NRC
. S
6/10/80
Parker
bfml

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

~~ADVISORY COMMITTEE ON REACTOR SAFEGUARDS~~

CONTINUATION OF DISCUSSION OF TMI VENTING

Nuclear Regulatory Commission
Room 1130
1717 H Street, N.W.
Washington, D.C.

Tuesday, June 10, 1980

The Committee met, pursuant to notice, at 10:05 a.m.

BEFORE:

JOHN F. AHEARNE, Chairman of the Commission

JOSEPH M. HENDRIE, Commissioner

VICTOR GILINSKY, Commissioner

RICHARD T. KENNEDY, Commissioner

PETER A. BRADFORD, Commissioner

STAFF PRESENT:

SAMUAL J. CHILK, Secretary

LEONARD BICKWIT, General Counsel

MARTIN MALSCH

E. S CHRISTENBURY

L. CHANDLER

E. HANRAHAN

H. DE' TON

bfm2

STAFF PRESENT, (Continued):

DR. B. SNYDER

DR. F. CONGEL

JOHN COLLINS

bfm3

P R O C E E D I N G S

CHAIRMAN AHEARNE: Last week the staff submitted its final environmental assessment for our decontamination of Three Mile Island Unit 2 reactor building atmosphere. We had a meeting last week which included summarizing the assessment and also the public comments.

The staff examined many alternatives and concluded that venting was the best choice. At last week's meeting, the Commission did not vote a decision. There were many public comments, almost 800 written comments.

After the first large meeting in the Middletown area, we concluded that instead of holding only one additional meeting, we would hold many smaller meetings. As a result, there have been many additional meetings, both here and in Pennsylvania with both the NRC staff and Commissioners participating.

I know there is great concern and strain. However, many groups have reviewed the potential hazard to physical health from venting and have concluded there are essentially no physical hazards. The groups include the NRC staff; the Governor's Commission on Three Mile Island, led by Lieutenant Governor Scranton; the National Council on Radiation Protection and Measurements.

For those of you who are unfamiliar with the NCRP, it is a non-profit corporation chartered by Congress and has as one of its objectives in its charter, to collect, analyze, develop,

bfm4

and disseminate in the public interest information and recommendations about protection against radiation.

Other groups also reaching the conclusion that there were no physical hazards associated with the venting include the Bureau of Radiological Health of the Department of Health, Education, and Welfare; the Environmental Protection Agency; and the Union of Concerned Scientists.

I, at least, have concluded therefore that there will be no physical health hazards to venting. Unfortunately, there will be some who will still believe there is a great health hazard.

Just yesterday I received a letter, obviously written in anguish from a mother who wrote: "It has caused me great pain to know that my child will be exposed to unnecessary additional radiation daily during the summer of 1980, and that I will bring my brand new baby home to the filth in the air, which I cannot see."

I empathize with the anguished people, but I believe we have thoroughly examined the questions and have fairly and truly found that there are no physical health hazards to venting.

Remaining is the mental stress issue. In another proceeding, the Commission is examining the issue of psychological stress. Do we have to consider it; and in what ways?

Although I have not reached conclusions on those issues, the mental anguish of the people in Middletown and neighboring

bfm5

areas has weighed heavily on me since the accident last year. In letters, phone calls, and meetings, this stress has come through strongly. As we heard at the last meeting, there are some medical professionals who believe stress can be eliminated or greatly eased by making a clear decision and by getting rid of the gas in four to six months.

The real physical health hazards at TMI-2, I believe, are associated with the highly contaminated water inside the reactor in the containment, and possibly with the badly damaged fuel.

THe safety contamination and clean-up must proceed. I believe we should now decide on what to do with the krypton.

At the last meeting, we asked the General Counsel to draft an order for the krypton to be vented, and in such a way that both the fast and slow purge systems should be used. The venting should start with the slow system and when the weather is right, shift to the fast.

The weather conditions to keep the releases below NRC-EPA precautionary limits for a normal plant. Also, at the last meeting, I asked the General Counsel to prepare an additional order that would lift what is, in fact, an additional limitation to control an operating plant independent of weather conditions.

In the present case, monitoring will enable the weather conditions to be used to control release rates, so as to control actual doses off site.

bfm6

Therefore, in order to get the venting over as soon as possible, I believe, it appropriate to allow the waiving of the current tech spec values. Draft orders are before us. I hope we can make decisions today on both of those issues.

Mr. Bickwit, would you care to summarize the two orders you have prepared for us?

MR. BICKWIT: The first order would grant permission for the venting in accordance with the conditions prescribed by the staff in its recommendation. The situation that you face from a legal matter is that the licensee may vent only if it receives approval from the NRC.

The first order would grant that approval, subject to the conditions imposed by the staff. It poses three questions which will have to be decided by the Commission. These are listed toward the bottom of page 2 of the order.

It states that the Commission must decide whether there is "sufficient need for prompt decontamination of the containment atmosphere to just-fy going ahead prior to completion of the programmatic impact statement."

It must also "decide whether the decontamination method recommended by the staff can be carried out consistent with the Commission's statutory mandate to ensure adequate protection of public health and safety;" and three, "whether the evnironmental review has met the requirements of the National Environmental Policy Act."

bfm7

The order goes on to deal with each of those questions and comes to the conclusion that each of them can be resolved in a way which will permit the action which the staff recommends.

The second order is a modification, a temporary modification of the license which would relieve the licensee from certain tech spec requirements. Because it is an amendment to the license, an opportunity for a full adjudicatory hearing is offered to those who could be adversely affected by the order.

The finding is made, however, that there are no significant hazards, considerations involved in the issuance of this order. Therefore, the required hearing, if held, would be held after the fact of the permitted actions.

CHAIRMAN AHEARNE: And incorporated into the already scheduled hearing?

MR. BICKWIT: That is right. We presently have a proceeding in which there have been requests for hearings with respect to changing the original tech specs for this license. That hearing has not been granted at this point. This order provides that if that hearing is granted, and if a hearing is granted under this order, that the two would be consolidated.

