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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE COMMISSION

In the Matter of

METROPOLITAN EDISON COMPANY, et al. Docket 50-289 SP

(Three Mile Island Nuclear
Generating Station, Unit 1)

AMENDMENT TO AAMODT MOTION OF JANUARY 15, 1985 ADDITIONAL HEALTH MATTERS WHICH MUST BE CONSIDERED PRIOR TO THE COMMISSION'S DECISION ON RESTART OF UNIT 1

Norman O. Aamodt
Marjorie M. Aamodt

200 North Church Street
Parkesburg, Pennsylvania 19365
(215) 857-1608

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PRIOR TO THE COMMISSION'S DECISION
ON RESTART OF UNIT 1

1.0 Abstract

On June 21, 1984, the Aamodts reported to the Commission that their findings of serious health effects in residents in the direction of early plumes from the TMI accident clearly indicated that a comprehensive investigation was warranted prior to the restart of Unit 1. The Commission denied the Aamodts' motion on December 1984, following the NRC Staff's direction and a cursory review by the Centers for Disease Control. Commissioners Bernthal and Asselstine provided dissenting opinions.

On January 15, 1985, the Aamodts asked the Commission to reconsider its decision since the 600% increase in cancer mortality in the areas surveyed had been verified. Other scientists, the TMI Citizens' Advisory Committee and Senator Arlen Specter also asked the Commission to reconsider the Aamodt motion.

Although there has been no ruling, the Commission has publicly stated that it may initiate an investigation of health effects. However, it appears that the Commission would not delay its decision on restart of Unit 1.

The Aamodts believe that the Commission must determine, prior to its Unit 1 restart decision, the cause, extent and scope of the TMI-area residents' health problems and environmental injury. Serious health effects as far as 30 miles from TMI appear to be accident-related and challenge the NRC's emergency planning for the 10 mile radius of TMI. The Aamodts have argued that since the people, flora, animals and insects were the true dosimeters, the dosimetric hardware and techniques, presently in use, have been demonstrated to be inadequate to protect the public and environment. In fact, residents in one area northwest of TMI are presently experiencing effects which appear to

be the result of residual radiation from the accident, however the agencies responsible for the protection of public health and safety claim that they are not able to identify causative radioactivity or any other agent.

The recently-acknowledged 5,100 degree temperature that the core of Unit 2 reached during the 1979 accident released transuranic materials from the core. These materials emit a type of radiation (alpha) which was not measured at the time of the accident, which is difficult to detect, which cannot be detected by the standard kind of dosimetry presently installed for the protection of the public, and which is highly hazardous.

Transuranic materials were probably released to the environment during the TMI accident, a matter which would challenge the legitimacy of further nuclear operations in the area. GPU admits that two to eleven tons of the Unit 2 core are missing, and transuranics were found in Unit 2 filters analyzed in 1980. The withholding of this information further calls into question the integrity of GPU management and NRC regulation of Unit 1.

GPU, in its pay-out of nearly four million dollars so far this year, has essentially admitted that TMI-area residents have been severely damaged by the TMI accident. A number of these residents reside beyond the 10 mile radius for which emergency planning has been provided. Over 300 additional personal injury claims have been filed. It can be assumed from these numerous claims and the findings of a 600% increase in cancer mortality west of TMI that the TMI accident was a disaster of undefined proportions.

GPU's imposition of a 'gag' on claimants in return for out-of-court compensation will block access to information needed in a comprehensive investigation of health effects from the accident unless a challenge is made in the public interest. If Unit 1 is allowed to operate, prior to

the full resolution of the extent and nature of the radiological impact from the Unit 2 accident, TMI-area residents may again experience additional serious physical injury from an accident at Unit 1.

Any further delay by the Commission, relative to the fair and independent resolution of the health effects in the TMI area, would provide cause for criminal prosecution of the commissioners. In the event that the Commission should act to restart Unit 1 prior to a fair resolution of health effects in the TMI area, legal action to remove the consenting commissioners would be appropriate.

2.0 Introduction

By memorandum of March 14, 1985, we notified the Commission that serious post-accident health problems in persons residing beyond the 10 mile EPZ (emergency planning zone) for TMI must be included in a comprehensive investigation of health effects and that this investigation must precede the Commission's restart decision. The matter of serious post-accident health effects within and beyond the 10 mile radius of TMI challenges the presently-approved emergency plans. While the Commission now appears to be softening its attitude toward the initiation of a comprehensive investigation of post-accident health effects in the TMI-area residents, the Commission has signaled its intention to proceed with its decision on restart of Unit 1 prior to any investigation.[1/]

The Commission's apparent change in attitude toward our motion for an investigation of the health problems is commendable, however a

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1/ See transcript of Commission meeting with Citizens' Advisory Committee of March 7, 1985.

restart decision would be premature -- and illegal -- if it precedes a health investigation.

The Commission must determine the extent of personal and environmental injury caused by the TMI accident prior to a decision on restart of Unit 1, whereby further radiological injury is premised. The Commission must determine whether the emergency plans developed on the basis of the totally false assumption that noone was injured, are adequate to protect a seriously-injured population.

The recently-acknowledged facts, that the TMI-2 core temperature exceeded 5000 degrees (fahrenheit) and that transuranic materials were found in filters, were not considered in planning protective actions for the public. In addition, the late admission by GPU of the extensive core damage, despite the telling evidence of transuranics in the filters, poses even more serious questions concerning the trustworthiness of the present management. The six year delay in any reasonable assessment of the severity of the accident, and the present reluctance to face the public health issues, by agencies that knew or should have known, has raised the issue of the adequacy of the oversight and regulation of nuclear operations at TMI -- or anywhere.

3.0 Health Effects Beyond 10 Mile Radius of TMI

The data is of three types. The first (presented in Section 3.1 and Figures 1,2) was routinely collected by the Pennsylvania Department of Health (PDOH) to ameliorate the effects of hypothyroidism in infants less than 28 days old (neonatal). The 1979 and 1980 data for Lancaster County is not new information, however a reinvestigation is now warranted in view of the significant drop in cases from 1981 through 1983. This drop was not expected by Licensing Board, in separating the 1979 hypothyroidism incidence from the TMI-2 accident. See PID,

December 14, 1981, ¶1721.[2/] If the 1979 cases were the result of radioiodine releases from the TMI accident, as appears to be the case, the distances of the residences of these cases, as far as 35 miles from TMI, challenge the concept of emergency planning for the 10 mile radius.

The second set of data was provided, individually and spontaneously, by the affected persons after our motion of January 15, 1985 was reported in the news media. Although the data is sparse in comparison to the potentially-affected population, we consider the cases reported as representative of a large number of existing, unreported cases.[3/] This data is presented in Section 3.2 and Figure 3. Its significance is its credibility (it is consistent with data concerning health effects within the 10 mile radius and, in a relative fashion, with radiation measurements made during the accident) and the distance of the affected beyond the 10 mile EPZ.

The third kind of data was gleaned from newspaper accounts of personal damage suits which GPU has tacitly admitted were valid in settling out-of-court for nearly four million dollars. At least seven of the personal injuries were to children who reside beyond the 10 mile EPZ. This information is presented in Section 3.3 and Exhibit 2.

2/ The Licensing Board's chief argument was that since the "rate of neonatal hypothyroidism in Lancaster County remained high in the first nine months of 1980, long after radioiodine releases from the TMI-2 accident should have ceased...the increased rates in Lancaster County after the TMI-2 accident, were not a result of that accident." (The Board's assumption that the venting in 1980 was void of radioiodine is naieve.) The Board did not have other credible evidence since it "was not convinced as to Dr. Tokuhata's (PDOH witness and chief epidemiologist) radiobiolobical expertise and understanding of genetics on which his conclusions regarding health effects were based." Id.¶1722.

3/ Since we have moved and have an unlisted telephone number, we can assume that many more people tried to reach us. The fact that these did, emphasizes their conviction. Residents within the 10 mile radius, in the areas surveyed last year, have called to report an additional 31 deaths and 46 cancer/tumor diagnoses in the area and nearby.

3.1 Neonatal Hypothyroidism Cases in Lancaster County

The significant drop in cases in the years 1981-1983 strips away the Licensing Board's (see Section 3.0 supra.) and the PDOH's bases[4/] for claiming that the 1979 incidence was not caused by the TMI accident. The 1979 data represent a tenfold increase in incidence over that expected(according to national averages (1 case/4000 - 5000 births)). With approximately 3000 births, annually, Lancaster County should report one or no cases per year (0.06 - 0.07). The higher than expected rate in 1980, which misled the Board into believing that incidence in Lancaster County Lancaster County was routinely above the national expected, can be attributed to the venting of TMI-2 containment gases in 1980.

