of mechnical -- electrical-mechanical equipment may have a failure. I wouldn't rule that out. I think it's not a likely course at the moment. These pumps are pretty reliable pieces of equipment. The fact that it's operating at a system pressure which is about half of normal operating pressure is not a significant element.

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If anything, it's slightly easier to service for the pump because the pressure on the seals and so on is down by a factor of two.

QUESTION: How long is he actually going to wait until something begins to go wrong before they suggest evacuating the people within a 10 to 20 mile radius of the plant?

CHAIRMAN HENDRIE: Well, evacuation is always a fairly traumatic experience, and there are some costs and burdens and possibilities of accident that have to be considered there and balanced in the overall assessment. We wouldn't necessarily at all wait until there was a demonstrated disaster in hand to strongly recommend recommendation.

If we felt at any point that it would be a prudent precautionary measure, why we will recommend a partial or full evacuation.

QUESTION: Mr. Thompson was saying yesterday that this was a very risky sort of procedure that has never been done before. So I'm trying to get some feel for how much risk you take without deciding to evacuate the area.

CHAIRMAN HENDRIE: I think I can't put numbers on that sort of a proposition.

QUESTION: I wondered if you could clear up some

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apparent confusion in Pennsylvania this morning.

The Metropolitan Edison people indicated the size of the bubble had been reduced. Then Mr. Denton later on indicated something different from that.

I wonder, has the size of the bubble been reduced, and if so, by what process?

CHAIRMAN HENDRIE: I think there may be some confusion about which bubble and where. There are in fact two bubbles in the primary system; one of them is in the pressurizer, a smaller tank off to the side which is used to control the system pressure.

There is in normal operation a steam bubble in there, and there is one now, and it's believed that inevitably some of the hydrogen that is in the system would be in that bubble. How much, I can't -- I just don't know. Then the bubble that we are worried about -- and what we mean when we talk about "the" bubble is the one in the reactor vessel, which is -- occupies the reactor vessel head.

Now, the procedure that has been going on at the plant through part of the morning was to let down a small stream from the pressurizer with the intention -- to the containment volume and not releasing it, just letting it down to the containment volume.

And the intent there was to try to carry some of the dissolved gas out and just release it in the containment

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and get it out of the primary system.

QUESTION: I'm still not quite clear. Does that mean that that bubble was affected, and how?

CHAIRMAN HENDRIE: To the extent that some gases came out without letdown, I guess you could say the bubble would be reduced.

QUESTION: Which bubble?

CHAIRMAN HENDRIE: The pressurizer bubble.

QUESTION: Not the reactor vessel; that's the same.

CHAIRMAN HENDRIE: I don't think so.

QUESTION: Mr. Hendrie, under what circumstances would any consideration be given to the safety of the people in the Washington area?

What sort of circumstances would prompt you to do anything in that regard?

CHAIRMAN HENDRIE: Let's see, how far are we from Harrisburg, 100 miles? It would be -- that's a pretty unlikely situation.

QUESTION: What does "unlikely" mean? Is there no circumstance under which there could be enough radiation in the atmosphere that winds could bring it into this area and prompt it to be a consideration?

CHAIRMAN HENDRIE: Not in the quantities that woul be of concern.

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QUESTION: What about Baltimore, which is half as far, Mr. Chairman?

MR. INGRAM: I think we're getting into awfully speculative areas at this point in time. I don't think he can try to answer that.

QUESTION: Has the bubble uncovered the core?

CHAIRMAN HENDRIE: Not that I know. Not that we know.

QUESTION: Can I proceed with Baltimore just for a second?

You're talking about 10 to 20 miles is the possibility. 20 miles is almost half-way from the site to Baltimore.

Can you give me -- what is your response to the Baltimore area possibility?

CHAIRMAN HENDRIE: And 10 miles is a fifth of the way to Baltimore.

QUESTION: Sure.

CHAIRMAN HENDRIE: What one looks at are the concentration, lines of constant concentration in view of other conditions that are expected to prevail over the time when you might be concerned about a release. In normal diffusion conditions, a 10 knot wind speed, and so on; but diffusion conditions are fairly good. The

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concentrations tend to fall rapidly to levels which would not in my judgment cause -- give you a reason to ask for evacuation. And the distances at which that would occur for normal daytime diffusion conditions in something like a 10 knot wind are just a few miles.

