



April 15, 1983

SECY-83-140

POLICY ISSUE (Information)

FOR: The Commissioners.

FROM: Executive Director for Operations

SUBJECT: GPUNC's TMI-2 Recovery Program Estimate

PURPOSE: Information for the Commission

DISCUSSION: The Commission's Policy and Planning Guidance document dated January 1983 (NUREG-0885, Issue 2) states that the NRC staff will direct General Public Utilities Nuclear Corporation (GPUNC) to submit plans and schedules in mid-FY 83 for the TMI-2 reactor head removal and that the staff should review this submittal and make recommendations to the Commission. On January 31, 1983, in response to a formal request by the Director, NRR, GPUNC submitted revised schedule and cost information in a document entitled "TMI-2 Recovery Program Estimate" (Revision 2, December 30, 1982). Copies of the document were sent by the licensee in the January 31, 1983 letter directly to the Commissioners. The results of the NRC staff review of the licensee's submittal and staff recommendations are presented in this information paper.

Background

Prompted by the slow progress in the cleanup effort at TMI-2, the Director of NRR requested (Attachment 1) in September 1982 that the licensee submit schedular information detailing major activities required to complete the cleanup at TMI-2 including removal of all radwaste from the site. GPUNC responses dated September 21, October 8, and November 18, 1982 (Attachments 2 - 4), expressed similar concern over the progress of the cleanup.

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The licensee also provided expedited schedules in response to the staff's September 8, 1982 memo for the removal of EPICOR-II prefilters and Submerged Demineralizer System (SDS) ion exchange media from the site. GPUNC further informed the NRC staff of the company's efforts to develop, by the end of 1982, an overall program schedule and cost estimate utilizing projected funding levels and technical and operational constraints. The results of this effort are contained in the licensee's December 30, 1982 program estimate.

The December 30, 1982 document is the third program estimate prepared by the licensee. In August 1980 the first recovery program estimate was issued and was based on plant conditions as of June 1980. The containment building had been entered only once as of the August report and the extent of the problems associated with defueling the reactor and decontaminating the facility was poorly known. Uncertainties associated with waste disposal also contributed to the speculative nature of this early estimate. At the time that the August 1980 estimate was prepared, the Pennsylvania Public Utilities Commission (PUC) had not yet acted to limit customer funds available for the cleanup; therefore, this estimate did not assume that funds for the cleanup would be limiting. In addition, the August 1980 estimate addressed both cleanup and refurbishment activities and costs required to return the unit to service. The August 1980 report estimated that containment decontamination would be completed by December 1983 and reactor fuel removal completed by April 1983. The total cost of the cleanup portion of the recovery program was estimated at \$598 million (in 1980 dollars) excluding normal site costs for operations and maintenance.

In July 1981 the licensee updated the cleanup program cost and schedule estimate in a document entitled, "TMI-2 Recovery Program Estimate," (Revision 1, July 1981). This revision was based upon a cost estimate prepared in April 1981 and on plant conditions known at that time. The program estimate differed significantly from the previous estimate in including costs for operations and maintenance of the site. It also did not address refurbishment activities and costs necessary to return the unit to service. The July 1981 revision reflected funding constraints resulting from Pennsylvania PUC actions up to the end of 1981 but assumed no significant constraints to funding after December 30, 1981.

The July 1981 revision estimated containment decontamination completed by August 1986 with minor cleanup continuing past that date. Removal of reactor fuel was estimated to be completed by February 1985. The total cost of the cleanup was estimated to be \$1,034 million (adjusted for inflation). The schedule and cost estimates presented in the July 1981 study represented the most recent comprehensive estimates prepared by the licensee prior to the December 1982 revision.

The December 1982 Revision

The December 1982 revision incorporates further detailed planning on the sequence and duration of cleanup activities, more recent technical information and the accumulated experience from cleanup activities since the accident. It also departs from the scope and methodology of the two earlier projections. The current study provides estimates of cost and completion dates for each of five alternative cash flow funding cases. The various funding alternatives (Table 1) analyzed for this report range from a total cost of \$950 million to \$1,041 million (adjusted for inflation) with associated completion dates varying from the end of 1987 to the end of 1989. Table 2, which summarizes the five alternatives, provides required as well as currently committed funding levels by year in millions of 1983 dollars. Table 2 also provides the projected shortfall between currently committed versus required funding levels for each of the five cases. Table 3 provides a breakdown by year of presently committed funding sources. Table 4 provides estimated completion dates of important schedule milestones for each of the five cases and compares them to the dates presented in the earlier July 1981 program estimate. The base case, or Case I, the most conservative but reasonable estimate, projects a scheduled completion date of mid-1988 at a total cost of \$975 million. According to GPUNC, even with essentially unlimited funding (Case V), the projected completion date (end of 1987) for cleanup is improved by only 6 months over the corresponding date for Case I, the base case. This is largely due to the sequential nature of the cleanup which involves completion of requisite activities before subsequent activities can begin.