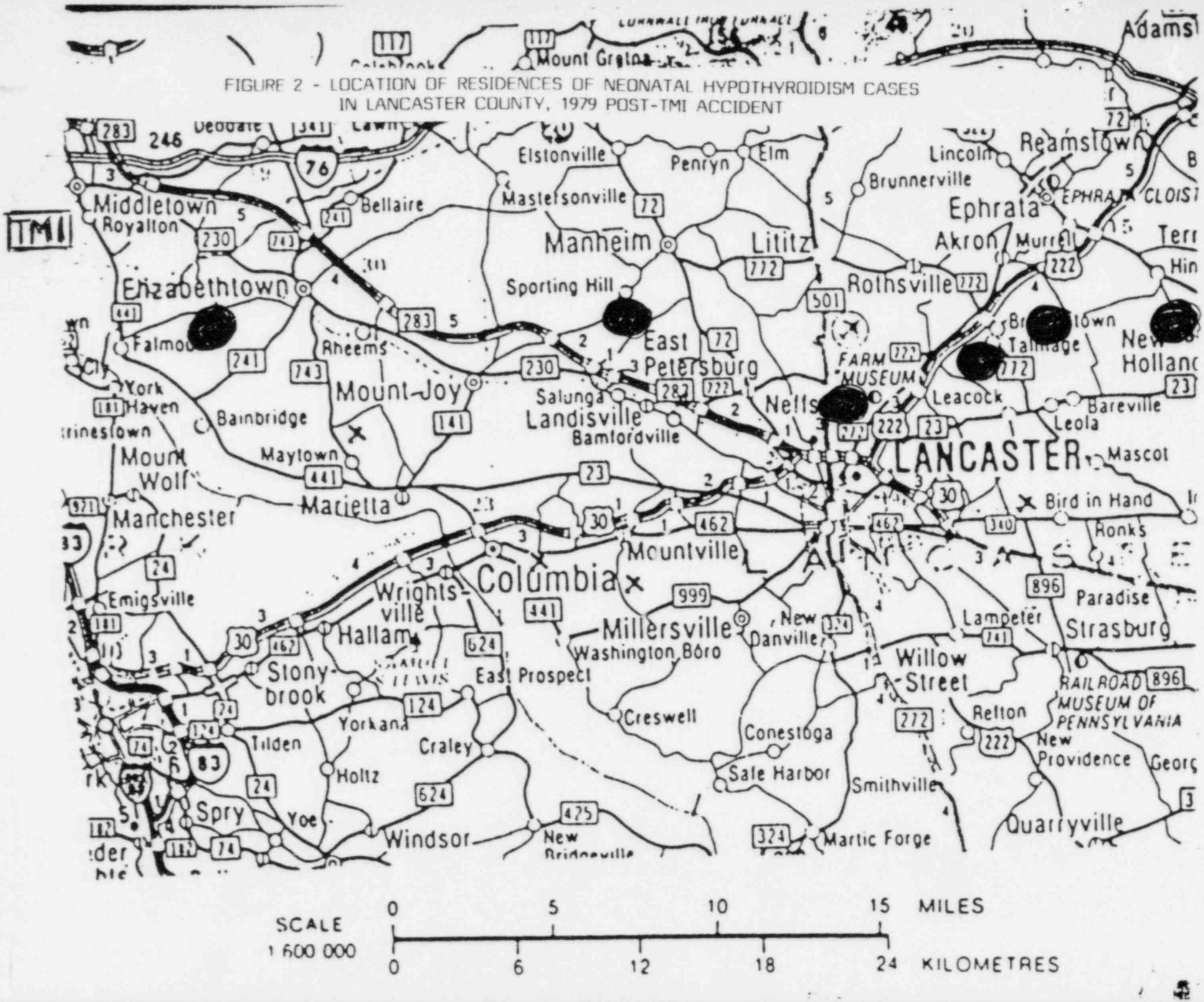
The number of cases are provided by year in Figure 1 and plotted by geographical location of residence in Figure 2.

FIGURE 1 - NEONATAL HYPOTHYROIDISM CASES IN LANCASTER COUNTY

Year	Number
1979	7
1980	4
1981	2
1982	0
1983	1

4/ Dr. Tokuhata has continued to attribute the high incidences of hypothyroidism in 1979 to genetic defects among the Amish, reiterating this absurdity as recently as this past fall in addressing a professional conference. Oral Presentation at the XII International Biometric Conference, September, 1984 (written version provided by PDOH).

FIGURE 2 - LOCATION OF RESIDENCES OF NEONATAL HYPOTHYROIDISM CASES IN LANCASTER COUNTY, 1979 POST-TMI ACCIDENT



The geographic distribution of the six (post-accident) cases (shown in Figure 2, pp.7) falls into a line in an east southeast direction from TMI, suggesting the impact of a plume from TMI.

Although one case was as close as approximately five miles from TMI, the other five cases resided from 15 to 35 miles from TMI, or well outside the 10 mile EPZ.

Since the Board's and PDOH's explanations of the high incidence of hypothyroidism in 1979 in Lancaster County has been refuted by the evidence of normal incidence in 1981 - 1983, the identification of the geographical locations of the 1979 cases as far as 35 miles from TMI, as well as the high incidence throughout southeastern Pennsylvania in 1979, must now be investigated for its implications concerning emergency planning.

The most recent study of the TMI-2 inventory has only accounted for between 17 and 28 percent of the radioiodine.[5/] Extrapolations of iodine release from milk sampling has been shown to be too low by a factor of 50 because of an error of assumption that cows were on pasture.[6/] In addition, milk sampling at distances where hypothyroidism occurred was essentially non-existent.

The more reasonable interpretation of the hypothyroidism incidence in 1979 would be to consider exposure of pregnant women to radioiodine from the accident. The highest incidence was in Lancaster County where the Amish pregnant women were working in the fields (as is the practice) and consuming fresh milk from the pastured family cow.

5/ Pelletier, et al., "Preliminary Results of the TMI-2 Radioactive Iodine Mass Balance Study, Transactions Vol 43, American Nuclear Society Meeting, Winter 1982, Washington, D.C.

6/ Beyea, "A Review of Dose Assessments at Three Mile Island and Recommendations for Future Research, August 15, 1984, C-55, Table C-5.

The NRC Staff withheld a study which it commissioned to determine the pathway of radioiodine to milk.[7/] This study, which established the pathway as totally to inhalation,[8/] if considered in the restart proceeding, would have led the Licensing Board to different conclusions concerning hypothyroidism data.

3.2 Recent Reports of Health Effects Beyond 10 Mile EPZ

The persons who provided the following information believe, independently of any outside information, that the injuries that they have described* are totally attributable to the accident at TMI. Their beliefs cannot be disgarded out-of-hand. In fact, the geographic plot of the cases, voluntarily reported, shows that the locations, geographically, are in to general directions north - west and south - east. Not surprisingly, these are the directions where the official records show that radiation releases were highest. See Exhibit 1 attached.

7/ Beyea, (Id.) pp.C53.

8/ Baker, et al., "Pathways fo Iodine-131 to Milk Following the Three Mile Island Incident", Letter Report to NRC, Battelle Memorial Institute, Pacific Northwest Laboratory, Richland, Washington, June 1983. (The study had been completed eighteen months earlier.)

* Since the time of the accident, people who had problems associated with TMI have met with denigrating official and medical reaction. The official position that 'not enough got out' was promoted by GPU among the local medical practioners. GPU hosted the TMI area physicians, (continued) after accident, to inform them that any medical indications of radiation damage that they might observe in their patients could not be attributable to physical damage from the TMI accident. It is believed that NRC personnel participated in this effort.

3.21 Serious Post-Accident Health Effects Beyond 10 Mile EPZ Spontaneously Reported

A description is provided and identified geographically on Figure 3 by corresponding letter.

(A) A baby, conceived within two weeks of the accident, with the following abnormalaities: a single eye located in the center of its forehead and hydroencephalus; died following full-term birth.

(B) Five cases of leukemia within a mile; one person in mid-30's died in March 1985.

(C) A 31 year old woman with hypothyroidism and leukemia.

(D) Four infants born in the same month with Downs Syndrome; incidence considered abnormally high by physician; one/year expected. (this hospital).

(E) Three carpenters, working outside near the city of Lancaster, experienced metallic taste during the initial days of the accident; two developed lipomas.

(F) Siblings were diagnosed as having an identical mysterious blood disorder in May 1979.

(G) Dandelion leaves over 3 feet long grow in profusion in a school yard.