So when I talk about 10 or 20, I'm trying to encompass a pretty fair part of the possible --

QUESTION: Can we go back to hydrogen for a minute and the chances of an explosion inside the reactor from the hydrogen that's in the bubble.

That's one question. And then the problem you have with the containment, the hydrogen in the containment and the recombiner.

CHAIRMAN HENDRIE: Okay, the bubble -- with regard to the bubble in the vessel, there is -- that is a problem which is of concern and which we are working on very intensively at the moment.

As long as the bubble has a hydrogen steam fission product gas composition, why it's not flammable. But if enough oxygen over a longer period of time were evolved, why it could become a flammable mixture.

Now, it is a fairly high pressure 1000 pound per square environment, wet environment, and contained in the vessel dome; in fact at the moment, a little too well contained for our purpose; so that there aren't ignition

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sources at hand, and the indication out of staff calculations and other calculations are being done for us by other experts around the country.

This preliminary indication from that is that we are some time from any possibility of a flammable condition. But that is a preliminary result, and it is a concern, and we are working very hard on that.

QUESTION: Could you allow him to finish that up with the recombiner? There are two hydrogen problems.

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CHAIRMAN HENDRIE: Okay.

With regard to the containment, then, there was a sample taken last night, I believe, or this morning that goes something like a percent and a half or 1.7 percent hydrogen in the containment. The balance of the atmosphere is about 16, 17 percent oxygen, and the rest nitrogen, and then trace gases. That is below the flammable, well below the flammable limit at those -- at the containment condition

One of the things which the plant staff is now in the process of doing is to hook up and get operating the hydrogen recombiners that are a part of the plant safety systems. And I would expect when they get that in place that we will have them establish circulation through the recombiners and just pull that residual -- begin to pull that residual -- begin to pull that residual amount of hydrogen down.

QUESTION: From the containment?

CHAIRMAN HENDRIE: From the containment.

QUESTION: But not from the reactor pressure vessel?

CHAIRMAN HENDRIE: Well, at some point we hope to be able to get the bubble that is in the vessel down out of the vessel, and the place it will go is most likely the containment.

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QUESTION: Mr. Chairman, is the NRC actively now mpb2

at other Babcock and Wilcox sites checking for possible similar problems, or will it recommend that be done immediately?

CHAIRMAN HENDRIE: We are looking at everything we know about the Three Mile Island sequence and are looking to get an advisory out to the other B&W plants as soon as possible.

If we find circumstances that indicate other action, why, we'll take other action.

MR. INGRAM: Mr. Chairman, if you will take one question here, then I think we'd better get you out of here so you can get back to your business.

QUESTION: Do you still say that the chances of a core meltdown or something getting through the containment vessel, the containing wall, is now still extremely low, or have the chances of those -- one of those two things happening increased in your judgment?

CHAIRMAN HENDRIE: I don't think they have changed very much in the past day or two. That is from this stable condition of the system as it is now, it's been there now for -- what? -- a day and a half or something like that. And I think it's just about the same.

MR. INGRAM: I think, ladies and gentlemen, we could go on forever this afternoon, and the Chairman does have important business to attend.

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(Whereupon, at 3:03 p.m., the press conference was adjourned.)

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<u>Three Mile Island Incident</u>

Summary of Initial Response and Radiological Surveys

At about 0700 hours, the license identified high levels of radioactivity in the reactor coolant sample lines - there were radiation readings of about 600 mr/hr at contact with the sample lines - and a "site emergency" was declared.

At 0730 hours the license declared a "general emergency" based on high radiation levels in the reactor building, and began notification of certain Federal, State and local agencies according to emergency procedures. At 0830 hours the radiation levels at the site boundary were reported to be less than 1 mr/hr.

NRC Region I received notification of the general emergency condition at the plant at approximately 0745 hours, March 28. After evaluation of the reported conditions, an NRC incident response team was assembled and dispatched to the site and the situation was reported to NRC Headquarters.