CHAIRMAN AHEARNE: All right.

COMMISSIONER GILINSKY: Could you summarize the modifications in the second order?

MR. BICKWIT: Yes. The present tech specs, as I understand it, would nor permit the venting either by a fast purge or

bfm8

by a slow purge. The current tech specs stand in the way of both of those actions. The fast purge is, as I understand it, inhibited by the releases that can be taken -- that can be made in a sudden fashion, whereas the slow purge is inhibited by the quarterly release limits.

CHAIRMAN AHEARNE: You mean that doing it in a given quarter -- completing it in a given quarter?

MR. BICKWIT: That's right. So that these particular tech specs do not stand in the way of either such action. I think I ought to ask Bernie Snyder, who has recommended the precise limits that are incorporated in this order to elaborate on that -- what those limits are.

DR. SNYDER: On page 3 of the second order, the limits appear, which would be substituted for the instantaneous and quarterly average tech spec limits, which are 2.1.2 in the reference there.

Basically, they will be Appendix I limits, which are (a) and (b) there. Fifteen millirem skin dose, and five millirem total body dose.

CHAIRMAN AHEARNE: Appendix I limits also meet the EPA guidelines?

DR. SNYDER: Yes. Item (c) was added because Appendix I does not have a rate limitation. We felt it would be advisable in order to assure meeting, especially, (a), the skin dose; that there whould be a 20 percent or three millirem per hour limit.

bfm9

That is what Item (c) represents.

COMMISSIONER GILINSKY: These are basically the yearly limits for operating reactors, aren't they?

DR. SNYDER: Yes, that's correct. That's true.

CHAIRMAN AHEARNE: Which is what the tech specs are calculated from, based upon average weather conditions.

DR. SNYDER: There is some further conservatism in these limits in that we assume that these dose limitations would apply to a single hypothetical individual who stands with exposed skin 24 hours a day at each of the sectors.

COMMISSIONER GILINSKY: What is the relationship of these numbers to the ones we saw last time, which were rather smaller? I thought you said you were going to try to hold them to something like .2 millirem or something on that order.

MR. DENTON: The ratio between skin dose and whole body dose is a factor of 50, so when you are dealing only with krypton under the Appendix I limits, the 50 millirem skin dose would correspond to a maximum of about .3 mr. whole body. So, you use the Appendix I limits. You are automatically limiting --

COMMISSIONER GILINSKY: That is limiting -- why then did you put (b) in at the higher rate?

DR. SNYDER: More for just consistency, really.

CHAIRMAN AHEARNE: Out of Appendix I?

DR. SNYDER: It could be one tenth of that. It would be no problem. Fifteen millirem will be the limit. Actually,

bfm10

(c) will come into the play as the operational --

CHAIRMAN AHEARNE: As the operational?

DR. SNYDER: I would assume that the licensee for administrative control purposes would go even lower -- would operate actually at lower than (c) which is 3 millirem per hour.

COMMISSIONER GILINSKY: Skin dose?

DR. SNYDER: Yes.

MR. DENTON: What controls the duration would be the maximum instantaneous dose rate permitted during an hour. The original proposal was a low number on the order of one tenth of the mr. per hour skin dose. Our standard tech specs limit, I think the maximum off site dose was .3 of an mr.

This would run the maximum to 20 percent of (a).

CHAIRMAN AHEARNE: Further questions on the order or orders?

COMMISSIONER BRADFORD: I will ask about -- this particular part -- what would be the -- your best estimate for the time that the venting would take if you were operating under the revised tech specs?

DR. SNYDER: It is hard to give a precise answer to that. We approached it from two points of view. We took a very theoretical lower limit based on having infinitely variable flow rate from zero to 50,000 cubic feet per minute, which is physically not possible in the plant, because there are two systems of different capacities.

bfm11

Just taking that as the bare minimum or the maximum flow rate, minimum time, and keeping it at a constant 3 millirem per hour and assuming that the wind owuld be such as to distribute it properly and not exceed the sector limit, it works out about two and a half days.

That is the absolute rock bottom minimum. It depends on the meteorology, of course. It is a little hard to say, but my estimate would be that going this way would cut it, perhaps, by a factor of two between the slow purge and this kind of a scenario.

COMMISSIONER BRADFORD: More like 30 days than 60, then?

DR. SNYDER: The 60 days really was to allow for winds in one given direction and rather stagnant conditions. I think maybe we are talking here two weeks -- between two weeks for the faster system and perhaps a month or so for the slower system.

It is quite hard to pin down these numbers because it will be done on a real time meteorological basis, updated data every hour.

MR. DENTON: There is one other factor. As the permitted instantaneous dose rate goes up, the maximum instantaneous permitted dose rate -- there is more likelihood that there will be someone occupying that sector.

The numbers we talk about are .1 or .2 mr. whole body. The occupancy is not likely to be 100 percent over a 50 day period, but it might well be 100 percent over a few hours. So,

bfm12

we have looked at the proposed maximum instantaneous skin dose which was on the order of .1 of an mr. per hour.

If you go all the way up to this proposal, you are down to just a few days. The likelihood of someone being present for an hour is high.

COMMISSIONER BRADFORD: Is the time for the venting, if allowed -- the time during which it takes place as between the slow and the fast purge in any way influence the timing of the rest of the clean-up, or are things like the treatment of the water basically on a schedule that is independent from the choice between slow and fast venting?

DR. SNYDER: I do not think that a matter of weeks is going to make that much difference, frankly, in the overall clean-up which you are talking in terms of years.

It is a very small percentage of time. I guess the only time -- if something -- a problem were to arise, it would be nice to have that extra time, but it really is truly a small percentage of the anticipated time of clean-up.

COMMISSIONER BRADFORD: Okay.

MR. DENTON: I think if you look in detail at the time required, the beginning of a small release rate -- to check out the equipment, make sure the monitors are working, the outside system is working, you would gradually increase it until you get the capacity of the smaller system.