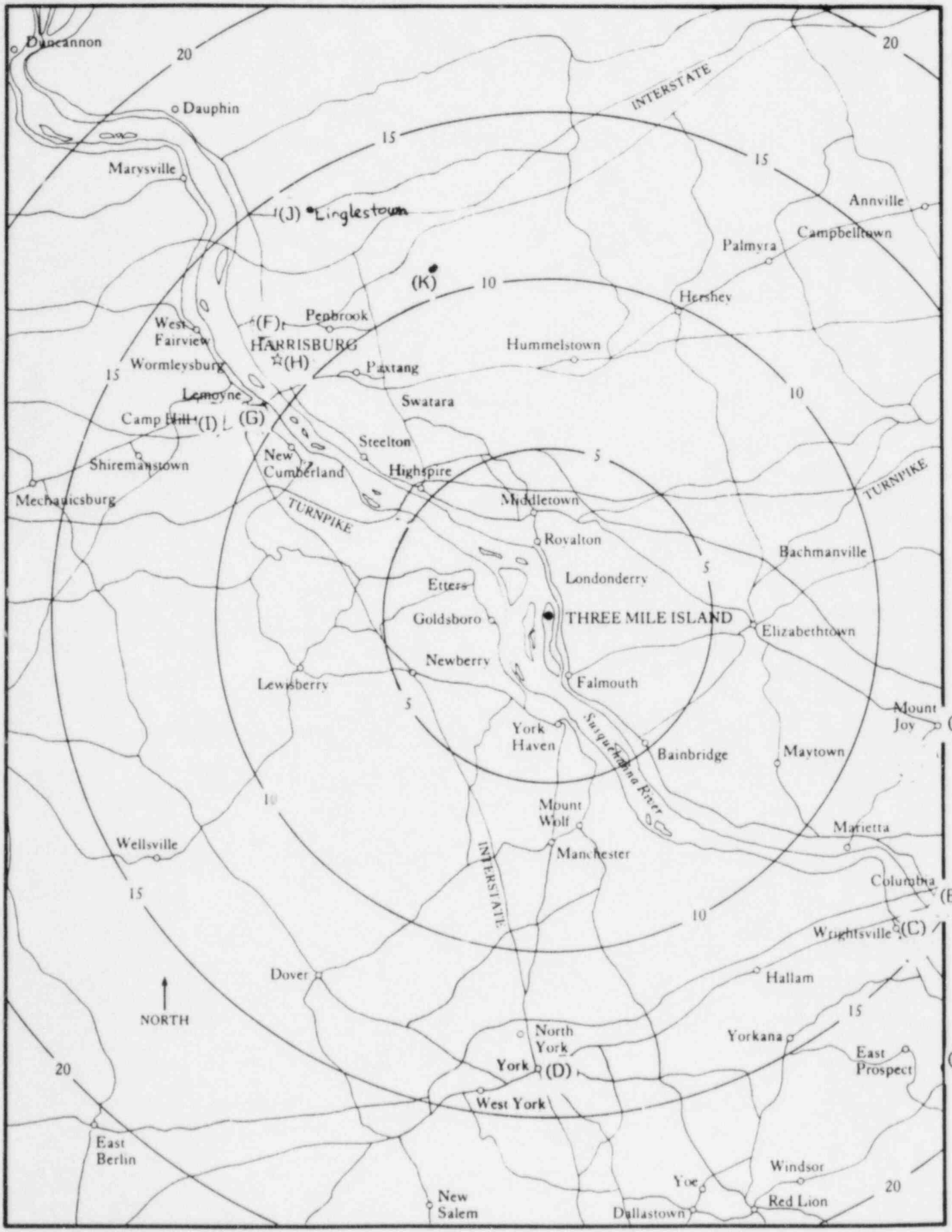
(H) A secretary in the Capitol building experienced metallic taste, nausea and severe vomiting on the first day of the accident, causing her to leave work and seek a physician's advise.

(I) A woman (less than 35 years old) has hypothyroidism and cancer of the cervix.

(J) A young woman has experienced a spontaneous abortion, death of an infant and a recent diagnosis of breast cancer.

(K) Cancer cluster.

FIGURE 3 - PLOT OF REPORTED SERIOUS HEALTH EFFECTS BEYOND 10 MILE RADIUS OF TMI



3.3 Serious Health Effects Beyond 10 Miles Acknowledged By GPU's Payout of Nearly 4 Million Dollars

On February 7, 1985, a Dauphin County judge approved awards of nearly four million dollars to persons claiming they "most probably came into physical contact with some radioactive debris" which "was dispersed throughout a large area." See Exhibit 2 attached. Information concerning the exact nature of the injuries claimed was not provided (except in the case of a Downs Syndrome case) because GPU required silence on the part of the claimants in return for the out-of-court settlements. Except for thirteen claimants, the addresses were not provided. Of those, seven residences are outside 10 mile radius of TMI. Seven live in Mt. Joy and Columbia, southeast of TMI, and one in Harrisburg, northwest of TMI, the two general directions where the majority of the serious cases plotted in Figure 3 also reside. Additional confirmation of plume impact in these directions is provided by the door-to-door survey results reported in the Aamodt motion (two areas were west northwest of TMI) and "clusters" such as the one reported in Maytown. See Exhibit 3 attached.

The juvenile cases came to notice of the press because they required approval of the court. GPU has admitted that "300 personal injury claims" were being settled out of court, essentially an admission of guilt and unethical silencing of the accuser.

4.0 Evidence of Radiation From TMI Presently in Environment

4.1 Measurements West of TMI By Agencies

On August 15, 1985, during a meeting with the Commission, we reported that we measured radiation on top of the ground ten times air level. west of TMI. (The instrument used was a Victorinne handheld owned by a local resident). This measurement was checked by use of the Newberry Township meter (also a Victorinne). The results obtained were the same (0.1mr. gamma). These readings were made in May 1984. Subsequently, on August 30, 1984, at the request of William Travers of the NRC field office in Middletown, PA, we arranged for representatives of NRC, DER and EPA to take measurements (onsite), and soil and water for sampling. On October 31, 1984, the NRC issued a joint report for the agencies which stated that there were no abnormal indications, however further analyses were underway and would be reported when completed. Approximately eight months after taking samples and more than a month after our reminder, the EPA issued a joint report on February 25, 1985. The NRC director had indicated that the delay in the final report was due to revisions being made to the data by the director of the EPA field office in Middletown, Dr. William Kirk. We requested the original results and an explanation of any "revisions", however a single report was provided.

We have reason to suspect that the surveillance done by the agencies was not adequate, if honest. We continue to receive reports from a resident where samples were taken who is experiencing health effects similar to those experienced at the time of the accident (see Affidavit 1 of Aamodt Motion, June 21, 1984) but not quite as severe. Other persons in this neighborhood are continuing to experience effects that are of the kind produced by high doses of radiation. For instance, the resident (referenced above) experiences tearing and burning eyes, erythema, the effect of looking through water, and blisters on and in his mouth after working outside on his

property. His wife has experienced the same kinds of symptoms, but to a lesser degree; she is not outside as much as her husband. Neighbors have reported persistent and unexplained blisters on their feet; several dogs in the neighborhood also have blisters on their paws. Last fall, four men in total who were in the woods in the same area had to seek emergency treatment for swollen and blistered mouths and throats. Several residents are continuing to experience hair loss, including a young child. The resident, referenced above, and his wife lost all their body hair by the end of last year. (Unlike previous years since the accident, these two persons have been engaged in extensive landscaping of their property since last May.) When they spent several months in Florida this past winter, their body hair started to grow back. They showed the new growth to health physicists at the PA Bureau of Radiation Protection, who were amazed but have not been able to provide relief to the residents. Since returning, the residents are again experiencing erythema, tearing eyes and other symptoms.

We believe that these residents are experiencing effects from residual radiation from the TMI-2 accident which has seeped into the soil and is being recycled by the trees and other vegetation. Dandelion leaves, nearly three feet long, were found in this area last fall; garden vegetables were gigantic. (Stimulation is a radiation-effect.) Cumcumbers were the size of mature zuchinni squash, and tomatoes the size of cantelopes. An authority in the field of the effects of ionizing radiation in plants, Dr. James Gunckel, believes that these vegetative effects are due to radiation presently in the environment.

It should be noted that with nearly 2000 different products that occur with uranium fission, the dozen analyses performed by the agencies was far from complete. All agencies refused to test for I^{129} on the basis of cost ($150/sample), although this measurement could provide a measure of the total radioiodine released by the accident to a particular area.

The analyses and equipment used by the agencies were unable to detect the radiation people in the TMI area are experiencing. The Comission must be concerned with the dose to these people, not to the instruments. This matter needs resolution, prior to restart; the problem is not restricted to a family or neighborhood; residents in each of the areas surveyed door-to-door reported similar experiences, notably the recurring rashes which, invariably, they experienced after extensive out-of-ddor activities.

While the agencies reported the radiation levels measured as not significant, the following statements from the EPA report (2/25/85) are troubling:

> It can be stated with great certainty, however, that the amount of radioisotopes present at the locations are quite ordinary.
>
> Levels of natural isotopes from the uranium series, thorium series and potassium-40 tended to be to
>
> The lack of preaccident samples at the same sites precludes making absolute statements regarding the precise relative concentrations of radionuclides present preaccident and now.
>
> ..at location #2 ..levels in the front and side yards, which had been graded and topsoil removed, were lower than in parts of the backyard where the original soil remained (4-8uR/hr vs 10-12 uR/hr).

While the report attributes the above average amounts of radioactivity to naturally occurring isotopes, there are no preaccident samples or other data provided to support this assertion. Further the fact that levels were lower where topsoil had been removed, (by a factor of as much as 2), would cut against the assignment of the above average readings to background.

A more reasonable interpretation is that radioactivity in the soil after the accident is twice the pre-accident level. Although the absolute values, even at twice the preaccident levels may appear insignificant, the doubling of the activity of the total soil sample could indicate the presence of minute highly-charged particules. Since the activity being measured is of the type, alpha, a single minute highly-charged particle whose energy was masked by the volume of the sample could cause the kind of biological damage described by the TMI-area residents if it landed on the skin.

The EPA report dismissed the damage in dogwood trees reported by one resident, and ignore the bulk of information provided about dead pines, pear trees and red maples. The tree damage in the areas where we surveyed, west of TMI, is remarkable. Nearly if not every property suffered some tree damage following the TMI accident.

5.0 New Information Concerning TMI-2 Core Temperature

Only recently has the fact that the core of Unit 2 reached a temperature in excess of 5000 degrees been made public information. This information was not considered in the restart proceeding, although it is exceedingly important relative to planning for protection of the public, in the event of a repeat performance of the TMI-2 accident and in the interpretation of health effects experienced since the accident.

The 5100 degree temperature of the core caused elevated levels of fission products and transuranics, melted the zirconium cladding of the core, allowing absorption by water vapor of transuranics with subsequent escape of these materials during venting and leakage to the environment.