The NRC response team, consisting of reactor operations specialists and health physicists, left the Region I Office at 0845 hours and arrived onsite at 1005 hours, March 28.

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Concurrent with the assembly and dispatch of the team, operations centers were activated both at the Region I office and at NRC Headquarters. Notificaton procedures were initiated at both NRC Region I and NRC Headquarters to inform the Commissioners, NRC staff and other State and Federal agencies.

At 0859 hours the NRC notified the Department of Energy's Emergency Operations Center at Germantown, Maryland and requested that an aerial survey (AMS, Aerial Measurement System) team be dispatched promptly to the site. The AMS helicopter arrived at the site and had located, tracked and made measurements in the plume by 1515 hours, March 28.

Returning to earlier events, the NRC incident team, arriving onsite at 1005 hours, measured radiation levels of less than 1 mr/hr at the north gate, 3 mr/hr in the north parking lot and 7 mr/hr at the east side of the island. The NRC team, after being briefed by the licensee regarding radiological and plant conditions, immediately set out to gather additional radiological data.

Radiation monitors in the plant showed abnormally high radiation levels in the containment and auxiliary building which prevented personnel access into certain areas. Radiation surveys also identified elevated levels of radiation outside plant buildings; however, the condition outside were not of such a level to prevent the gathering of survey data. Radiation surveys determined that a release of airborne radioactivity was occurring.

At 1110 hours, radiation levels of 3 mr/hr were measured at the plants' observation center on Route 441 immediately east of the plant, and at 1130 hours, levels of 0.3 mr/hr were measured on Route 283 near Harrisburg.

By the afternoon of March 28, survey measurements showed radiation levels up to 15 mr/hr (beta-gamma) in the plume at ground level and levels generally less than 1 mr/hr (beta-gamma) outside the plume. The highest measurement of about 70 mr/hr (beta-gamma) was at 1520 hours at the north gate of the plant.

Aerial surveys the afternoon of March 28 located the plume travelling in a N to NE direction in approximately a 30° sector, and radiation levels of 0.1 mr/hr were measured at about 16 miles from the site at an altitude of several hundred feet. The aircraft survey identified, by gamma spectral analysis, the radioactivity as principally xenon-133.

By the evening of March 28, the agencies conducting radiation surveys and sampling operations included the licensee, NRC, DOE and the State of Pennsylvania. In addition to the DOE AMS helicopter and aerial survey team and the NRC team and portable equipment, a mobile laboratory of the NRC Region I office had arrived at the site to process and analyze samples.

Sampling and analysis of milk and air sampling for radioiodine had begun and has continued to date. Thus far, only low levels of radioiodine in milk and air have been reported. The levels are far below the level of action for control of dairy herds or milk. The sampling will continue until some time in the future and the results are continuing to be evaluated.

By March 29, the NRC team at the site had established a routine operation and procedures for obtaining both onsite and offsite radiological data. This information was being relayed to the NRC Region I (Philadelphia) office and to the NRC operations center in Bethesda, Maryland. Aerial surveys were being conducted at 3-6 hour intervals.

During March 29, radiation levels at the site boundary on the island ranged up to about 50 mr/hr (beta-gamma). The plume during the morning of March 29 extended in a N to NW direction, and aerial surveys measured 0.5 mr/hr at 1 mile and 0.2 mr/hr at 10 miles from the site. Offsite ground surveys measured levels generally less than 1 mr/hr during the day; maximum offsite radiation levels of 20 mr/hr (gamma) and 30 mr/hr (beta/gamma) were measured one mile west of the plant in Goldsboro at 0600 hours. These levels persisted for a short period of time, less than one hour.

By the end of March 30, the number of NRC staff at the site had grown to 83, including Regional Office and Headquarters personnel. Radiation surveys were more scheduled and routine. Ground level surveys in offsite areas downwind from the site measured radiation level ranging from less than 0.1 up to 1.8 mr/hr. Aerial surveys measured radiation levels of 8-10 mr/hr over the site, and levels of 6-8 mr/hr in the plume near the site. In the evening of March 30, the plume was tracked in a northwesternly westernly direction from the site and was not detectable beyond 5-6 miles away.