Significant assumptions and qualifications have been made by the licensee in the preparation of this report. The estimates assume: (1) no significant changes in current regulatory guidance and site license requirements for

radwaste disposal; (2) GPUN will bear the cost of shipping, storage and disposal of the reactor fuel; (3) no salvage value of equipment or material has been considered; (4) no specific cost or schedule contingency allowance has been included; (5) maintenance of equipment and facilities as investment protection has been specifically excluded; and (6) no significant unanticipated technical problems.

NRC Staff Review

The NRC staff has conducted a review of the proposed activities associated with the cleanup. Based on our current knowledge of the conditions within the Unit 2 containment and auxiliary and fuel handling building (AFHB), the staff concludes that there are no known technical factors that could preclude eventual cleanup. The staff, based on existing information, has no reason to assume that the hierarchical breakdown of all program activities and sequencing of these activities are unreasonable.

Technical and Scheduler Considerations

The staff recognizes that the planned sequence and scope of effort and activities may require changes due to a number of recently identified technical considerations. For example, significant uncertainty now exists resulting from radiation surveys made within the reactor vessel since the latest cost and schedule study was completed. Preliminary data has revealed radiation levels in the upper plenum region of the reactor vessel about ten times higher than expected. Further characterizations are planned in the next several months. Should radiation levels under the head prove as high as was determined by the preliminary examination (>500 R/hr.) then a wet reactor vessel head lift would be required, as opposed to the current plan for a normal dry head lift. This complication has the potential for delay and increased costs.

A second factor that could adversely affect the sequence of activities is if thermal distortion and/or mechanical damage occurred in the upper plenum or the fuel support structure. Then underwater cutting and/or machining operations may be required for removal. This would also adversely impact the present schedule, and could result in a significant delay in fuel removal and an increase in the overall cost of the cleanup.

Difficulty in the decontamination of the containment building may also adversely affect the sequencing of cleanup activities. Decontamination of the reactor basement will likely prove particularly difficult since the sludge contains high levels of cesium and strontium activity and contamination of the uncoated internal concrete structures (not the surfaces of the containment boundary) to depths of several inches has probably occurred. Furthermore, the licensee has experienced significant problems with re-contamination of surfaces and equipment that have been decontaminated in the containment building. High radiation levels in the containment could result in higher than anticipated exposure for workers. Workers receiving their maximum permitted exposure early in each quarter would be removed from the work force. A shortage of skilled workers may therefore hamper the cleanup effort, resulting in increased time to completion and overall cost for the cleanup.

Other factors that are less well defined but still likely to affect the schedule of the cleanup effort are: a) the lack of significant contingency planning for major milestones, and b) unanticipated technical problems. Funding limitations have restricted the licensee's ability to develop contingency plans for critical tasks. Certain critical tasks have a high probability of developing technical problems that would impact the schedule. Contingency planning to develop alternative procedures and equipment is not being conducted at a level of effort that would result in minimal schedule disruption should technical problems arise. Technical problems have occurred in the past resulting in significant delays in the schedule. The difficulty of decontaminating surfaces, problems of re-contamination and difficulties in shipping ion exchange resins offsite are examples of problems that have impacted the cleanup. It is unrealistic to assume at this stage in the cleanup that such problems will not continue to occur. It is presently impossible to determine accurately the impact that these factors have on the overall cleanup schedule.

All of the above considerations lead the staff to conclude that, although the present sequence appears reasonable, the schedule for accomplishing major cleanup tasks is to a large degree indeterminate. Until additional experience is gained in decontamination, and the reactor head, plenum and fuel support structure is removed, the predicted completion date of the cleanup under any funding alternative is, in the staff's opinion, speculative.

Cash Flow

The licensee's financial planning for the cleanup is based on the cost-sharing program prepared by Governor Thornburgh of Pennsylvania. The licensee expects that most sources of revenue under the plan will be committed by 1984, at the latest. Certain sources (customer revenue in New Jersey, the Pennsylvania state appropriations, and insurance proceeds) are already committed essentially at the full Thornburgh Plan level. Other sources (customer revenues in Pennsylvania, the New Jersey State appropriations and the federal contributions) are either partially committed or expected to be committed in 1983 or in 1984 at the latest. The current DOE commitment to the TMI-2 program is \$159 million through 1987 compared to the \$190 million contribution suggested by Governor Thornburgh. It is estimated that approximately \$83 million directly offsets costs included in the GPU cleanup estimate. An additional \$20 million of DOE funding is estimated to have a direct beneficial impact on the cleanup, although it is committed to items not contained in the GPU estimate.

National industry funding is a source of funds anticipated in the Thornburgh Plan that could cause a significant shortfall. The Thornburgh Plan suggests industry contributions totalling \$190 million. At present, industry commitments are essentially limited to an annual EPRI contribution of \$1 million to \$2 million. The EEI recently proposed a voluntary cost-sharing plan whereby the investor-owned utility industry would contribute \$150 million to the cleanup. The licensee has indicated that they reasonably expect voluntary contributions of approximately \$100 million. It should be noted that to date no monies have been provided by any element of the nuclear industry other than the nominal EPRI contribution.