Then there is still some work to be done on the large

bfm13

system before that can be brought into service. So, it seems to me that some combination of the two, the small and large might reduce the total time, perhaps by a factor of two or three weeks, depending on weather conditions.

CHAIRMAN AHEARNE: Dick, do you have questions?

COMMISSIONER KENNEDY: No, I assume there will be some -- I assume there will be some editorial work done on it. There are a number of things that need to be -- some references need to be added.

MR. DENTON: One other point I would like to make about the dose rate, just to reiterate. The licensee will no doubt impose administrative controls to stay below these limits so as not to exceed them and face citations for that purpose. The time, then, cannot be calculated from these numbers readily. It depends on how far below that he achieves.

CHAIRMAN AHEARNE: Joe?

COMMISSIONER HENDRIE: I am in agreement with both orders.

COMMISSIONER BRADFORD: I do have some other questions. They were not on that particular aspect.

CHAIRMAN AHEARNE: We can get to --

COMMISSIONER BRADFORD: The order, in several places, uses the phrase "favorable meteorological conditions." I have not -- as I understand it, there is no one definition of "favorable meteorological conditions."

bfm14

Are there any weather conditions under which you would not allow the venting to take place at all? Leave aside the question of whether a particular sector had received its full allocation; just say on the first day when no one has received anything.

Are there conditions which you would not allow venting on the first day?

DR. SNYDER: I cannot think of any.

MR. DENTON: No a priori conditions. I think we are -- depending on the exact instantaneous limit chosen, there would be some weather conditions that you would expect diffusion to be very poor.

You might not need this dose criteria. Perhaps Frank Congel could --

COMMISSIONER KENNEDY: COuld I ask a simple question? If the plant were in or at the area of a major front anticipated to be in the area for some hours with violent thinderstorms, heavy rains anticipated, would venting likely go ahead in such circumstances?

end t1

bgn t2

DR. CONGEL: I think I can address both questions that were asked by noting that we have specified only maximum off site release rates that the utility must stay within.

This is intentional to give them as much flexibility as they could possibly have and still carry out their mission of cleaning up the containment. Of course, if there were

bfm15

extremely poor dispersion conditions, low wind speeds, or hardly any, I doubt we could -- excuse me, the release rate was so low that it would hardly be worth their effort to do any purging.

The point I want to make is the product of the release rate and the dispersion condition is the thing that will serve as the limitation. If we do have very favorable conditions, as you pointed out, I would expect them to take advantage of that.

COMMISSIONER BRADFORD: Let me ask the same question I asked before. On the first day when no sector has received any dose, are there weather conditions under which you would not allow venting?

DR. CONGEL: We have nor proposed a number that they had to stay above; only the product of the release rate and the dispersion conditions. Then you have the flexibility within that range.

CHAIRMAN AHEARNE: I guess you are saying, Frank, is that if the dispersion coefficient is sufficiently poor, that then the release rate that they would be allowed to operate under would be low.

DR. CONGEL: So small that it would not be worth their effort to do any purging.

DR. SNYDER: I think perhaps there is the lower limit in that there is a flow rate limit down below which the hydrogen control system cannot operate.

CHAIRMAN AHEARNE: Is it about 100?

bfm16

DR. SNYDER: It is about 50 or 100 CFM. So that would put the floor on the lower release rate. So, if the meteorology is poor enough that they have to operate below that number, whether it is 50 or 100, I'm not sure they would have to cancel the purging that day.

So, there is a mechanical --

CHAIRMAN AHEARNE: You say for that day?

DR. SNYDER: That period of time. There will be forecasts made.

CHAIRMAN AHEARNE: What is the weather cell that you plan on looking at?

DR. SNYDER: I believe there is going to be hourly forecasting by the DOE-IRAC system, plus Met Ed has their own forecasing consultants.

COMMISSIONER BRADFORD: The point I think I now understand is this phrase "favorable meteorological conditions" is pretty well tied to the concept of allocating the dose around -- among the quadrants.

DR. SNYDER: And the concentration in the building at that time.

COMMISSIONER BRADFORD: Right.

DR. SNYDER: The product of those two things.

COMMISSIONER BRADFORD: It is not a matter of some abstracts of weather conditions.

MR. DENTON: That is correct.

bfm17

DR. SNYDER: That's right.

MR. BICKWIT: Mr. Chairman, one point along these lines. The order, as we drafted -- the second order says: "Under the above conditions, the licensee is required to minimize the total time required to complete the purging."

We have discussed this matter with OELD and we feel that should be revised to more closely reflect the first order. What we would propose in lieu of that language is the following language. I will read it quickly. If you want to go back to it we can.

"In addition, any purging shall be in accordance with procedures approved by the director of NRRR as required by the order of June X, 1980."

The significance is that the language as originally drafted does not incorporate the idea of meteorology as a limiting condition, and simply says that the licensee is to minimize the total time required.

COMMISSIONER HENDRIE: Furthermore, it conceivably could be read to drive him to set his administrative limints just up under the tech spec limits where there may be, for reasons of measurement, time delays, control on valving, and so on. Those would be good reasons for him to want a comfortable cushion below those limits.

I think the change is desirable.

CHAIRMAN AHEARNE: The phrase you made would be able to

bfm18

be linked to the first order, and therefore to meteorology.

MR. BICKWIT: That is right. It would also make any violation of the instructions -- violation of license conditions and thereby enforceable.

CHAIRMAN AHEARNE: Fine, fine. Peter?

COMMISSIONER BRADFORD: This really goes more to the assessment than it does to the order, but with regard to the 57,000 curies, is that a measurement we have made, or is that a Met Ed?

DR. SNYDER: Let me comment on that. We asked recently within the last week that a new measurement be made. We split the sample with Met Ed, the volume of gas.

The licensee made a measurement and came up with essentially identical results as in the environmental assessment, which is approximately 1.0 microcuries per cc. Our experiemental results, I'm going to check with John Collins.