By the end of March 31, ground and aerial surveys were being coordinated on a frequent scheduled basis and the results being reported regularly to NRC Headquarters. Information on results of milk, water and air sampling was being received and evaluated. Results of licensee's TLD stations (18 stations within a 15-mile radius of the reactor) were received. The TLDs had been in place for three months and had been exposed for about 32 hours after the incident. Three dosimeters showed exposures above normal levels; the highest was from a station on Three Mile Island, 0.2 miles NNW of the reactor - 921 mr, approximately 905 mr above previous normal quarterly readings; the other high readings were 0.4 miles north of the reactor -81 mr, approximately 65 mr above previous normal quarterly readings and a station at north bridge, 0.7 miles NNE of the reactor - 37 mr, about 22 mr above normal quarterly readings.

On March 31, the NRC established 37 TLD stations within a radius of 12 miles of the site. Two or more dosimeters were placed at each station, one to be left indefinitely for integrated dose and the others to be changed daily. The first day of this monitoring (March 31-April 1) showed the highest reading of 1.1 mr/hr at ½-mile ENE of the plant. Other readings were much less and have decreased steadily since.

As of April 4, the following information had been received on sampling and analysis for radioiodine:

Approximately 130 offsite water samples, analyzed by NRC, DOE and the Commonwealth of Pennsylvania, showed no detectable radioiodine.

Approximately 150 offsite air samples had been taken and analyzed by NRC, DOE, the licensee and the Commonwealth. Samples were collected at distances out to 40 miles. Only 8 of the samples indicated detectable concentrations of iodine; these were in the range 2.7×10^{-13} to 2.4×10^{-11} microcuries/cc, the highest being about 1/4 of the MPC established for unrestricted areas in 10 CFR Part 20.

Approximately 200 samples of milk had been analyzed by the State and FDA. The results ranged from minimum detectable activity to 41 picocuries per liter; there were two samples at or near the higher level. By comparison, the HEW recommends placing dairy herds on stored food when iodine-131 in milk reaches 12,000 picocuries per liter.

Approximately 170 vegetation samples had been collected and analyzed by DOE, NRC and the Commonwealth of Pennsylvania. The samples were collected from various sites within 2 miles of the plant. None showed any detectable radioiodine.

Approximately 150 samples of soil were collected and analyzed by NRC and DOE. None showed any detectable radioiodine.

As stated previously, sampling and analysis of air and milk for radioiodine is continuing. As a further measure in evaluating the significance and health implications of any radioiodine released from the plant, actions have been initiated to have a selected number of persons analyzed in a "whole-body", radiation measuring system. The people selected would include both licensee employees who were onsite, and local offsite residents.

Recent aerial and ground level surveys results indicate radiation exposure rates to be consistently less than 0.1 mr/hr.

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SUMMARY OF RADIOACTIVE LIQUID

RELEASE SITUATION

(IWTS)

The Industrial Waste Treatment Sump (IWTS) and the Industrial Waste Filter Sump (IWFS) normally collect nonradioactive liquid industrial wastes at the TMI facility. The normal sources of water to these sumps are floor drains and other sumps located in facilities which do not have radioactive systems. The IWFS and IWTS are periodically discharged to the Susquehanna River by being pumped (approximately 130 gpm) into the cooling tower blowdown which flows into the river at a location just South of the Unit 2 mechanical draft cooling tower. The 60,000 gallon per minute cooling tower blowdown dilutes the IWFS/IWTS discharge by a factor of approximately 500 before it enters the river.

During the TMI incident, the high concentration of radioactivity in primary systems cross-contaminated normally non-radioactive secondary systems and contaminated water eventually ended up in the IWFS/IWTS. The precise

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ENCLOSURE 6

timing of these events is not known. To preclude overflow of the IWFS/IWTS the licensee initiated discharge at about 1300 hours on Thursday, March 29. Log records show that the licensee considered a controlled diluted release a better alternative than letting the sump overflow with a resulting undiluted release to the river. NRC analysis of water in the IWFS/IWTS at this time indicated the presence of Xe-133 and Xe-135, but results were not precisely known because the radioactivity in the gaseous plume being released interfered with radiation counting instruments used to analyze the samples. However, it was determined that no iodine was present and the Xe concentrations were not considered significant for the release pathway. Prior to the initial release NRC consulted with the State of Pennsylvania, Bureau of Rad Health who was in agreement with NRC's position to allow releases as long as Technical Specifications were met. The State later, however, expressed concerns and at approximately 1800 hours on Thursday, March 29, NRC requested the licensee to stop discharging pending further analysis of the situation.