The staff has reviewed the required cash flow estimates for the base case and the four alternative cases. Table 2 provides: 1) the required funding levels for each year for each case, 2) funding level presently committed and can definitely be expected to be obtained by the licensee, and 3) the difference between required and committed funds for each year by case. In Cases I, II and III sources of funds should essentially cover projected spending in 1983. The licensee reasonably expects funding of approximately \$84 million of cleanup costs in 1984 even if there are no industry contri-

butions. If the licensee receives an additional \$16 million in annual customer cleanup revenues in 1984 (as GPUNC expects), available funds should cover projected spending for Cases I, II, and III in 1984. For all cases after 1984 required sources of funds are significantly higher than committed (see Table 2).

The staff concludes that during 1983 and 1984 Case I (base case) and Cases II and III could likely occur, causing no significant impact to the most recently projected cleanup schedule until the end of 1984.

Since currently committed sources of funding result in significant shortfalls in 1985 and beyond, the staff believes that there exists further uncertainty (beyond the technical issues previously discussed) in the schedule completion and total cost estimates.

Delay from July 1981 Program Estimate

The staff has analyzed the proposed base case schedule and has compared it to the schedule given in the July 1981 program estimate to determine the cause for the additional two-year delay in the completion of the cleanup (See Table 4). Several factors appear responsible for the additional time required for completion. Activities associated with the removal of the reactor plenum and reactor coolant system decontamination are, in the December 1982 estimate, scheduled to take a significantly greater period of time than was estimated in the July 1981 study. This significant increase in time, accounting for almost all of the two-year delay, is attributable to technical factors that were speculative at the time the July 1981 study was prepared. The staff has reviewed these activities and the factors contributing to the change in schedule and have found no reason to assume that the estimates are not reasonable.

Additional activities were included in the most recent estimate that were not in the scope of the July 1981 estimate. These are completion of radwaste shipping and final decontamination. These tasks would not result in lengthening the overall schedule since these activities would be conducted concurrently with other activities. Therefore they represent additional tasks that do not influence the cleanup completion date but rather an increase in overall effort.

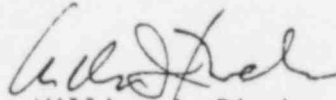
Conclusion

The staff recognizes that the licensee has made significant progress towards the goal of decontaminating the facility, defueling the reactor and safely disposing of the radioactive waste and water resulting from the March 28, 1979 accident. Contaminated water has been processed and significant amounts of ion exchange radwaste have been shipped offsite. Much of the AFHB has been decontaminated, except for the sump and some of the most contaminated cubicles. Decontamination of the containment building has begun and progress towards removal of the reactor head has been made. Both visual and radiological underhead characterizations have been made.

The staff finds that the proposed sequence of remaining cleanup activities reasonable. However, technical uncertainties and minimal contingency planning could result in a significant schedule slip even within the next two year period when the licensee does not anticipate any funding shortfall. After 1984, funding limitations may exacerbate technical problems and further lengthen the cleanup effort. Both of these factors, technical problems and funding limitations, have occurred in the past and both have resulted in significant departures from the schedule. The staff foresees these factors as having a potentially significant impact on the presently proposed schedule.

Based on the reasonableness of the proposed sequence of activities and the level of committed funding, the staff concludes that for the years 1983 and 1984 the licensee's actions will adequately protect the public health and safety. If the projected shortfall in funding appears likely after 1984, the Commission may need to take action. By early 1984 the licensee expects to have firmer funding commitments for the next several years, and a better understanding of technical factors that might influence the cleanup schedule. The staff recommends that no Commission action be taken at this time; however, a re-evaluation should be performed by the staff in early 1984 to provide the Commission with an assessment of the licensee's schedule and ability to adequately continue cleanup operations in 1985 and beyond.

The staff believes it would be desirable to arrange a briefing for the Commission by GPUNC management on this subject in the near future. This would provide for direct interaction with GPUNC representatives over concerns and/or questions the Commission might have.



William J. Dircks
Executive Director for Operations

Enclosures:

1. Tables 1-4
2. Ltr to GPUNC fm H. Denton
dtd 9/8/82
3. GPUNC Response dtd 9/21/82
4. GPUNC Response dtd 10/8/82
5. GPUNC Response dtd 11/18/82

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ENCLOSURE 1

ENCLOSURE 1

TABLE I

ALTERNATIVE FUNDING CASES ANALYZED IN THE
DECEMBER 1982 PROGRAM ESTIMATE*

- Case I: Base case of the program estimate. Maximum allowable cash flow of \$76.0 M in 1983, \$92.6 M in 1984 and \$100.0 M for 1985 through 1987 and \$55 M for 1988. All estimates are in 1983 dollars.
- Case II: Maximum allowable cash flow of \$76.0 M in 1983 and \$100.0 M for 1984 and later in current 1983 dollars. Funding is not adjusted for inflation.
- Case III: Same as Case I with the exception of \$20 M additional (1983 dollars) in 1985 applied to fuel removal activities required to complete those activities in 1985.
- Case IV: Same as Case I with the exception of 1983 and 1984, which are increased by \$10 M each year (1983 dollars) representing a modest near-term increase in funding.
- Case V: Same as Case I with the exception of an additional \$10 M in 1983, \$24 M in 1984 and \$20 M in 1985 (all in 1983 dollars) representing unlimited cash flow.