Transuranics emit a type of radiation (alpha) which was not considered during the radiation measurements and dose assessments of the accident. However, a single particle, too minute to be visible and only detectable at close range with special equipment, is extremely hazardous when inhaled or ingested. Little is known about the specific biological effects of transuranics, however alpha radiation, in general, causes more severe cell damage than equal doses of either gamma or neutron activity. See Exhibit 4 attached. Thus, the most-often cited reference data for biological effects from radiation (Hiroshima, Nagasaki data) where the primary exposure was to gamma and neutron activity, cannot be used as the absolute standard for interpreting TMI-related health effects.

There is a high probability that transuranic materials escaped into the environment. GPU cannot account for between 6,000 and 22,000 pounds of core material See Exhibit 5 attached. The assumption that this material is trapped within the reactor is not too credible. When Unit 2 filters were analyzed in 1980, transuranics were found in the filters. See Exhibit 6 attached. Considering the saturated and deterioriated condition of the filters at the time of the accident and the limitations of filters,[9/] it is not unreasonable to postulate that transuranics went beyond the filters. Other escape routes have been identified, and more, unidentified, probably existed.

Obviously, GPU and the NRC knew in 1980 that the core temperature had exceeded 5000 degrees and that the accident had been far more serious than they were admitting. They also knew, from the presence

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9/ Deitz, "Effects of Weathering on Impregnated Charcoal Performance", NRL Memorandum Report 4006, NUREG/CR-0771, May 10, 1979

of transuranics in the filters, that these lethal products could be in the environment, however, they failed to act to protect public health and safety.

6.0 The New Information Meets the Standards for Reopening the Hearing

The new information presented in this motion, by itself, meets the tripartite test of NRC rules for reopening a hearing. The information is (1) significant, (2) safety-related, and (3) would have caused the Board to have ruled differently.

The contentions, listed in Section 7.0, need to be considered prior to restart of Unit 1.

7.0 Contentions

1. The recommendations for protective actions for the public and emergency workers are inadequate in view of the severity of the accident and release of transuranic materials.

2. Emergency planning for the 10 mile radius of TMI is not responsive to the apparent severe radiological impact from the TMI accident beyond the 10 mile radius.

3. The public information phamplet does not alert the public to the unique hazard from alpha particulates.

4. The agricultural information booklet, which specifically diminishes the risk of contamination from alpha particulates, does not provide the information or means farmers would need to protect themselves from alpha radiation.

5. Dosimetry available to measure radiation in the environment would not detect alpha-emitting products released to the environment.

6. The public cannot not depend on the competent and honest regulation of Unit 1 by the NRC Staff.

7. The public whose health has been impacted by the TMI-2 accident cannot safely bear the additional radiological burden of ALARA[10/] releases from the routine operation of Unit 1 as well as the potential of additional severe exposure from incidents and accidents at Unit 1.

8. Present GPU management has demonstrated an improper attitude in paying-off personal injury claimants to silence them.

8.0 Discussion

It is our view that the investigation of the TMI accident is about to begin. Whether the NRC will provide the forum, or the outside courts will do so, is a decision that the Commission will make in the coming weeks.

The public has reason to dispair about the administration of nuclear power by the NRC. Is it uncritical enthusiasm which has allowed unsubstantiated conclusions concerning radiological dose to the public to parade as scientific conclusions.? The Commission accepted the dose assessment of the Ad Hoc Committee, in rejecting our first motion for a health study, although an independent reviewer had reported the conclusions of this committee were unsubstantiated.[11/]

For the first time, we fully appreciate the concerns expressed by Dr. Gordon MacLeod, director of the Pennsylvania Department of Health at the time of the accident, when he questioned if the decisions concerning the protective actions for the public should be made by nuclear physicists.

10/ As Low As Reasonably Achieveable

11/ Beyea, "A Review of Dose Assessments at Three Mile Island and Recommendations for Future Research, August 15, 1984, A29-43.

MacLeod wrote:

> It seemed that noone outside of professional health circles could appreciate the potential for health hazards of the TMI accident unless they saw people being carried off to hospitals vomiting from radiation sickness. ..That's the attitude that seemed to reighn among nuclear engineers and radiation health physicists throughout the accident. Some of those who protested most vehemently against the recommendation that women and children leave the area were among our own ranks within state government -- not the health department ranks -- but radiation health physicists and engineers dealing with the technical aspects of the accident. 12/

"Some Public Health Lessons From Three Mile Island", Gordon, K. MacLeod, M.D., presented in Stockholm, Sweden, March 11, 1980.

MacLeod's early call for the evacuation of mothers and children went unheeded due to the opposition of the Commonwealth's radiation physicists and nuclear engineers.13/ Absent a consideration of the health effects in residents, the Commonwealth and the NRC will allow the nuclear physicists and health physicists to again make inadequate decisions for the public in the event of another accident.

Although the restart of Unit 1 has been an open issue for over six years, the Commission cannot cave-in to pressure from special interests to restart Unit 1. The evidence presented in the Aamodt Motion of January 15, 1985 and in the present motion should alert the Commission to the fact that the most important issue -- the health of people impacted by the Unit 2 accident -- is at stake. The Commission must tarry until the matter of the extent of damage, already caused

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12/ The Commonwealth's nuclear engineer replied, when asked if he believed that the plant was stable after he learned about the high radiation levels, "Yeah, I guess so." NUREG-0760,103-4,pp.14.
A Commonwealth health physicist testified in the restart proceeding that the Bureau of Radiation Protection is in the "business of public health...what impacts most people" and does not take unique exposures, such as the farming family into account. Tr.18,225.

13/ Bulletin, Allegheny County Medical Society, April 26, 1980, Vol. 69, No. 8, pp. 157.

by the TMI-2 accident, has been assessed. A little more exposure to radiation may be too much for an elderly person, a little child, or a pregnant Amish woman. The Commission's decision will be a matter of life or death for a presently unknown number of persons who live in the path winds from TMI travel.

9.0 Conclusions

If the Commission should allow the restart of Unit 1 prior to a full investigation of health effects in the TMI area, the people of central Pennsylvania should call for the resignation of all consenting Commissioners. Unless the Commissioners heed the public's outcry concerning health problems by deferring its decision on restart of Unit 1 until this matter is fully understood, the Commission will face a public challenge of its own integrity. The Commissioners are, in fact, engaging in criminal neglect of their duty in continuing to ignore their responsibility for the public's health and safety in the face of the clear evidence provided in the Aamodt Motions of June June 21, 1984, January 15, 1985 and this amendment.