MR. COLLINS: Our results came out to be .8. The difference is in the analytical measurement, a different geometry was used by the licensee than the geometry used by the NRC.

So, within the difference in the geometry, .8 and the one is very close.

CHAIRMAN AHEARNE: We would end up with saying more like 47,000?

DR. SNYDER: Yes.

MR. DENTON: This was using equipment in Region I's

bfm19

portable van.

DR. SNYDER: Continuous samples will be available, though, for further analysis as it comes out.

COMMISSIONER BRADFORD: One other question on the assessment. I think I am coming out in the direction of venting, so it is something of a moot point. You did, with regard to most of the stored systems, discuss the problems involved in long term storage of krypton on the site.

I gather, in the last few days, that, in fact, there is something of a market for krypton-85 and Oak Ridge buys it at something like $5 per curie.

Is it really correct to talk about having to store the stuff for 100 years on the site?

DR. SNYDER: Well, I am not familiar with the market that may exist in krypton, although it is used as a tracer in medical research, medical diagnostic work.

I guess we had not factored that in. I was not aware that anyone would be interested in buying. In any case, it would take a long time before it would be available in that form.

COMMISSIONER BRADFORD: I understand the drawbacks to the recovery system. As I say, I am not inclined toward them, but it did seem to me that perhaps the question of long term storage had been overstated, given that there does seem to be something of a market for krypton-85. I wondered if that had been explored at all.

bfm20

DR. SNYDER: No, we have not explored that at all.

MR. DENTON: No, we haven't.

CHAIRMAN AHEARNE: Further questions?

COMMISSIONER BRADFORD: No further questions.

CHAIRMAN AHEARNE: Thank you.

COMMISSIONER GILINSKY: We received this order last night. My position is that I would --

CHAIRMAN AHEARNE What I would propose to do is that we -- I think that probably a number of people have some modifications or editorial that aim at trying to have an affirmation on Thursday, with appropriate modifications.

I would vote in favor of the two positions. Victor?

COMMISSIONER GILINSKY: You're asking about the question of venting?

CHAIRMAN AHEARNE: Yes.

COMMISSIONER GILINSKY: I concur in that result.

CHAIRMAN AHEARNE: And the modification?

COMMISSIONER GILINSKY: Not to approve the order as it is wirtten now.

CHAIRMAN AHEARNE: Dick?

COMMISSIONER KENNEDY: Yes.

CHAIRMAN AHEARNE: Joe?

COMMISSIONER HENDRIE: I tend to vote for both of these orders, presuming the editorial changes don't change the thrust.

CHAIRMAN AHEARNE: Peter?

bfm21

COMMISSIONER BRADFORD: I am coming out the same way, and apologizing for my technical impermeability. Let me just ask for as clear and concise a statement of what the net result of that is as I can get; that is, under this order with both provisions approved, when would the venting begin?

CHAIRMAN AHEARNE: Let us make the assumption that the affirmation on Thursday --

COMMISSIONER BRADFORD: Right.

DR. SNYDER: We promise the people in the area of ten days advance notice. The slow purge of the hydrogen control system is available presently.

During that ten day period, I would conduct, along with other members of the staff and with the licensee and other parties, a readiness review that will go in parallel. I would say that at least two weeks from the decision date -- maximum, I'm sorry.

A maximum of two weeks from the decision date we would be prepared to start.

CHAIRMAN AHEARNE: Which would be something like the end of June.

DR. SNYDER: It would be before the end of the month.

COMMISSIONER HENDRIE: The earliest data -- this is the 10th, two days is the 12th. The earliest date would be the 22nd and you would not expect it to be any longer to the start of venting than the 26th.

bfm22

COMMISSIONER BRADFORD: Bernie, let me put the question the way it is goi _ to be put to you many times in the next few days, anyway. I concur in the assessment that as nearly as I can tell there is no health physical effect involved in the venting, but there are still going to be people who want to make plans around the venting schedules whether they involve leaving the area, taking precautions, or whatever.

What are you going to say to them when they ask you how long is it going to go on? What is the soonest it is going to be over? What is the latest it will be over? Supposing I want to be indoors at all times, what should I do?

DR. SNYDER: Assuming that I cannot convince them that it is not a health hazard, which I probably will not be able to do.

COMMISSIONER BRADFORD: There are going to be some cases where --

CHAIRMAN AHEARNE: Like the letter I got.

DR.SNYDER: Yes. No doubt there will be. Just looking at the calendar, I would say that the venting should start by the end of the last week in June, which is the 27th or the 28th or thereabouts. We are told by the licensee, I believe it is correct, that about the 11th of July, the large system would be available.

I would hope that it would be all over in the month of June.

bfm23

COMMISSIONER BRADFORD: July.

DR. SNYDER: Excuse me, July.

COMMISSIONER GILINSKY: Presumably, you will announce these dates?

DR. SNYDER: Yes, they will be.

COMMISSIONER GILINSKY: There will be periodic results?

DR. SNYDER: First of all, we will give them ten days notice, both the public and some of the states. The state of Maryland, for example, in a letter to us asked us whether we will do that, of course.

We will also --

CHAIRMAN AHEARNE: In the state of Pennsylvania.

DR. SNYDER: That goes without saying. The results, the dialy results will be available to the public. There is planned, at least in the first week, the daily press briefing in which all parties would take part.

The EPA results will be made available on a daily basis, their off site monitoring results which we are looking to. We will do everything possible to keep people informed on a real-time basis.

MR. DENTON: We try to, each day, estimate how much activity has been released, what the estimated off site doses were, and what the next day's plant activities were.

COMMISSIONER GILINSKY: Where will these be available?

CHAIRMAN AHEARNE: You would certainly post them at

the Middletown office?

DR. SNYDER: There would also be every morning at 10:00, I believe, it is planned to have a press briefing so the media would be informed there. Word would presumably get out that way.

CHAIRMAN AHEARNE: All right.