* All estimates in millions of 1983 dollars.

TABLE 2

SUMMARY OF FIVE FUNDING CASES PRESENTED IN THE
DEC. 1982 PROGRAM ESTIMATE*

Case Funding Level	Funds Firmly Committed as of Mar. 83***	I Base Case	II Not Adjusted For Inflation	III + \$20M in 1985	IV + \$10M in 83 & 84	V + \$10M 83 + \$24M 84 + \$20M 85
83	77	76 (-)**	76 (-)	76 (-)	86 (9)	86 (9)
84	84	93 (9)	93 (9)	93 (9)	103 (19)	117 (33)
85	62	100 (38)	86 (24)	120 (58)	100 (38)	120 (58)
86	45	100 (55)	79 (34)	100 (55)	100 (55)	100 (55)
87	38	100 (62)	74 (36)	100 (62)	100 (62)	98 (60)
88	37	55 (18)	68 (31)	37 (-)	32 (-)	
89	37		62 (25)			
90	37		16 (-)			
Total to Complete		525	553	526	521	520
Total for Entire Cleanup Including Escalation		975	1041	971	962	950

* Cost in Millions of 1983 Dollars unless otherwise noted

** Numbers in parentheses is shortfall

*** Funds Firmly Committed From Table 3

Table 3

CLEANUP FUNDS FIRMLY COMMITTED BY SOURCE AS OF MARCH '83*
(1983 dollars in millions)

	<u>'83</u>	<u>'84</u>	<u>'85</u>	<u>'86</u>	<u>'87</u>	<u>'88</u>	<u>'89</u>	<u>'90</u>
Customer Revenues ^{1/ 2/}	\$ 34	\$ 34	\$ 34	\$ 34	\$ 34	\$ 34	\$ 34	\$ 34
Commonwealth of PA ^{3/}	5	-	-	-	-	-	-	-
State of NJ ^{4/}	-	-	-	-	-	-	-	-
Insurance ^{5/}	19	25	-	-	-	-	-	-
Industry ^{6/ 7/}	2	2	2	2	1	-	-	-
D.O.E. ^{8/}	14	20	23	6	0	-	-	-
B&W ^{9/}	3	3	3	3	3	3	3	3
TOTAL	<u>77</u>	<u>84</u>	<u>62</u>	<u>45</u>	<u>38</u>	<u>37</u>	<u>37</u>	<u>37</u>

*Assumptions for determining Funds Firmly Committed on pages 7 and 8.

ASSUMPTIONS FOR DETERMINING
THE LEVEL OF COMMITTED
FUNDING FOR THE YEARS 1983 - 90

- 1/ Customer revenues from Pennsylvania and New Jersey applied to cleanup are assumed to continue at current level (\$34 million per year). If pending Pennsylvania rate request is granted, approximately \$16 million will be added to funds available each year. Rate increase could be effective by 4th quarter of 1983.
- 2/ TMI-1 restart would increase funds available for cleanup in each year from restart forward and could partially offset the need for higher customer rates to pay for cleanup.
- 3/ The \$5 million annual Pa. contribution suggested in Thornburgh Plan has been appropriated for 1983 only. Governor supports contributions over a 6 year period.
- 4/ The N.J. contribution suggested in Thornburgh Plan has not been appropriated. Efforts are underway in N.J. Appropriations could amount to \$2 million per year.
- 5/ Remaining insurance is expected to be exhausted in 1984. However, if industry contributions do not begin by 1984, GPU may not be willing to use all remaining insurance in that year. In such case, if insurance utilization is reduced, then total available cleanup funds would be less than \$84 million in 1984.

- 6/ Funds shown are EPRI only. GPU and EPRI have an agreement whereby EPRI will expend \$10 million on cleanup. It is expected that this will amount to approximately \$2 million per year. (Approx. \$800,000 was spent in 1982.)
- 7/ EEI has proposed an electric utility industry cost-sharing program that might conservatively provide \$17 million per year, or more optimistically, \$25 million per year, for six years. No funds are yet committed.
- 8/ DOE estimates are provided from DOE at NRC staff request. These estimates are subject to the uncertainty associated with appropriated money. In making these rough estimates DOE was unable in all cases to make full correlation with tasks in their program and GPU's current assessment.
- 9/ Although no annual figures have yet been firmed up, GPUN expects that the settlement between B&W and GPU will provide, on average, approximately \$3 million per year for cleanup for 10 years. GPU expects to begin realizing this source in 1983. Since the settlement has been finalized, the staff assumes for the purposes of Table 2 that \$3 million is available each year.