Respectfully submitted,

Norman O. Aamodt

Norman O. Aamodt

Marjorie M. Aamodt

Marjorie M. Aamodt

April 13, 1985

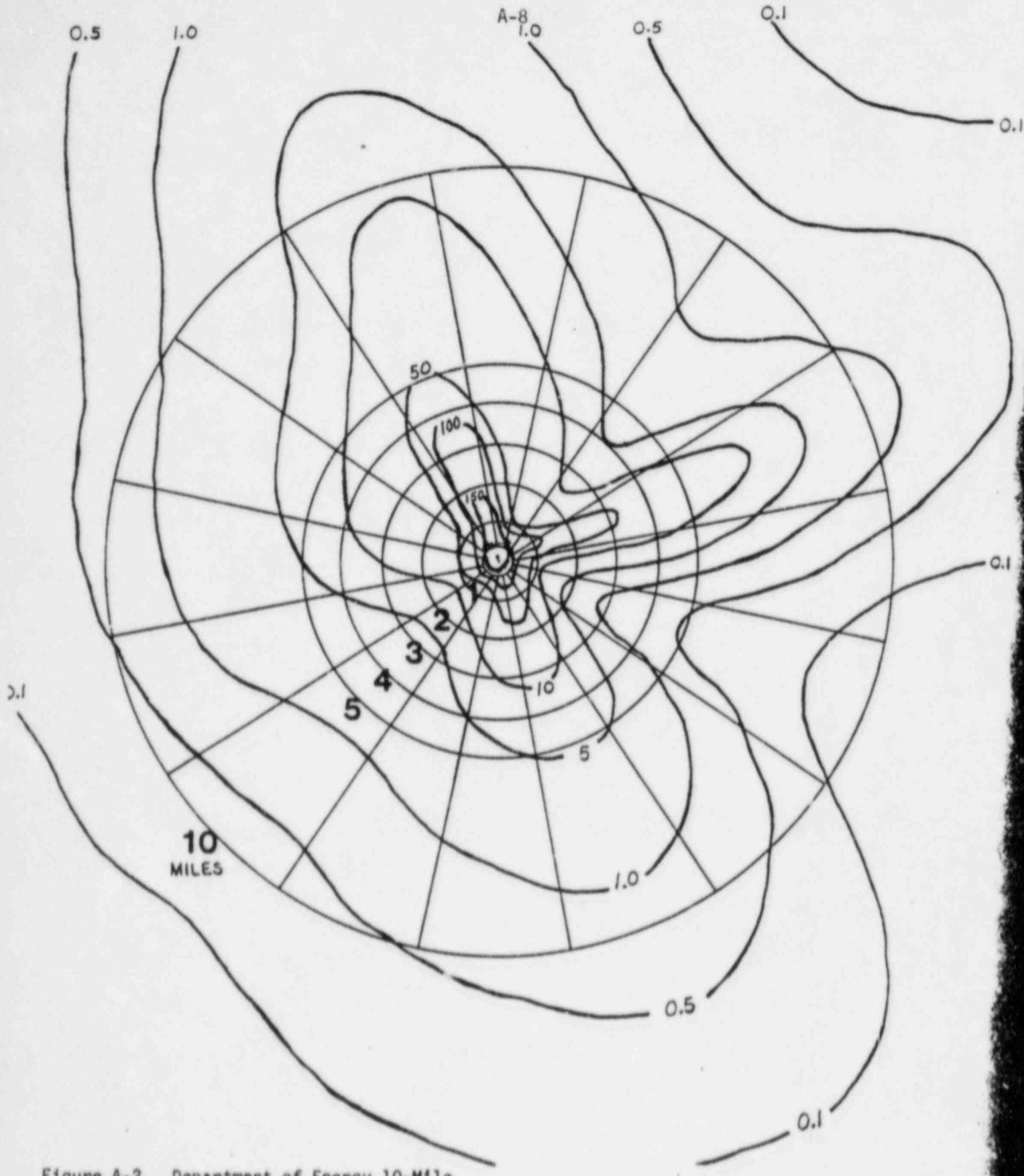
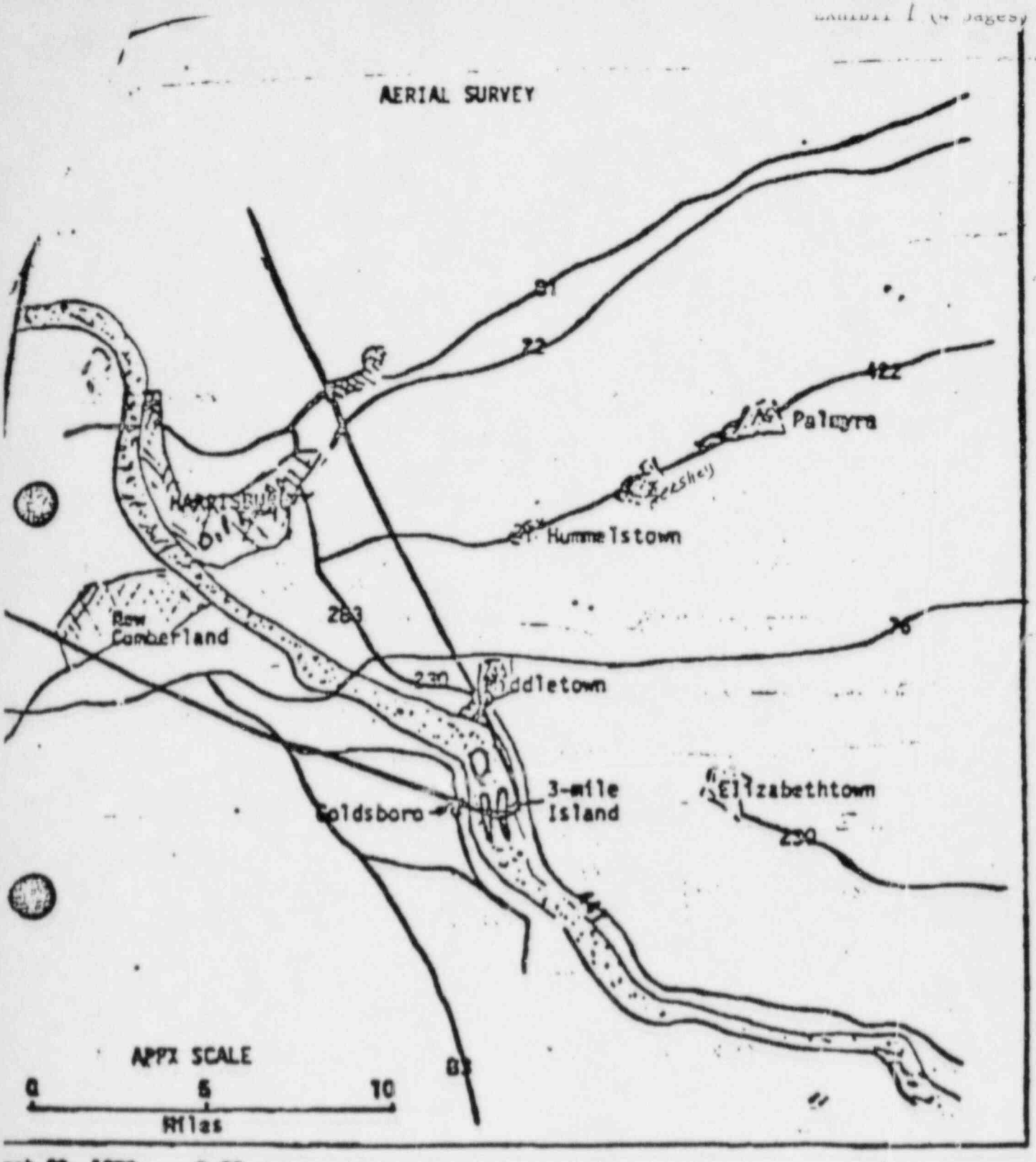


Figure A-2. Department of Energy 10-Mile Exposure Profile (mR) for the Period March 28 through April 3, 1979.

Note: See discussion on instrument calibration on page A-5

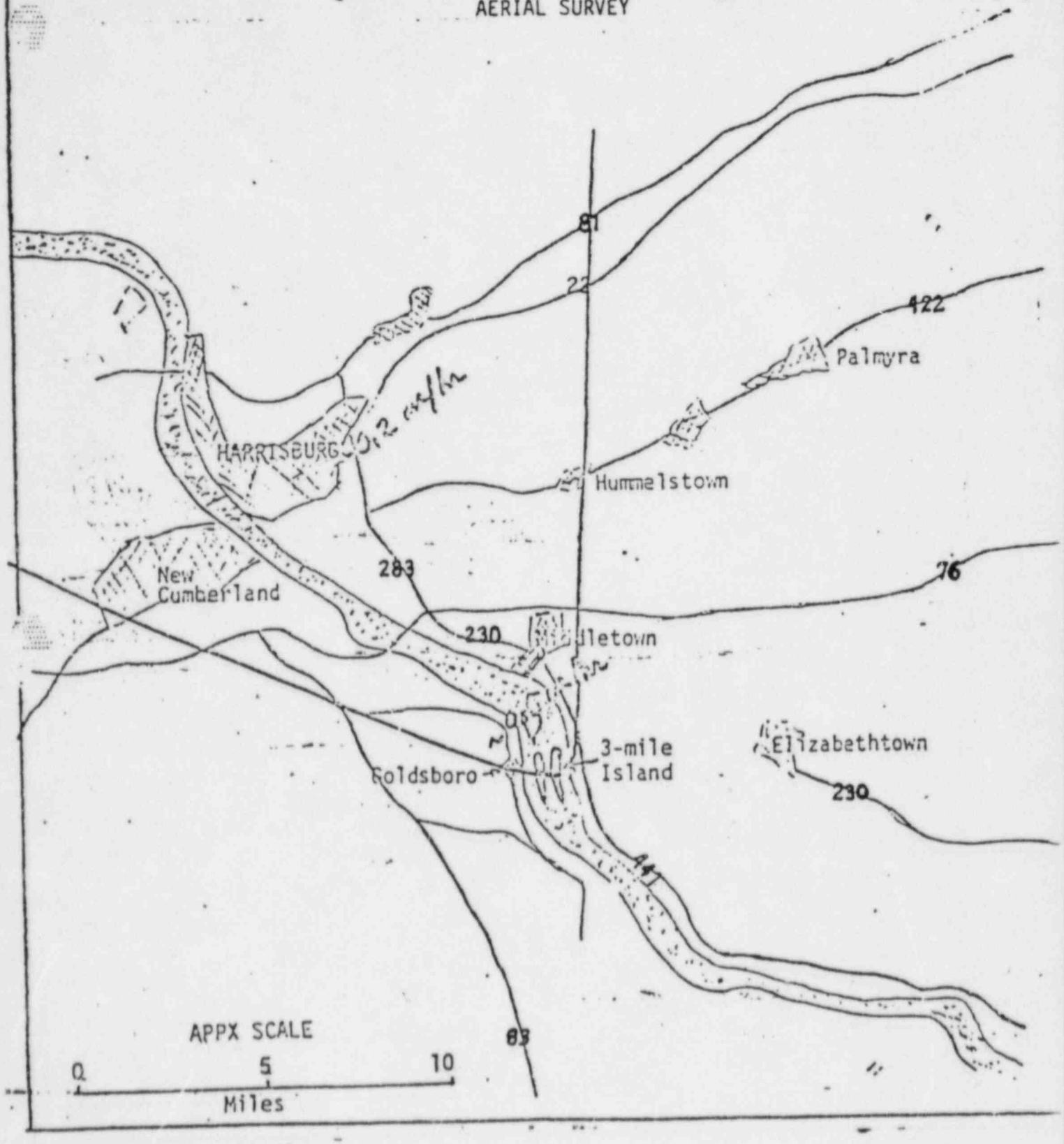


rch 28, 1979 8:00 p.m.

Plume in a N to NW direction. Primarily Xe-133. Over Harrisburg, radiation measurements in the plume showed about 0.1 mr/hr. At 10 miles from the site, the plume was about 4-5 miles wide; top of plume at about 3000 feet.