After consultation with the State, NRC and Pennsylvania subsequently authorized the continuation of release at 0015 hours on Friday, March 30. The licensee began making releases again at 0430 hours on Friday, March 30. Intermittent releases continued until Monday, April 2, when the State of Pennsylvania requested they be discontinued.

Due to a backlog of samples for analysis, NRC did not become aware of radioiodine in the waste water until the sample counted at 1430 hours on Saturday, March 31; this sample had been collected at 0400 hours that morning. Also, because samples were being split with the licensee's contractor, the samples were not being analyzed in the same order in which they were collected. During subsequent analysis it was determined that iodine was initially present in the discharge on early Friday, March 30, as identified by a sample collected at 0200 hours on Friday, March 30. This particular sample was analyzed at 0133 hours on Sunday, April 1. Releases were again terminated at 1110 hours on Monday, April 2. Several reasons exist for the approximate two day time frame between identification of radioiodine in the water and cessation of releases. First, the NRC laboratory was merely processing samples and was not in a position to interpret the results. Second, the feedback of results of sample analyses to those who might interpret them was hampered by the overall urgency of the moment. Third, the majority of samples were below the release limit, thereby making this a low priority matter relative to the other events at the time.

After further review of the matter and additional consultation with both the States of Pennsylvania and Maryland, joint agreement was reached and the licensee was again authorized to make releases on Thursday morning 4/5. The licensee began discharging again at about 0300 hours on Friday with no further problems noted.

It should be noted that three organizations have been performing sample analysis. NRC and the licensee's contractor were performing analysis on the scene and the samples were then forwarded to the State of Maryland for analysis. Analyses performed at the scene were considered preliminary because of counting interference caused by the gaseous releases from TMI

Unit 2. Obviously, there would be some time delay in receiving Maryland's results.

It should also be noted that a State of Pennsylvania representative (Bill Dornsife) was at the scene throughout these events and was frequently receiving the results of all sample results. This person stated that he had received all information in a timely manner.

Review of sample analysis indicates that the maximum concentration of radioiodine released was 2.7×10^{-6} microcuries per milliliter (μCi/ml) of iodine-131, after dilution; this is approximately nine times the instantaneous release rate limit specified in the plant's Technical Specifications; the limits are the concentrations for unrestricted areas listed in Table 2, Appendix B, 10 CFR Part 20 and whereas Part 20 allows concentrations to be averaged over a year to achieve compliance, the Technical Specifications limit discharges to Part 20 concentrations on an instantaneous basis. The majority of samples averaged approximately 2.4×10^{-7} μCi/mℓ or about 80% of the Technical Specification limit. At no time was any radioiodine identified in any river water samples collected downstream of the release point.

PRELIMINARY EVALUATION OF HEALTH EFFECTS
OF THE THREE MILE ISLAND INCIDENT

Radiation monitoring indicates that the exposure of the general population in the immediate vicinity of the plant was well within the limits of NRC regulations (10 CFR Part 20) for annual doses to members of the general populations. They did exceed the numerical design objectives for normal reactor operation of 5 millirem per year (Appendix I to 10 CFR Part 50). The sources of exposure were radioactive gases (xenon, krypton and iodine) that leaked from the plant -- primarily from the auxiliary building. Radioactive iodine (I-131) would be of particular concern because of its concentration in food, particularly in milk. However, as of April 3, 1979, it appears that no more than 3.0 curies of radioiodine were released. Iodine levels observed in milk samples are less than one-tenth of those observed in milk following the Chinese nuclear tests in the fall of 1977. The predominant radioactivity released from Three Mile Island was the noble gas Xenon-133. The NRC has estimated that as of April 5, 1979, approximately 10 million curies of Xe-133 were released. An independent estimate of Xe-133 releases by Lawrence Livermore Laboratory is 14 to 34 million curies, thus both estimates are in agreement considering the extent of the uncertainty in the estimates.