TABLE 4

TMI-2 ESTIMATED COMPLETION DATES OF
IMPORTANT SCHEDULE MILESTONES


MILESTONE	July 1981	December 1982		Program Estimate		
	Program Estimate	Case I	Case II	Case III	Case IV	Case V
Complete Reactor Building Hands On Decon	Aug. 86	Mar. 88	Jun. 89	Mar. 88	Dec. 87	Sep. 87
Polar Crane Requalification Completed	Sep. 83	Mar. 83	Mar. 83	Mar. 83	Mar. 83	Mar. 83
Reactor Head Removal	Dec. 83	Jun. 83	Jun. 83	Jun. 83	Jun. 83	Jun. 83
Reactor Plenum Removal	Feb. 84	Oct. 84	Oct. 84	Oct. 84	Jun. 84	Jun. 84
Start Reactor Fuel Removal	May 84	Jan. 85	Jan. 85	Jan. 85	Jul. 84	Jul. 84
Complete Fuel Removal	Feb. 85	Jun. 86	Jun. 86	Dec. 85	Dec. 85	Jun. 85
Start Reactor Coolant System (RCS) Decontamination	Feb. 85	Jul. 86	Jul. 86	Jan. 86	Jan. 86	Jul. 85
Complete Core Support Assembly Removal	Jul. 85	Dec. 86	Dec. 86	Jun. 86	Jun. 86	Dec. 85
Complete RCS Decon	Apr. 85	Mar. 87	Aug. 87	Oct. 86	Oct. 86	May 86
Start Reactor Fuel Shipping	Aug. 84	Apr. 85	Oct. 86	Apr. 85	Jan. 85	Sep. 84
Completion of Phase II Decon	Aug. 86	Mar. 88	Sep. 89	Mar. 88	Dec. 87	Sep. 87
Complete Fuel Shipping	Not in Scope	Dec. 87	Jun. 89	Dec. 87	Sep. 87	Mar. 87
Final Decon	Not in Scope	May 88	Nov. 89	May 88	Feb. 88	Nov. 87
Complete Radwaste Shipping	Not in Scope	Jun. 88	Dec. 89	Jun. 88	Mar. 88	Dec. 87

ENCLOSURE 2

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

September 8, 1982

Docket No. 50-320



Mr. Robert C. Arnold, President
General Public Utilities Nuclear Corporation
100 Interpace Parkway
Parsippany, NJ 07054

Dear Mr. Arnold:

In accordance with its responsibility to protect public health, safety and the environment, the U.S. Nuclear Regulatory Commission (NRC), through its staff, has been providing close regulatory oversight during cleanup activities at Three Mile Island Unit 2 (TMI-2). Although the cleanup began shortly after the accident, the activities completed to date represent only limited progress toward total plant cleanup. A great deal of difficult work remains to be done.

Containers of highly radioactive ion exchange materials from EPICOR-II system processing and from submerged demineralizer system (SDS) processing, remain on-site pending efforts necessary to make them safe for shipment. More of this kind of waste will be produced as additional water from the reactor building basement and the reactor coolant system is decontaminated using SDS and EPICOR-II. Removal of the reactor vessel head for examination and subsequent removal of the vessel internals and the fuel have yet to be accomplished. Only limited planning, engineering and preparations have been initiated to carry out this task. Highly radioactive demineralizer resins from the reactor coolant purification system, in place since the accident, must also be removed and shipped off the site. The balance of the most contaminated floors and surfaces in the auxiliary building remains to be cleaned up, and the entire reactor building will have to undergo further extensive decontamination. Following defueling, the reactor coolant system surfaces will require decontamination. Finally, all fuel assemblies, packaged core debris, vessel internals and related radioactive wastes will require shipment off site for research and/or disposal. It is clear that this remaining work represents the majority of the total cleanup project and will require a significant effort to complete.

In the past, the NRC has clearly stated its intent that the licensee expedite the cleanup (Statement of Policy, April 28, 1981) and, as the Director of the Office of Nuclear Reactor Regulation, I ordered that specific action be initiated to decontaminate radioactive water from the reactor building basement and the reactor coolant system (Order, June 18, 1981). I remain concerned that cleanup delays, if they are permitted to continue, will increase the likelihood of incidents involving radiation leakage and the possible exposures of workers and the public.

Mr. Robert C. Arnold

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In order to determine more precisely the state of planning and schedules for some major TMI-2 cleanup tasks, the licensee is requested to submit the following information, on the dates indicated, pursuant to section 182 of the Atomic Energy Act and 10 CFR 50.54(f) of the Commission's regulations:

1. Implementation schedules for completing the removal of EPICOR-II prefilter and submerged demineralizer system ion exchange wastes from the TMI-2 site are requested to be submitted before October 8, 1982.
2. An implementation schedule for all major activities required to facilitate defueling the reactor core, including reactor vessel head removal, is requested to be submitted before November 8, 1982. Major activities should include, among others, design of any special water cleanup system(s), and fuel and debris removal equipment, as well as suitable containers. The licensee should include a schedule for submitting preliminary as well as detailed technical information on these activities to the NRC.
3. An implementation schedule for activities required to facilitate the removal of the reactor coolant purification system ion exchange wastes from the TMI-2 site is requested to be submitted before October 8, 1982. This schedule should include the licensee's schedule for completing characterization studies and conceptualized and final planning for removal and shipment of these wastes.