MR. DENTON: We and EPA, we discussed -- we could use their office, our office, or find some office -- I think that Mr. Fouchard is looking into some kind of combined approach each day.

COMMISSIONER KENNEDY: Coordinated with Governor Thronburg's office?

CHAIRMAN AHEARNE: I would urge anyone who has modifications to try to get them both to Mr. Bickwit and the others of us this afternoon, if possible, so we can look at them Wednesday.

COMMISSIONER BRADFORD: I still --

COMMISSIONER GILINSKY: I may have some additional comments.

CHAIRMAN AHEARNE: Yes.

COMMISSIONER GILINSKY: On the whole decision making process, which I must say troubles me.

COMMISSIONER BRADFORD: I still owe you a vote. It is, in a sense, just a formality since I am concurring in the result you all have reached. I would also just say, though, that

bfm25

about the stress question. If I were convinced that stress were in some way a quantifiable, measurable, reduceable commodity that would in fact be reduced by one of the UCS proposed alternatives or some other way of going at this, I would be perfectly prepared to do that.

Specifically, I want to say that I do not think that the UCS proposals in that direction ought to be labelled irresponsible.

I think there were sincere efforts to --

CHAIRMAN AHEARNE: The order did not do that.

COMMISSIONER BRADFORD: THe order did not, of course. It has been done. That's why I make the comment. In the end for me what is convincing is that it seems to me that different people are stressed by different things. While there are certainly those to whom the propsect of a krypton release is an overriding stres, there are others for whome the overriding source of concern comes from what is still in the containment.

I just find myself unable to determine that the krypton-related stresses are in any way (A) something that is greater than the stresses caused by the overall prolonging of the clean-up; and (B), something that would be greatly improved by a differing choice among these alternatives.

So, I come down in favor of the venting proposal as you have already voted on it.

CHAIRMAN AHEARNE: Okay.

bfm26

COMMISSIONER GILINSKY: I would add that I fell in this direction principally by the conclusions on the physical effects on the surrounding population and the absence of overwhelming indications concerning other psychological and other questions that have been brought up.

It is very difficult for this agency to deal with such questions. I suppose in the end, the fact that we do not have strong representations from the collective representatives of the area, the state; and to the contrary, leaves me feeling we ought to base our decision principally on the questions of physical risk here.

I said I was uncomfortable with aspects of the order, particularly the ones that deal with psychological stress. I am troubled about the reliance that staff has placed on opinions of psychologists, however qualified -- however qualified they are themselves to review studies conducted by others.

It turns out those studies depended on telephone surveys. I don't know that you can make very much of that. I would not place very much reliance on those views.

CHAIRMAN AHEARNE: Then, I think to make clear to the people assembled, the Commission will be voting formally on an order, but the decision has been to approve the venting. This decision has been to approve the release and the tech spec issue.

(Thereupon, at 10:44 a.m., the meeting was adjourned.)

NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the

---

in the matter of: ADVISORY COMMITTEE ON REACTOR SAFEGUARDS CONTINUATION OF DISCUSSION OF TMI VENTING

Date of Proceeding: June 10, 1980

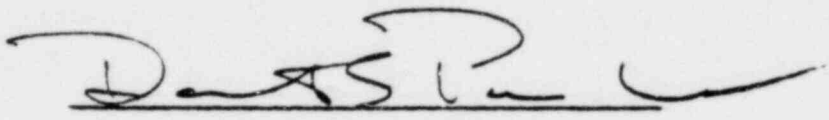
Docket Number:

Place of Proceeding: Washington, D. C.

were held as herein appears, and that this is the original transcript thereof for the file of the Commission.

David S. Parker

Official Reporter (Typed)



Official Reporter (Signature)

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

June 9, 1980

MEMORANDUM FOR: Chairman Ahearne
Commissioner Gilinsky
Commissioner Kennedy
Commissioner Hendrie
Commissioner Bradford

FROM: LB Leonard Bickwit, Jr.
General Counsel

SUBJECT: DRAFT ORDER TO PERMIT PURGING OF THE TMI-2 CONTAINMENT

We have prepared a draft memorandum and order approving the staff's recommendation to decontaminate the TMI-2 containment by purging to the atmosphere. Attachment 1. We have also prepared a possible companion document which would modify the TMI-2 Technical Specifications to assure that neither a "slow purge" nor a "fast purge" would be in violation of license conditions controlling operations at TMI-2. Attachment 2.

Attachments:
1. Memorandum and Order
2. Draft Order for Temporary Modification of License

cc: OPE
SECY

Contact: E. L. Blaggie, OGC
634-3224
Martin G. Malsch, OGC
634-1465

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

John F. Ahearne, Chairman
Victor Gilinsky
Richard T. Kennedy
Joseph M. Hendrie
Peter A. Bradford

In the Matter of METROPOLITAN EDISON COMPANY, et al. (Three Mile Island Nuclear Station, Unit 2)	Docket No. 50-320

MEMORANDUM AND ORDER

The Commission has before it a recommendation by the technical staff that the licensee, Metropolitan Edison Company, et al., be authorized to commence promptly a controlled purging of the TMI-2 reactor building atmosphere. To meet the requirements of the National Environmental Policy Act the staff has submitted in support of this recommendation a "Final Environmental Assessment for Decontamination of the Three Mile Island Unit 2 Reactor Building Atmosphere," NUREG-0662, May 1980.[1/] The draft version of this assessment and two subsequent addenda were issued for public comment,

---

1/ The assessment was prepared under the direction of Dr. Bernard J. Snyder with the assistance of:

Karl Abraham
Lawrence G. Bell
Ronald R. Bellamy
Donald S. Brinkman
Robert T. Carlson
T. Jerrell Carter, Jr.
John T. Collins
Marilee Duncan
Anthony N. Fasano
Reginald L. Gotchy
Charles S. Hinson
Algis J. Ignatonis
Paul H. Leech
Joseph Levine
Ronnie Lo
Oliver D. T. Lynch, Jr.
Scott Newberry
Walter E. Oliu
Walter J. Pasciak
William D. Travers
Lowell E. Tripp
Richard Weller

and by the close of the comment period on May 16, 1980 approximately 800 responses had been received. These are summarized in the final assessment. The Commission received further information regarding the proposed purging at an oral briefing by the staff on June 5, 1980.