An ad-hoc dose assessment group of representatives from NRC, EPA and HEW have made estimates of the radiation doses to the population around the Three Mile Island plant, based primarily on monitoring of offsite areas by thermoluminescent dosimeters. The calculated, total cumulative, 50-mile radius population dose from March 28 to April 8,* was approximately 2400 man-rems, which is equivalent to an average dose to individuals of 1.1 millirems. The maximum dose to an individual offsite (hypothetical individual continuously present out-of-doors at a location 0.7 miles NE of the plant) is still estimated to be less than 100 millirems (85 millirem). This is within the dose limits recommended by the National Council on Radiation Protection and Measurements for annual doses to a member of the general public (170 millirem per year). These estimates are whole body gamma doses resulting primarily from the relatively weak gamma radiation from Xenon-133 (80 keV).

The health impact of the estimate of maximum individual dose for a hypothetical individual exposed out-of-doors for entire duration at location of highest measured offsite dose can be considered in terms of the added risk of a fatal cancer. The existing lifetime risk of fatal cancer is approximately one-eighth (0.12). The estimated risk from natural background is approximately one to two percent of this value (0.0017). The added risk delivered to the hypothetical individual would be 0.16% (0.000019) of the existing risk of a cancer death or about one percent of the estimated risk from natural radiation (1.1%). The potential health impact of the estimated population dose including fatal and non-fatal cancers and genetic effects to all future generations is 1.3 health effects; and the number of potential fatal cancers over the lifetime of the population is 0.45. This can be compared to the existing cancer death rate of 4,500 per year and

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*From April 4th on, these values have been updated by members of the NRC Staff.

the estimated incidence from natural background radiation (125 millirem per year) of 54 per year. This supports the conclusion that the accident will not produce any detectable cancers within the lifetime of all of the residents in the area.

Resident Inspection Program

In May 1977 the NRC decided to adopt a revised inspection program that, when fully implemented, will include assignment of resident inspectors to each operating power reactor site, to selected fuel facilities and to power reactor sites in the later stages of construction. This decision was based upon the results of a two-year trial program of resident inspection which was completed in October 1976. The trial program demonstrated that the concept of locating inspectors near reactor sites has the potential for increases in both effectiveness and efficiency when compared to the program of inspections conducted by inspectors based in a regional office which may be several hundred miles from a reactor site.

In May 1977, the Commission requested that OMB approve an amendment to IE's FY 1978 budget to provide resources needed to begin implementation of the revised inspection program. A FY 1978 supplemental request was submitted to the OMB on September 15, 1977 and was signed by the President on September 8, 1978. The initial resident inspector under this program arrived onsite in July 1978. Currently, there are resident inspectors assigned to 20 reactor sites. As a result of the Three Mile Island accident, at each of these sites with similar Babcock and Wilcox designed reactors, a full-time inspector was assigned to provide the equivalent of the resident inspection program.

A description of the Revised Inspection Program for Nuclear Power Plants was published as NUREG-0397 (March 1978).

The four elements of the revised inspection program provide a balanced examination of the activities of the licensee. The revised program consists of:

- Resident inspectors onsite at all reactors in operation, at reactors in the late stages of construction, and at selected fuel facilities.
- Region-based inspectors who will supplement the inspections performed by the residents with highly specialized inspections in such areas as environmental monitoring, physical security and health physics.

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ENCLOSURE 8

- Performance appraisal inspectors to independently assess licensee performance, the effectiveness of the NRC inspection program and to confirm the objectivity of inspectors.
- Increased independent verification of licensee activities.

The specific requirements of resident, specialist, and performance-appraisal inspectors and of the entire program create a need for a comprehensive approach to training, management of the inspection force and career development. An expanded training program for all types of inspectors and an enhanced career management plan assure the performance of all elements of the inspection program by well trained and experienced inspectors.