In accordance with the concerns expressed above, the schedular information requested should be based on an expedited cleanup pace, unencumbered by financial constraints. The near-term dates for receipt of this information reflect the NRC's perception of the need for prompt action given the long lead times associated with ultimate completion of these activities.

This information is required in order to determine whether the Commission should take any additional steps to assure that cleanup tasks are completed expeditiously.

Sincerely,

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

cc: J. Barton
L. King
J. Larson
Service List (see attached)

ENCLOSURE 3



GPU Nuclear Corporation
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TELEX 84-2386
Writer's Direct Dial Number:

September 21, 1982

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Mailstop P-428
Washington, D.C. 20555

Dear Mr. Denton:

The Company shares your concern that "cleanup delays, if they are permitted to continue, will increase the likelihood of incidents involving radiation leakage and possible exposures of workers and the public." Our concern has been manifested by specific activities we undertook unilaterally to reduce the potential for such incidents. For example, we sought early approval for krypton venting, and we moved aggressively to complete the Epicor II system for decontaminating auxiliary building wastes. We moved forward expeditiously with the design, procurement, installation, and startup testing for the Submerged Demineralizer System even though we lacked NRC endorsement of the system. Indeed, the NRC made it clear that we were proceeding at our own risk. The availability of that system provided the basis for the June 18, 1981, Order that "specific action be initiated to decontaminate radioactive water from the reactor building basement and reactor cooling system." Having completed processing of the water collected on the floor of the lower level of the reactor building, we are in the process of using the SDS for the decontamination of the primary coolant system water. (This system interconnects with numerous systems that penetrate containment.) We have recently achieved visual access to the damaged core in order to enhance the planning basis for fuel removal. We have been and continue to be dedicated to removing the risk to public and worker health and safety that the damaged plant currently represents.

We have provided in the past (August, 1980 and July, 1981) cost and schedule information on the base plan for the TMI-2 cleanup program. Those cost estimates and schedules have been the basis for the efforts by many outside organizations, including the NRC, to understand and to address the technical and financial requirements of the cleanup program. Because there was only limited technical information available on conditions within the plant, and because there was not a consensus on the mechanism of funding, those earlier program plans had to be based on a number of critical assumptions. One of those assumptions was that funding would not be a constraint on progress of the work. We now have a much better sense of the funding levels that are likely to be available.

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P PDR

GPU Nuclear Corporation is a subsidiary of the General Public Utilities Corporation

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Mr. Harold R. Denton, Director
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We believe the planning, site work, and engineering work since the accident, which have involved not only technical experts of Bechtel Corporation (our major contractor for defueling and decontamination) but also technical input from the NRC staff, the national laboratories, and numerous other members of the nuclear industry, have given us a much better understanding of the technical requirements and the limits on effective application of resources for the program than existed in mid-1981.

Our evaluation of anticipated funding and technical and operational requirements of the cleanup are being utilized for an overall program schedule and cost reassessment. This program reassessment is scheduled to be completed by year end. It is a major effort which is requiring many man-months to complete, and we do not believe it would be productive to initiate a separate effort to develop a schedule based upon an assumption of unlimited funding. Such an effort would be a diversion of limited resources and counterproductive to our objectives of safe and efficient cleanup. Accordingly, we believe it will be more beneficial to utilize the current program reassessment effort to respond to item 2 of your September 8, 1982, letter.

The program reassessment is being carried out in a manner which will facilitate identification of technical, operational, and financial restraints. This approach will let us better identify where schedule improvements may be achieved if additional funding can be made available. We should be in a position to review the program plan with the NRC after the beginning of 1983. In response to item 2 of your September 8 letter, we expect to be able to identify to the NRC where opportunities for schedule improvements may exist if additional funds are available by February 1, 1983. We will provide a response to items 1 and 3 by October 8, as requested.

The funding plans for the program for 1982, 1983, and 1984 and the sources of the funding are currently anticipated to be:

<u>Source</u>	<u>1982</u> <u>(millions)</u>	<u>1983</u> <u>(millions)</u>	<u>1984</u> <u>(millions)</u>
Customer Revenues	\$ 20	\$ 34	\$ 50
Commonwealth of Pennsylvania	--	5	5
State of New Jersey	--	2	2
Insurance	40	19	20-10
Industry	1 (EPRI)	2 (EPRI)	10-15
U.S. DOE	9	14	10-15
TOTAL	<u>\$ 70</u>	<u>\$ 76</u>	<u>\$ 95-100</u>

The 1983 funding plan reflects the actual revenues approved by our state utility commissions. While cleanup revenues are currently being collected from customers, the necessary trust agreements under which funds would be released remain to be

Mr. Harold R. Denton, Director
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developed. The increase in customer revenues projected for 1983 is dependent upon favorable action by the Pennsylvania PUC on a forthcoming rate case to be filed in January, 1983. Action could occur as early as March and as late as September.