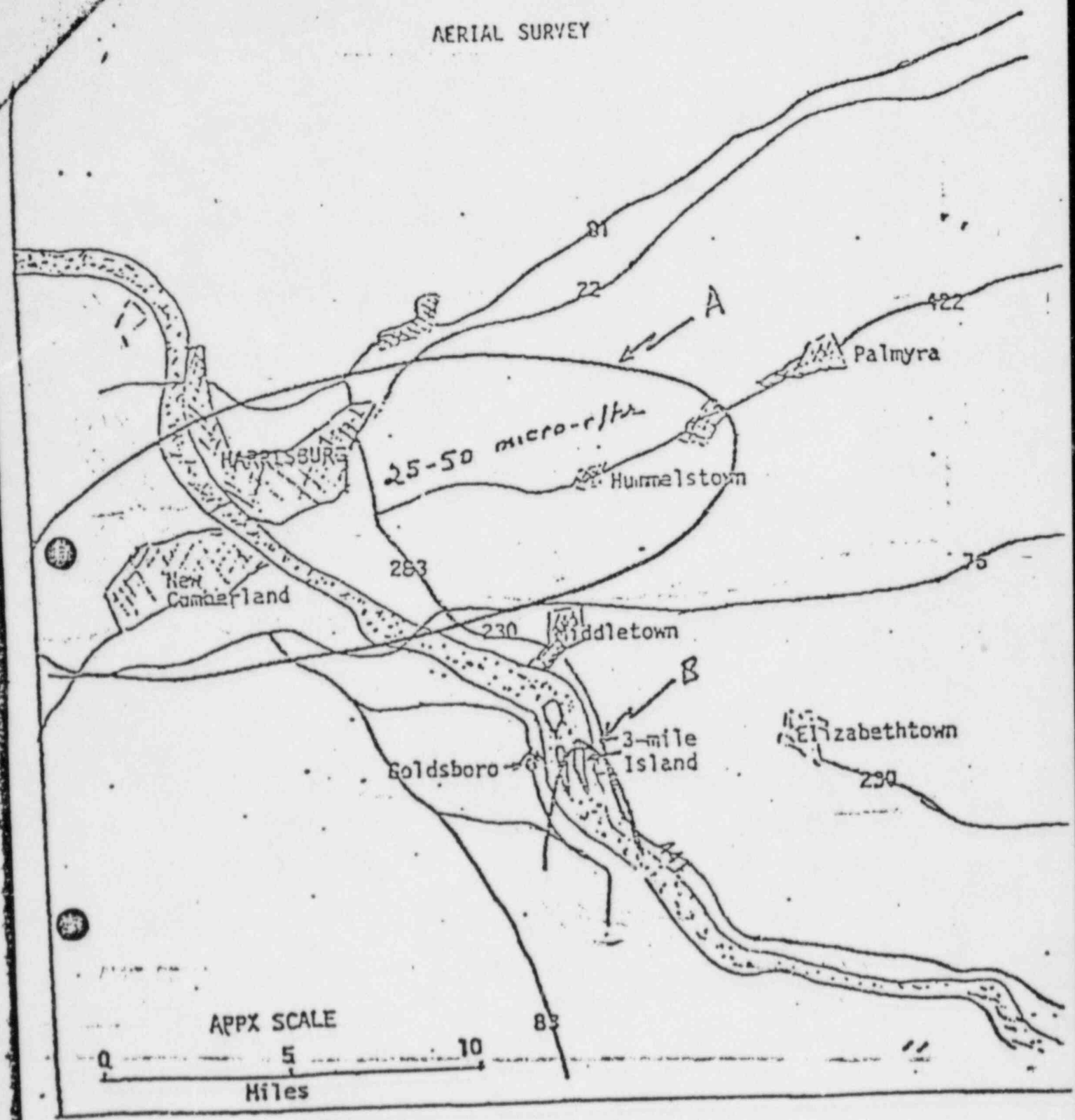
EXHIBIT 1 (4 pages)

AERIAL SURVEY



March 29, 1979 10:15 a.m.

Plume in a N to NW direction. Primarily Xe-133. Radiation measurements in the plume at about 10 miles from plant in centerline of plume were 0.2 mr/hr; at 1 mile from plant, about 0.5 mr/hr maximum.



March 29, 1979 5:00 p.m.

A Residual cloud (Xe-133) N to NW between Mechanicsburg and Hershey, Pennsylvania. Radiation measurements in the cloud in the microroentgen/hour range, highest readings in cloud center.

B Ground level measurements on the island indicated a plume in the southerly direction. Radiation measurements at fenceline south of plant were 10 mr/hr, and one-half mile south of fenceline, 0.5 mr/hr.

EXHIBIT 2 (2 pages)

(emphasis added)

Evening News

HARRISBURG, PA., THURSDAY, FEB. 7, 1985 FINAL •

Judge OKs $3.9 million for TMI suits

By MARY WARNER
Staff Writer

A Dauphin County Court judge has approved more than $3.9 million in settlements of injury claims resulting from the 1979 accident at Three Mile Island.

The largest — in a claim filed for a Down's syndrome child — was for $1,095,000.

The settlements, all reached out of court, had to be approved by a judge because they involved claims on behalf of children or of the estates of adults who have died since the accident.

A statement issued yesterday by the insurance companies representing the nuclear plant's operators indicated the claims were being settled without regard to the evidence, strictly to avoid the expense of trials.

"These settlements represent an economic decision arrived at by the insurance companies and do not constitute an admission of liability by the companies involved, General Public Utilities Corp. and Metropolitan Edison Co.," the statement said.

"In exchange for payments to the claimants by the insurance companies, all of the defendants in the settled cases are being given general releases from claims of liability."

It could not be learned how much money was involved in the settlements that did not require court approval. Plaintiffs and defendants have agreed not to discuss the settlements, the statement said.

In all, the statement said, "the great majority of 300 personal injury claims" were being settled out of court.

Doug Bedell, a spokesman for TMI operator GPU Nuclear Corp., released the statement. He had no other comment.

The settlements approved by Judge William W. Lipsitt closed claims by 70 children and three estates.

A group of 19 settlements approved yesterday included $855,000 for Gabriella Elsen of Harrisburg, an infant born since the accident who suffered cerebral palsy, and $1,095,000 for 5-year-old Bradley R. Baker of New Cumberland, a Down's syndrome child.

Court documents said Bradley, born just over nine months after the accident, suffered the disorder, which includes mental retardation.

His parents Blaine and Deborah Baker were among 62 plaintiffs in a 1981 suit that sought damages for injuries allegedly linked to the March 28, 1979, accident at the Londonderry Twp. nuclear plant.

The suit said the plaintiffs "most probably came into physical contact with some radioactive debris," which "was dispersed throughout a large area."

Defendants in the suit were General Public Utilities Corp.; its subsidiaries, Metropolitan Edison Co., Jersey Central Power & Light Co., and Pennsylvania Electric Co.; plant designer Babcock and Wil-

See TMI — Page A8

17 County Youths to Get $181,700 In Settlement over TMI Accident

By AD CRABLE
New Era Staff Writer

Seventeen Lancaster County children, who, most of their parents say, suffered nightmares and emotional stress because of the Three Mile Island nuclear accident, are among 68 youths sharing a $3.3 million out-of-court settlement with TMI insurance companies.

The 17 local children will receive $181,700 from the settlement.

The settlements represent the bulk of personal injury cases stemming from the 1979 accident, said Lee Swartz, one of the attorneys for the youths.

The cash award agreements were approved in January and February by Dauphin County Court Judge William W. Lipsitt. The money will be paid by insurance companies for the defendants: General Public Utilities Corp., the owner of the plant, and Metropolitan Edison Co., the GPU subsidiary operating the plant at the time of the accident.

While the lawsuits claimed the accident caused birth defects and emotional distress, TMI officials and the insurance companies stressed the settlements do not mean an admission of responsibility or that the claims were true.

"The insurance companies decided to settle," Philip R. Clark Sr., president of GPU Nuclear Corp., said in Lancaster Tuesday. "It did not represent a decision by GPU."

The settlements say the children did not suffer any 'provable' injuries.

Clark said the insurance companies weighed the cost of the settlements against the expense of going to trial. The settlements are not an admission of guilt, he said.

The settlements say the children did not suffer any "provable" injuries from radiation exposure or any emotional injuries requiring medical treatment caused by the accident.

The attorneys for the youths and their parents were bound not to comment on the cases, as part of the settlement agreement.

Richard V. Ropka Sr., Bainbridge, said the accident caused emotional stress in his grandchildren, Elizabeth Ropka, 17, Thomas Ropka, 12, and Richard Ropka, 6, each of whom received $10,000 in the settlement.

"The children were very upset about it (the accident) at the time," he said. The children's mother, Connie Ropka, Bainbridge, declined to discuss the circumstances.

Marchillo Sardi, Columbia R3, said his two children, Marco Sardi, 14, and Edrige Sardi, 14, developed stress because of the accident. The children developed "a lot of nightmares," he said. Each of the children received $10,000.

Receiving $21,700 in the settlement is Amy Shoop, 6, daughter of Edward and Sydney Shoop, Bainbridge.

The largest award of the 68 settlements — $1,095,000 — went

—See 17—Page 2

LANCASTER, PA., NEW ERA— WEDNESDAY, MARCH 6, 1985—

(emphasis added)

Over TMI Accident

17 Here Will Share Settlement

(Continued from Page One)

to 5-year-old Bradley R. Baker, Harrisburg, who was born with Down's syndrome a little more than nine months after the accident.

The other Lancaster County children receiving $10,000 each are:

- Nathan Bare, 11, and Natalie Bare, 9, children of Terry Bare, Columbia.
- Michael Halterman Jr., 16, amd Paul Halterman, 14, sons of Michael Halterman, Mount Joy.
- Joseph Geltz Jr., 9, son of Joseph and Marylou Geltz, Columbia.
- Ruth Hoover, 16, Joy Hoover, 15, and Lamar Hoover, 14, Columbia.
- Gina Metzgar, 16, daughter of Lewis and Sally Metzgar, Mount Joy.
- John T. Melson, 17, and Melissa Melson, 15, children of Sharon Wettrau, Columbia.