In a Statement of Policy dated November 21, 1979 the Commission announced its intent to prepare a programmatic environmental impact statement on decontamination and disposition of radioactive waste resulting from the March 28, 1979 accident at Three Mile Island, Unit 2. The policy statement noted that if the best interest of public health and safety required prompt decontamination action prior to completion of the programmatic statement, such action would not be precluded. The Commission stated, however, that no action to decontaminate high-level waste water in the containment building or to purge the containment of radioactive gases would be taken without a prior environmental review and opportunity for public comment. Before we can approve the staff's recommendation for controlled purging of the TMI-2 containment, we must thus decide whether there is sufficient need for prompt decontamination of the containment atmosphere to justify going ahead prior to completion of the programmatic impact statement. We must also decide whether the decontamination method recommended by the staff can be carried out consistent with the Commission's statutory mandate to ensure adequate protection of public health and safety and whether the environmental review has met the requirements of the National Environmental Policy Act.

The immediate goal of the proposal to purge the reactor building atmosphere is to remove radioactive particulates and gases released into

the containment by the accident. Most of the radionuclides originally released into the containment atmosphere have decayed to insignificant levels. The dominant remaining radionuclide is the gas, krypton-85 (Kr-85), which has a 10.7-year half-life. The Environmental Assessment states that approximately 57,000 curies of Kr-85 are mixed in the containment atmosphere, as determined by periodic sampling of Kr-85 concentrations.

Removing Kr-85 from the containment atmosphere would yield a number of important and immediate benefits. Radiation from Kr-85 at the concentration levels found inside the containment significantly limits worker access and precludes extensive operations needed to gather information, inspect and maintain equipment, and proceed toward the eventual removal of the highly radioactive damaged nuclear fuel from the reactor core. Decontaminating the atmosphere would relieve workers performing necessary maintenance and cleanup activities from hazards of working in awkward protective clothing and risk from penetrating gamma radiation associated with the decay of Kr-85. Moreover, there is no serious question that removal of the Kr-85 from the containment atmosphere is a necessary step toward core defueling. Until the fuel is removed, TMI-2 will continue to present a potential risk to public health and safety. Thus decontaminating the containment atmosphere has an immediate and independent utility which justifies proceeding at this time,[2/] provided that the proposed method is acceptable on health and environmental grounds.

2/ The President's Council on Environmental Quality was consulted on the staff's proposal to vent Kr-85. In a letter dated May 19, 1980, and relying on the staff's technical analysis, the Council advised "that as a matter of procedure, staff's proposal does not violate 40 CFR § 1506.1 (1979) (limitations on actions during NEPA process) of the Council's regulations implementing the National Environmental Policy Act."

There are several methods discussed in the Environmental Assessment by which the radioactive krypton can be removed. The method proposed by the licensee and recommended by the staff involves controlled release to the outside atmosphere of the gases in the containment through the existing plant ventilation system and the hydrogen control subsystem. The release rates would be controlled so as to take place only in favorable meteorological conditions, which would be continuously monitored, such that the dose limits established by 10 CFR Part 20, the design objectives of 10 CFR Part 50, Appendix I, and the provisions of 40 CFR Part 190.10, to the extent they may be applicable, will not be exceeded. In addition to monitoring of releases by the NRC, radiological monitoring during the proposed controlled purging would be conducted by the U.S. Environmental Protection Agency (EPA), the Commonwealth of Pennsylvania, the U.S. Department of Energy and Metropolitan Edison Company.

The Environmental Assessment contains ample evidence to show that risk to physical health from the proposed purge or from any of the alternative decontamination methods considered by the staff would be negligible. See Table 1.1, NUREG-0662. The assessment also addresses the effects on the psychological well-being of persons living in the vicinity of TMI, a subject of importance in view of the strong public reaction to the accident and continuing concern in its aftermath. The staff concluded that psychological stress resulting from the proposed venting of Kr-85 will be less than from any of the alternatives, including the alternative of taking no action. Testimony at the oral briefing by expert consultants on the question of psychological stress supported this conclusion and indicated that purging the containment should have

the net effect of reducing the stress which otherwise would occur if positive steps are not taken promptly to proceed with decontamination and reduce uncertainty about the present and future condition of TMI-2.

Because of the importance to the public of having a clear understanding that purging the TMI-2 containment presents a minimal risk to physical health, we review here the basis for concluding that the physical health impacts of venting Kr-85 under proper controls will be negligible. This conclusion was supported by the U.S. Environmental Protection Agency, the U.S. Department of Health, Education and Welfare, the National Council on Radiation Protection and Measurement, the Pennsylvania Department of Environmental Resources, and the Union of Concerned Scientists. Governor Thornburgh of Pennsylvania has indicated that he adopts the consensus that the dose rates associated with controlled purging are insignificant. Krypton-85 has no significant food pathway involvement and in 99.6 percent of its radioactive decays emits only weak beta particles which primarily affect the skin, one of the tissues least susceptible to radiogenic cancers. The Environmental Assessment estimates that to the maximally exposed individual the risk of skin cancer "would be equivalent to spending 30 minutes in the sun. The average individual in the population would have an added risk of skin cancer equal to about a half-second of exposure to the sun's rays." NUREG-0662, p. 7-7. The total lifetime-individual cancer risk to the maximally exposed individual would be about one in sixteen million, compared to a normal lifetime expectancy of one chance in five from all types of cancer. NUREG-0662, p. 7-2.