At the end of 1982, about \$40 million of spendable cash will remain from the original \$300 million of insurance. As a result, depending on the range of funding available, insurance will run out in 1984-85.

For the electric utility industry participation, we are using a modest planning assumption until their program for support of the Thornburgh Plan firms up.

The U.S. DOE participation, including waste and fuel disposal, is valuable but far short of the Thornburgh Plan. We would urge the NRC to work within the administration to expand the U.S. DOE funding at least to the Thornburgh level.

Although detailed schedules must await the results of our current reassessment, we anticipate that during the next 15 months, consistent with current funding expectations, we will be performing the following activities towards the defueling and decontamination of the unit:

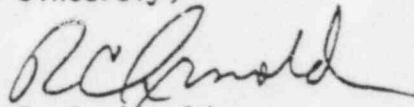
- Repair, refurbishment (as necessary) and requalification of the polar crane for lifting the reactor vessel head and plenum.
- Removal of the reactor vessel head (scheduled to be completed by mid-year) and possibly the plenum.
- Preparation for removal of the fuel.
- Shipping of radioactive wastes from the site.
- Further decontamination of the reactor, auxiliary and fuel handling buildings.

Given the nature of the cleanup program and the extent to which the activities are expected to continue to be heavily influenced by information and insight gained by preceding activities, we suggest that the most effective approach for protection of public and worker health and safety is one which focuses on near term efforts within the context of an overall plan which must inherently contain many uncertainties. We will continue to work with the NRC TMI-2 Program

Mr. Harold R. Denton, Director
Page 4
September 21, 1982

Office to keep them apprised of our planning and schedules so that the NRC may have appropriate and timely input into the planning phase of TMI-2 activities.

Sincerely,


R. C. Arnold
President

cc: Nunzio J. Palladino, Chairman, U.S. NRC
Thomas M. Roberts, Commissioner, U.S. NRC
Victor Gilinsky, Commissioner, U.S. NRC
John F. Ahearne, Commissioner, U.S. NRC
James K. Asselstine, Commissioner, U.S. NRC
Dr. Bernard J. Snyder, Director, TMI Program Office
Susan M. Shanaman, Chairman, Pennsylvania PUC
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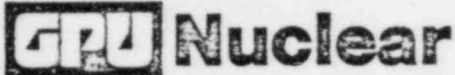
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TELEX 84-2386
Writer's Direct Dial Number:

October 8, 1982
4410-82-L-0026

Office of Nuclear Reactor Regulation
Attn: Mr. Harold M. Denton, Director
US Nuclear Regulatory Commission
Mailstop P-428
Washington, DC 20555

Dear Mr. Denton:

In response to your letter of September 8, 1982, and in accordance with our response letter of September 21, 1982, GPU Nuclear Corporation is providing information regarding schedules for the removal of EPICOR II prefilters, Submerged Demineralizer System ion exchange wastes, and Reactor Coolant Purification System ion exchange wastes.

1. EPICOR II Prefilter Shipments

Four EPICOR II prefilters have already been shipped off-site with the anticipated schedule for the shipment of the 46 remaining EPICOR II prefilters to be as indicated below. In preparing this schedule, consideration was given to the normal problems which occur in such shipment such as minor corrective maintenance problems with equipment and weather conditions. The schedule does not, however, include any abnormal problems which may occur such as major/key equipment breakdown or severe weather conditions which may hamper shipments. Additionally, the assumption that these prefilters will be accepted by the Department of Energy (DOE) as they are readied for shipment has been made. Should the DOE place any restrictions on receipt of these prefilters, the schedule may be extended.

Another consideration in the development of a shipping schedule for the EPICOR II prefilters is the licensing of two shipping casks designed by Ridihalgh, Eggers, and Associates (REA) for the shipments of EPICOR II prefilters. The current licensing situation concerning the REA casks necessitated the development of two schedules.

Schedule No. 1 - Use of REA Casks

Schedule No. 1 makes the following assumptions: (a) the REA casks can be licensed and available for use by TMI-2 in February, 1983; (b) TMI-2 has the use of the presently licensed HN-200 and CNSI-120 casks until the REA casks are available; and (c) use of the GPUNC

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owned SN-1 cask for shipment of some prefilters provided the cask radiation profile is acceptable.

October 1982: Start Shipment.

Projected shipment of eight (8) to ten (10) liners during the last quarter of 1982.

Completion of shipment of all 46 liners by the end of 1983 based upon approximately seven (7) shipments every two (2) months.

Schedule No. 2 - Use of HN-200, SN-1, and CNSI 8-120 Casks Only

Schedule No. 2 has been prepared on the assumption that the REA casks will not be available for shipment of the EPICOR II prefilters. This schedule is contingent on the availability for the HN-200 and CNSI 8-120 casks as GPUNC has no guarantee from the vendors that these casks will be available on a continuing basis.

October 1982: Start shipment.

Projected shipment of eight (8) to ten (10) liners during the last quarter of 1982.