In May 1977, the Commission requested that OMB approve a budget amendment for IE for 125 people and $6,000,000. These resources were requested to allow IE to begin implementation of the resident inspection program in FY 1978 with full implementation in FY 1981.

In June 1977, the Office of Inspection and Enforcement developed its program plan for implementation of the resident inspection program. This plan assumed timely approval of the budget amendment request and aimed toward having the first resident inspectors onsite in FY 1978 with full implementation by the end of FY 1981. The planned schedule was:

	FY 78	FY 79	FY 80	FY 81	FY 82
Residents	35	46	111	133	152

In September 1977, the OMB approved a portion of the May 1977 request for additional resources. This OMB approval provided for increasing the NRC full-time personnel ceiling by 75 to allow earlier implementation of the revised program. Under this OMB-approved amendment (submitted to Congress in January 1978), the manning schedule was:

	FY 78	FY 79	FY 80	FY 81	FY 82
Residents	22	49	76*	93	98

*All operating reactor sites manned.

At full implementation, it was planned to have at least one inspector at sites with reactors in the later stages of construction, in pre-operational test, or in operation.

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In September 1978, the FY 1978 supplemental request was signed by the President and the NRC was allocated 61 positions and $2,650,000 for the revised inspection program. The Office of Inspection and Enforcement, in anticipation of approval of the FY 1978 supplemental had initiated recruitment efforts and was successful in promptly recruiting personnel.

In the planning for the resident inspection program, an integral part of the revised program was a national level performance appraisal effort. This is intended to provide for (1) evaluation of NRC licensee performance from a national perspective, (2) evaluation of the effectiveness of the NRC inspection program, and (3) confirmation of the objectivity of NRC inspectors.

The modifications to the revised inspection program from the initial budget amendment request to OMB to the approved FY 1978 supplemental are:

<u>Budget amendment request for 125 additional people (May 1977)</u>

Manning Schedule:

	FY 78	FY 79	FY 80	(Full Implementation) FY 81	FY 82
Resident Inspectors	35	46	111	133	152
Performance Appraisal Inspectors	42	78	119	157	157

Full implementation in FY 1981 includes:

- One inspector for each reactor phase (construction, preoperational testing, operations) at a site.
- Additional inspectors so that no inspector would cover more than two reactors in any one phase.

Approved FY 1978 supplemental of 61 additional people

Manning Schedule:

	FY 78	FY 79	FY 80	(Full Implementation) FY 81	FY 82
Resident Inspectors	22	49	76	93	98
Performance Appraisal Inspectors	10	15	17	28	33

Full implementation in FY 1981 includes:

- One resident at each site with an operating reactor
- One resident at each site with a reactor in a later stage of construction
- One resident at each of six selected fuel plants

Currently, there are resident inspectors assigned to 20 reactor sites. At these 20 sites are:

26 operating reactors

2 reactors in the preoperational test phase

6 reactors under construction

As a result of the Three Mile Island accident, at each of three additional sites, an inspector was assigned to provide the equivalent of the resident inspection program. On these three sites is a reactor of Babcock and Wilcox design similar to the Three Mile Island reactor.

The phased implementation of the resident inspection program resulted from the need to train newly hired inspectors, and the need to maintain a qualified base of inspectors in the regional offices. Currently, the implementation of the program is on schedule.

POPULATION DOSE ESTIMATES

During the week of April 1, a joint NRC/HEW/EPA ad-hoc study group agreed on the methodology to be used in estimating the radiation dose received by the population within a fifty (50) mile radius of the site. In addition, the study group calculated the initial dose estimates up to April 4. Using the agreed upon methodology, as of noon April 8, the NRC has estimated the total population dose within a fifty mile radius to be 2400 man-rem. There are approximately 2 million people living within the fifty mile radius of the site. Thus, the radiation dose to an average member of the population is estimated to be in the range of 1-2 millirem.

It is estimated that the maximum radiation dose received offsite by a member of the public is less than 100 millirem (~85 millirem is the current best estimate). This individual would have had to be continuously present out-of-doors at the site boundary approximately 0.7 miles northeast of the reactor, which is the point at which the higher radiation dose rates were measured.

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