Of course, most persons would receive a dose much smaller than the estimated maximum. The Environmental Assessment estimates that the collective offsite dose to the population within 50 miles of TMI-2 will be 0.76 and 63 person-rem for total-body and skin doses, respectively.[3/] NUREG-0662, Table 1.1. Based on these figures and on a cancer mortality risk estimate of 135 deaths per million person-rem,[4/] the Environmental Assessment finds that "[t]he cancer mortality risk among the general population within 50 miles resulting from the purge option would be about 0.0001." In other words, the chance that the proposed purge would cause a cancer death among the general public living within 50 miles of TMI is about one in ten thousand. Although the impacts described above apply specifically to a slow purge as originally recommended by the staff, the Environmental Assessment notes that they also apply approximately to a fast purge alternative conducted under meteorological conditions favorable for atmospheric dispersion. The staff's current recommendation calls for use of a fast purge rate if weather conditions permit. The Commission agrees with the technical staff that the physical health impact of this recommended action may be termed insignificant.[5/]

3/ At the oral briefing the staff reported that estimated total-body doses to the U.S. and world populations were about 15 person-rem and 60 person-rem respectively.

4/ This risk estimate is taken from the 1972 Report of the Committee on the Biological Effects of Ionizing Radiation, "The Effects on Populations of Exposure to Low Levels of Ionizing Radiation," National Academy of Sciences, November 1972.

5/ At the oral briefing the staff noted in answer to a question by the Commission about possible health hazards to animals that humans are generally more sensitive to radiation than other living things and that the proposed purging would clearly have no significant effect on animals.

Alternative methods which could reduce offsite radiation exposure still further were considered in the Environmental Assessment, including several suggestions offered by commenters on the draft assessment. These included variations of the purging method whereby the Kr-85 would be injected into the atmosphere at a higher level, either by various means of elevating the release point higher than the existing 160-foot stack or by heating the gases prior to discharge to increase its buoyancy. The staff also considered methods whereby the krypton could be captured and stored indefinitely or until the radioactivity decayed to insignificant levels (about 100 years). These methods include (1) selective absorption of krypton by a scaled-up version of a system now in operation at Oak Ridge National Laboratory, (2) adsorption on large quantities of charcoal, (3) gas compression and storage in pressurized containers, and (4) extracting the Kr-85 by liquefying it through cryogenic processing. The alternatives considered appear to have varying degrees of practicality, but the staff found that none of them could be implemented in the near future or, for that matter in a time period much short of a year at the best.[6/] The controlled purging method of decontamination recommended by the staff can be implemented immediately. Since the physical health risks of the purging method are extremely small to begin with and since decontaminating the TMI-2 containment atmosphere should not be unnecessarily delayed, for reasons we have already discussed, the Commission agrees with the staff that the possibility of reducing very small physical health risks still further does

---

6/ In particular, the staff investigated a suggestion that the selective absorption process could be placed into operation in six months by using equipment said to be available from the National Aeronautics and Space Administration and other sources. The suitability of this equipment turned out to be questionable, and the proposed schedule for design and procurement appeared unrealistic. The staff's minimum time estimate for making a selective absorption system operational was 16 months.

not justify significant delay and uncertainty associated with implementing an alternative process.

When we add the desirability of minimizing psychological stress to the factors affecting our decision, we find that the argument in favor of controlled purging is reinforced. It is of course difficult to predict with precision the likely psychological effects of the various alternatives, including the alternative of doing nothing, particularly so because the Commission lacks expertise in the field of mental health. Nevertheless, the weight of evidence presented to the Commission by experts in the subject indicates a real possibility that prolonged delay or inaction may induce chronic stress symptoms among persons who have already experienced substantial anxiety related to the accident. Although it seems likely that there will be an increase of stress during the period of controlled releases, this stress will be temporary rather than chronic, and the ultimate effect of purging should be a reduction in overall stress levels. In any event, so long as the containment atmosphere remains contaminated, there exists a possibility of accidental leakage of Kr-85. Accidental leakage, though unlikely to have any physical health significance, could well impose a stress exceeding that associated with controlled releases under carefully selected optimum meteorological conditions. Thus it appears on balance that the net impact of controlled purging on the psychological well-being of the public will be beneficial. Even the temporary increase of stress may be slight if, as the Commission hopes, awareness of the broad-based consensus that the proposed krypton venting presents no objective reason for concern about health effects serves to reduce public fears.

The Commission thus finds that decontamination of the TMI-2 containment atmosphere should be carried out promptly by the purging method recommended by the staff. Physical health impacts will be negligible, and the proposed action will probably result in a net reduction in psychological stress.7/ Thus there is adequate assurance that public health and safety will be protected as required by the Atomic Energy Act. We can also accept the conclusion of the Environmental Assessment that the proposed action will have no significant adverse effect on the environment. Accordingly, no environmental impact statement need be prepared and a negative declaration to this effect may issue. In view of the scope and detail of the Environmental Assessment and the extensive solicitation of public comment, we believe in any case that the purposes of NEPA have been fully served and that preparation of a formal EIS, had one been required, could not add significantly to the level of environmental consideration and public disclosure already achieved.

TMI-2 is presently being maintained pursuant to restrictions in an order issued by the Office of the Director, Nuclear Reactor Regulation on February 11, 1980 requiring the licensee, Metropolitan Edison Company, to maintain the facility in accordance with the requirements of revised technical specifications set forth as an attachment to that order. In implementation of the Commission's Policy Statement of November 21, 1979, these

---

7/ The Commission has not yet determined whether psychological stress is a health concern cognizable under the Atomic Energy Act and/or an environmental impact cognizable under NEPA. We are presently considering these issues in connection with the TMI-1 restart proceeding. In the Matter of Metropolitan Edison Company (Three Mile Island Nuclear Station, Unit No. 1), Docket No. 50-289. In view of our finding that the proposed venting of Kr-85 will have an overall beneficial effect on psychological stress, the present decision does not hinge on how the issues are finally resolved.

specifications included the restriction that "purging or other treatment of the containment atmosphere is prohibited until approved by the NRC ...." In the present order we give the approval contemplated by that restriction insofar as necessary for the licensee to conduct a purging of the TMI-2 containment, commencing no sooner than 10 days from the date of this order, in accordance with the proposal recommended by the NRC staff as presented to the Commission in the record for this proceeding. The licensee shall conduct this purging in accordance with procedures approved by the Director, Office of Nuclear Reactor Regulation.