Completion of shipment of all 46 liners end of first quarter of 1984, based upon average shipment of five (5) liners every two (2) months.

2. Submerged Demineralizer System Ion Exchange Wastes

The ion exchange waste generated by the Submerged Demineralizer System is labeled as ion exchange vessels, leakage containment vessels, and filter vessels.

Of the fourteen (14) ion exchange vessels, one (1) vessel has already been shipped from TMI-2. Of the remaining vessels, five (5) are currently in service and will require on-site characterization following removal from service. Two (2) have been removed from service and are awaiting on-site characterization. Six (6) have been removed from service, characterized, and are awaiting preparation for shipment. This preparation will be performed by a system designed for vessel vacuum pumpdown and catalyst insertion. This system will be installed and tested in the fourth quarter of 1982. Assuming success of this system and exclusive use of the CNSI 1-13C-2 cask, the projected completion for shipment of the ion exchange vessels currently removed from service is the third quarter of 1983.

There are six (6) leakage containment vessels at TMI-2. Two (2) are currently in service. Two (2) have been removed from service and require sluicing into a 6x6 liner prior to disposal. Two (2) have been removed from service and require, due to their curie content, sluicing into a 6x6 liner, sampling, and solidification prior to disposal. The sluiced resins will be shipped when the 6x6 liners are at full capacity.

The twelve (12) filter vessels include two (2) that are currently in service, seven (7) that have been removed from service and characterized, and three (3) that have been removed from service and require characterization. Characterizations performed to date indicate that several spent filter vessels are potential candidates for commercial burial. Providing repository receipt is available, projection to complete the shipment of filter vessels currently removed from service is the last quarter of 1984, based on shipments being able to start mid-December 1983.

3. Removal of the Reactor Coolant Purification System Ion Exchange Wastes

The following delineates the status of activities currently underway and those which are planned in an effort to characterize the letdown purification demineralizers to obtain the necessary technical information to effect their safe removal. The majority of the tasks are DOE funded since the activities leading to the removal of the resins consist of research and development activities.

GPU initiated a program to obtain radiological and video data from the "A" and "B" demineralizer cubicles in July 1982. Numerous video tapes and radiological surveys have been obtained. In addition, crystalline material samples were obtained from the "A" cubicle and Solid State Track Recorders (SSTR's) were placed on the tank within "A" cubicle for neutron detection. Video and radiological data gathering was assisted using a robot provided by a DOE contractor. The following activities are scheduled for completion by the end of the fourth quarter of 1982: (a) a gamma spectrum of the "A" cubicle; (b) removal and reading of the SSTR's in the "A" cubicle; and (c) installation and use of a periscope to take pictures in both cubicles.

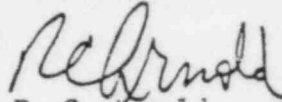
Engineering activities to obtain gas and/or liquid samples from both demineralizers are also in progress. Analysis of the samples is expected to be completed by the end of the first quarter of 1983.

Engineering activities for obtaining demineralizer resin samples are anticipated to commence within the next few weeks. Analysis of the resin samples to be obtained is scheduled for completion by the end of the second quarter of 1983.

In June 1982, a DOE contractor initiated a study to assess the resin removal alternatives. The removal techniques fall generally into three categories: (a) sluicing; (b) dissolution; and (c) whole demineralizer removal. Additionally, results of characterizations performed by GPUNC will be supplied to DOE as the data becomes available which will be used to determine which of the above removal options will be implemented. This assessment will be completed by the end of 1983. Since this activity is a research and development activity, schedule for development of hardware, installation of such hardware, and removal of resins will be developed as the research progresses. It is anticipated that resins will be ready for off-site shipment in late 1984.

TMI on-site NRC personnel are able to follow these Research and Development activities as they occur.

Sincerely,



R. C. Arnold
President

RCA/JJB/jep

cc: Dr. B. J. Snyder, Program Director - TMI Program Office
Lake Barrett, Deputy Director - TMI Program Office
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November 18, 1982
4410-82-L-0052

Mr. Lake H. Barrett
Deputy Program Director
TMI Program Office
U.S. Nuclear Regulatory Commission
c/o Three Mile Island Nuclear Station
Middletown, Pennsylvania 17057-0191

Dear Sir:

Re: Letter (4410-82-L-0026) dated October 8, 1982
from Mr. R. C. Arnold to Mr. Harold M. Denton

We wish to inform you of improvements in the ongoing activities for removal of the reactor coolant purification system ion exchange wastes.

We now anticipate that the analysis of resin samples which we had scheduled for completion in the second quarter of 1983 would be complete by the end of the first quarter of 1983. As a result of improvement in that schedule, we also anticipate that the assessment for the techniques for resin removal which we had anticipated for the end of 1983 could be completed by the middle of 1983.

This letter essentially confirms the information that we provided to you in a telephone conversation. We will continue to inform you of improvement in any schedule as it becomes feasible.

Yours truly,

B. K. Kanga
B. K. Kanga
Director, TMI-2

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BKK:ms

cc: Dr. B. J. Snyder
Program Director, TMI Program Office

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