Sixty-two people, including some of those receiving settlements, filed suit in 1981, alleging they probably came in contact with radioactive debris dispersed over a large area during the accident.

At least one group opposed to the restart of TMI accused the plant's owners of making the out-of-court settlements in an attempt to downplay the health issue.

"In spite of the fact that out-of-court settlements are common, this is not a common issue," said Frances Skolnick of Lancaster, a member of the Susquehanna Valley Alliance.

"Genetic and physical damage to children and adults has occurred. GPU has been willing to pay behind the scenes and at a time when the (Norman and Marjorie) Aamodts have been pressing the NRC to investigate issues in their study which showed a higher incidence of cancer in the Three Mile Island area."

"We feel that GPU settled out of court behind closed doors because it did not want to life the lid off of Pandora's box."

EXHIBIT 2 (2 pages)

EXHIBIT 3 (2 pages)

(emphasis added)

A Time For Sharing And Caring

Party Brings Young Friends Back Together

By Roxanne Platt
Extra Staff Writer

MAYTOWN — They used to sit together in the schoolyard — playing games, talking and just spending time with each other.

Seven-year-old Matthew Decker, suffering from the affects of an inoperable, benign brain tumor and the medication that accompanies the treatments, was confined to a wheelchair.

Michelle Turner, a classmate of Matt's at Maytown Elementary School, befriended him. The Maytown girl knew that Matt was ill. He, however, didn't realize that she was suffering from leukemia. While other classmates ran and played during recess, the two of them grew to be close friends.

Last Thursday, Michelle turned eight-years-old and Matt, the son of James and Donna Decker, Mount Joy R2, made a guest appearance to wish her well.

Complete with party hats, a specially-created birthday cake, and oodles of friends, Michelle's party was her second in two days. The previous day, her first grade class at Maytown Elementary held a small celebration for her, too.

The piece de resistance for Michelle this year was a bicycle, given to her by the entire student body of W.I. Beahm Junior High School. The money, which was collected at the recent Lollipop Sale at the school, was donated to a fund for Michelle. The fund is being handled by the Welcome Wagon Club of Mount Joy.

Cheri Dillow, a spokesman for the Welcome Wagon Club, said the group felt that because it was such a special time for Michelle and because the funds for such a gift were beyond her mother's means, it would be nice to use the junior high school student collections to go toward Michelle's dream bicycle.

"They gave it (bike) to her after the party at school," said he mother, Shirley Stoudt, 119 Maplewood Lane, Maytown.

"Gail (Goodhart, a friend of the family) carried Michelle out of the building after school and told her to keep her eyes closed until they got next to the bike.

"When she opened her eyes and saw it," Michelle's mother added, "she jumped on it and took off, riding up and down the street a couple of times before she stopped.

"It's made her very happy and that's what I want, for her to be happy. Every year we go all out because we just don't know."

Michelle is currently undergoing chemotherapy treatments at Hershey Medical Center, while Matt travels to Philadelphia Children's Hospital for occasional tests and CAT scans.

When Matt and Michelle met in September 19[illegible], he was had been in a diagnostic program with Lancaster-Lebanon Intermediate Unit 13. He remained there until that December when he was placed in an Educable Mentally Retarded (EMR) class at East High Elementary School in Elizabethtown.

"When I was in a wheelchair, I met her," said Matt.

"At the time," Miss Stoudt said, "Michelle wasn't going outside at recess t often because her white (blood cell) cou was down. She was allowed but she didn want to. After she met Matt, she wanted sit and play with him."

At the end of last year, Michelle was a mitted to Hershey Medical Center for trea ment.

More PARTY Page 10

EXTRA Photograph by Roxanne Platt

Michelle Turner turned eight last week and one of her friends, Matthew Decker of Mount Joy, showed up as a special guest.

EXHIBIT 3 (2 pages)

EXTRA

Published every Wednesday by Lancaster Newspapers, Inc. Lancaster, Pa. March 20, 1985

Party Brings Two Together

Continued from Page One

"I didn't even know that they knew each other until I saw a story in the newspaper about her being in the hospital," Mrs. Decker said. "Mrs. (Brenda) Lepley, Matt's former teacher, told me."

In January, Matt and his mother went to Hershey to visit Michelle.

"I went because I wanted to see her," he said. He presented her with a red rose on that visit. "I thought she'd never remember me when I went to the hospital to see her because I got glasses."

"She got him back," Michelle's mother said. "Since he had seen her at school, she got a wig."

Both of the youngsters had lost weight, too. Matt lost 17 pounds; Michelle, 12.

"Everytime I saw her," he said, "she looked different."

Matt and his family made a second trip to see Michelle at the hospital but were surprised to find her room door closed.

"We asked the nurse," Matt recalled, "and she said that Michelle went home."

"We must have passed them on different elevators or something," said Mrs. Decker.

"They've both been through so much," said Miss Stoudt, who feels that their friendship is an important understanding tool.

"Sometimes they're comfortable talking and other times, they just like sitting together. It's good for them to be together."

EXTRA Photograph by Roxanne Platt

Proceeds from a Lollipop Day sale at B[illegible]ohm Junior High School went toward the purchase of a bicycle for Michelle's birthday.

THE DEPOSITION OF RADIANT ENERGY

When ionizing radiations deposit energy in biological materials, ionizations and excitations occur which are not by any means distributed at random. The events tend to be localized along the tracks of individual ionizing particles, in a pattern dependent upon the type of radiation involved. For example, photons of x rays give rise to fast electrons, particles carrying unit electric charge and having very small mass; neutrons, on the other hand, give rise to recoil protons, particles again carrying unit electric charge but this time the particles have a mass nearly 2000 times greater than that of the electron. Alpha particles ionize directly; since they are helium nuclei they carry two electric charges on a particle four times as heavy as a proton, and therefore almost 8000 times as heavy as an electron.

These various charged particles have very different charge-to-mass ratios, as well as different velocities, and as a result the spatial distribution of the ionizing events they produce will differ markedly. The average separation of primary events along a track of an ionizing particle decreases with increasing charge and mass. The tracks of energetic electrons, produced by the absorption of x-ray photons, will be traced by individual primary events which are well separated in space; hence x rays are usually described as being sparsely ionizing. At the other extreme, α particles (which are slow moving, heavy, and cumbersome by comparison with electrons) give rise to individual ionizing events which occur so close together that they tend to overlap, giving rise to tracks which consist of well delineated columns of ionization. Alpha particles, therefore, are said to be densely ionizing. Neutrons fall between these two extremes, and are consequently referred to as particles of intermediate ionizing density.

LINEAR ENERGY TRANSFER (LET)

The linear energy transfer (LET) is a term introduced by Zirkle, and is the energy transferred per unit length of the track. The unit usually used for this quantity is keV per micron of unit density material. The International Commission of Radiological Units (1962) defined this quantity as follows:

> The linear energy transfer (L) of charged particles in a medium is the quotient of dE/dl, where dE is the average energy locally imparted to the medium by a charged particle of specified energy in traversing a distance of dl.

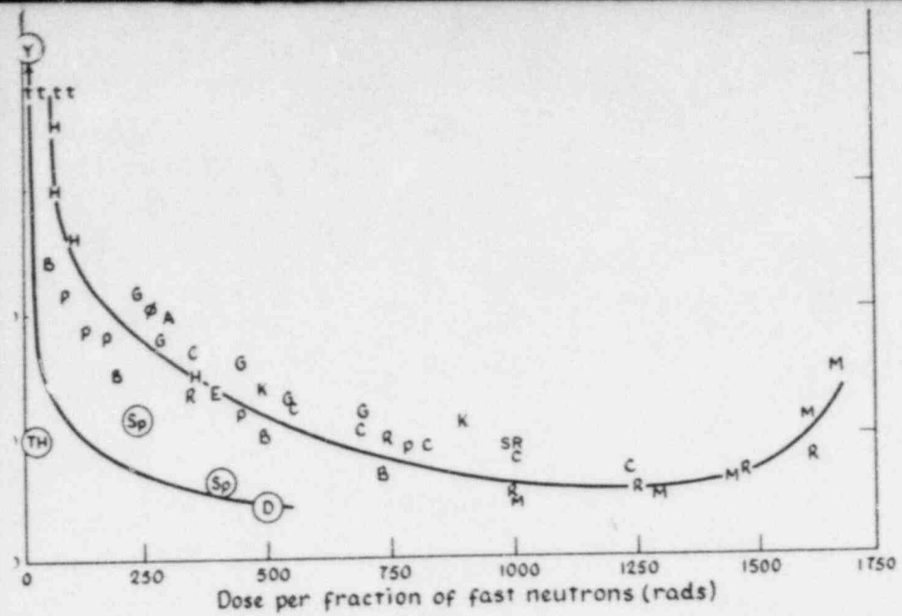


Figure 4-2. RBE for normal tissues irradiated with neutrons from the Hammersmith Cyclotron as a function of dose per fraction of fast neutrons. H: human skin reactions, P: pig skin reactions, G: 4-day gut death in mice, ϕ: leakage of protein from mouse gut, A: leakage of albumin from rat gut, B: stunting of tail growth in rats, K: observation of clones in rat bones, E: survival of chick embryos, R: rat skin reactions, SR: rat skin reactions, M: mouse skin reactions, C: clones in mouse skin, t: weight loss in mouse testes, Y: mouse lymphocytes, TH: weight loss in mouse thymus, Sp: mouse hemopoietic cells, spleen colony assay, D: 30-day death in mice. (From Field SB: Radiol 93: 915, 1969.)