It is so ORDERED.

For the Commission

SAMUEL J. CHILK
Secretary of the Commission

Dated at Washington, DC,
this day of June, 1980.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of METROPOLITAN EDISON COMPANY, et al. (Three Mile Island Nuclear Station, Unit 2)	Docket No. 50-320

ORDER FOR TEMPORARY MODIFICATION OF LICENSE

I.

Metropolitan Edison Company, Jersey Central Power and Light Company and Pennsylvania Electric Company (the licensee) are the holders of Facility Operating License No. DPR-73, which had authorized operation of the Three Mile Island Nuclear Station, Unit 2 at power levels up to 2772 megawatts thermal. By Commission order dated July 20, 1979, the licensee's authority to operate the facility, except as provided therein, was suspended. The facility, which is located in Londonderry Township, Dauphin County, Pennsylvania, is a pressurized water reactor used for the commercial generation of electricity.

II.

On March 28, 1979, an accident at the Three Mile Island Nuclear Station Unit 2 resulted in substantial damage to the reactor core and to certain reactor systems and components. The facility is not capable of normal operation and is in a shutdown condition with fuel in the core. The facility

is being maintained in a stable, long-term cooling mode in accordance with the provisions of the Commission order, dated February 11, 1980. That order did not affect the limits on release of gaseous radioactive effluents set forth in Appendix B, section 2.1.2 of the technical specifications attached as a condition of the license. However, the krypton-85 (Kr-85) released into the reactor building during the accident must be removed from the building so that workers can begin the tasks necessary to clean the building, maintain instruments and equipment, and eventually remove the damaged fuel from the reactor core. Those tasks must be performed whether or not the plant ever again produces electricity. Radiation from the krypton gas, although thinly dispersed through the reactor building atmosphere, nevertheless poses a threat to workers who would have to work in the building for prolonged periods. The preferred method for removing the Kr-85 is a kind of flushing or purging process by which the gases would be pushed out of the building and fresh air pulled in.

Section 2.1.2 of the Appendix B technical specifications contains both instantaneous and quarterly average release limits for releases of Kr-85 to the atmosphere. These limits were developed with normal facility operations in mind. The revised limits described below have the effect of increasing the allowable gaseous release rate during the purging process so that the purging process can be completed in the shortest practicable time. However, under the revised rates the dose to the maximally exposed individual offsite will still be within the limits of the Commission's regulations that would apply if the reactor were operating normally. The health and safety impact on the public from these revised limits will be negligible. The nature and effects of the

purging process are described more fully in the Commission's Memorandum and Order in this matter, dated June __, 1980, and NUREG-0662, "Final Environmental Assessment for Decontamination of the Three Mile Island Unit 2 Reactor Building Atmosphere", June 1980.

III.

The Commission has found for the reasons stated above that a temporary revision to section 2.1.2 of the Appendix B technical specifications will not be inimical to public health and safety and involves no significant hazards consideration. Accordingly, pursuant to sections 161b and 189a of the Atomic Energy Act of 1954, as amended, and 10 CFR sections 2.204 and 50.54(h) of the Commission's regulations, section 2.1.2 of the Appendix B technical specifications is amended, effective immediately, by adding at the end thereof the following:

> For the period of the purge of the TMI-2 reactor building atmosphere, Sections 2.1.2a and 2.1.2c are replaced by the following:
>
> > Do not exceed for the maximally exposed individual* in any one of the 16, (22 1/2°) sectors centered on the TMI-2 reactor building any of the following:
> >
> > (a) 15 mrem skin dose
> >
> > (b) 5 mrem total body dose
> >
> > (c) 20% of the limits in (a) and (b) shall not be exceeded over any one hour period.
> >
> > Under the above conditions, the licensee is to minimize the total time required to complete purging the reactor building to 10 CFR Part 20 MPC (for workers).

*Maximally Exposed Individual

(1) One hypothetical individual within <u>each</u> of 16 sectors at off-site location with maximum anticipated dose.
(2) No allowance for occupancy time - assume individual present continuously.
(3) No hypothetical individual shall receive more than dose design objectives of (a) and (b) above.

IV.

The licensee or any person whose interest may be affected may, within thirty days, file a request for a hearing with respect to this Order. In the event a hearing is held, the issues shall be: (1) whether the temporary technical specification modification imposed herewith (described in Part III above) is in the interest of the public health and safety; and (2) whether this Order should be sustained. A request for a hearing will not stay the effectiveness of this Order. In the event a hearing is held, it shall be consolidated with any hearing held in regard to Commission orders in this docket dated February 11 and May 12, 1980.

A request for a hearing by the licensee or another person must be filed with the Office of the Secretary, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Docketing and Service Section, by the above date. A copy of the request for a hearing should also be sent to the Executive Legal Director, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555 and to Mr. George F. Trowbridge, Shaw, Pittman, Potts, and Trowbridge, 1800 M Street, N.W., Washington, D.C. 20036, attorney for the licensee. Any questions regarding the contents of this Order should be directed to the Chief Hearing Counsel, Office of the Executive Legal Director, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

For further details with respect to this action, see (1) Operating License DPR-73, as amended, (2) NUREG-0662, "Final Environmental Assessment for Decontamination of the Three Mile Island Unit 2 Reactor Building Atmosphere", dated June 1980, (3) Commission Memorandum and Order, dated June __, 1980. All of the above documents are available for inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C. and at the Commission's

Local Public Document Room at the State Library of Pennsylvania, Government Publications Section, Education Building, Commonwealth and Walnut Streets, Harrisburg, Pennsylvania 17126.

FOR THE NUCLEAR REGULATORY COMMISSION

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Dated at Washington, D.C.

on June __, 1980.