It is important to realize that the RBE of a densely ionizing radiation does not have a unique value. It may vary due to several factors, in particular the size of the dose fraction. This consideration has important implications in the planning of radiotherapy schedules with new and unconventional radiation modalities.

RBE AS A FUNCTION OF LET

Figure 4-3 illustrates the survival curves obtained for x rays, for 14-MeV neutrons, and for α particles. As the LET increases from about 2 keV/μ, for x rays, up to 100 keV/μ, for α particles, the survival curve changes in two important respects. Firstly, the slope of the survival curve *increases*, and secondly the extrapolation number tends towards

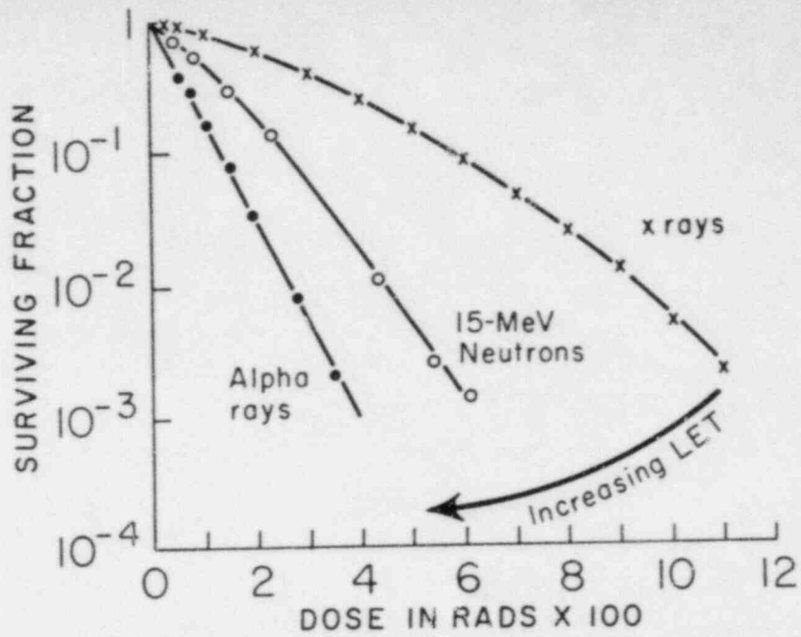


Figure 4-3. Survival curves for cultured cells of human origin exposed to 250-kVp x rays, 15-MeV neutrons, and 4-MeV α particles. As the LET of the radiation increases the slope of the survival curves gets steeper and the size of the initial shoulder gets smaller. (Redrawn from Broerse JJ, Barendsen GW, van Kersen GR: Int J Radiat Biol 13: 559–572, 1967 and Barendsen GW: in Current Topics in Radiation Research. Ebert M, Howard A, Eds. Amsterdam, North-Holland Publishing Co., 1968, Vol 4, pp 293–356.

unity, that is, the shoulder of the curve becomes progressively smaller as the LET increases. A more common way to represent these data is to plot the RBE as a function of LET; this has been done in Figure 4-4. As the LET increases the RBE increases slowly at first, and then more rapidly as the LET increases beyond 10 keV/μ. Between 10 and 100 keV/μ the RBE increases rapidly with increasing LET, and in fact reaches a maximum at about 100 keV/μ; beyond this value for the LET, the RBE again falls to lower values. This is an important effect and needs to be explained in more detail.

THE "OVERKILL" EFFECT

As described in a previous section, the shape of the survival curve for mammalian cells exposed to a sparsely ionizing radiation, such as x rays,

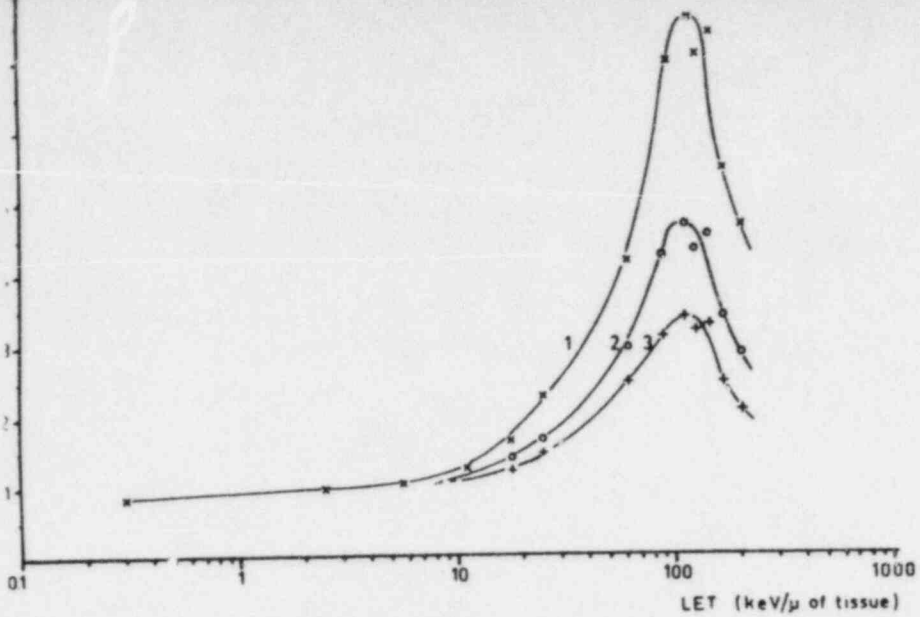


Figure 4-4. The variation of RBE with LET for survival of mammalian cells of human origin. The RBE rises to a maximum at an LET of about 100 keV/μ, and subsequently falls for higher values of LET. Curves 1, 2, and 3 refer to cell survival levels of 0.8, 0.1, and 0.01, respectively, illustrating that the absolute value of the RBE is not unique, but depends on the level of biological damage, and therefore on the dose level. (From Barendsen GW: in Current Topics in Radiation Research. Ebert M, Howard A, Eds. Amsterdam, North-Holland Publishing Co., 1968, Vol 4, pp 293–356.)

strongly indicates that there is more than one target within the cell in which energy must be deposited before the cell will lose its reproductive integrity. In the case of x or γ rays, ionizing events along the tracks of charged particles are separated by relatively long intervals, and indeed it is for this reason that they are described as sparsely ionizing. On average, the spacing between ionizing events is such that it is extremely unlikely that more than one such event will occur within the sensitive target volume of the cell due to the passage of a single electron generated by an x-ray photon. In general, for a cell to be killed by sparsely ionizing radiations, events must occur within the cell from more than one electron passing through it.

In Figure 4-5, cells are depicted as having two sensitive sites in which energy must be deposited in order for the cell to lose its reproductive

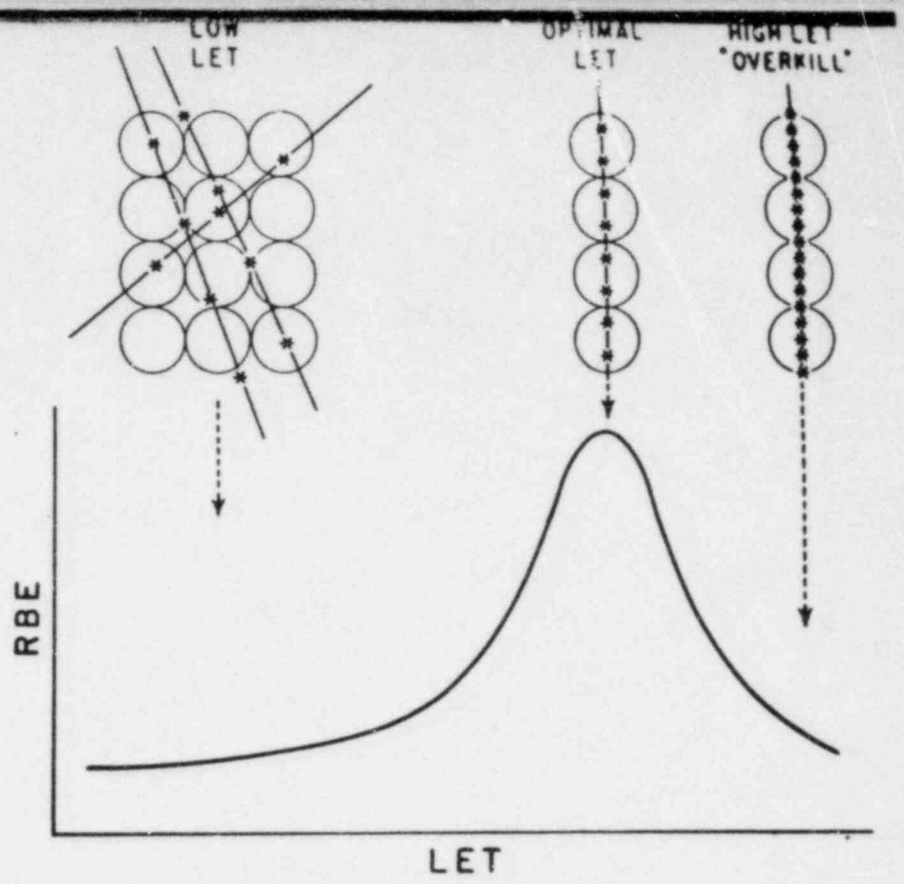
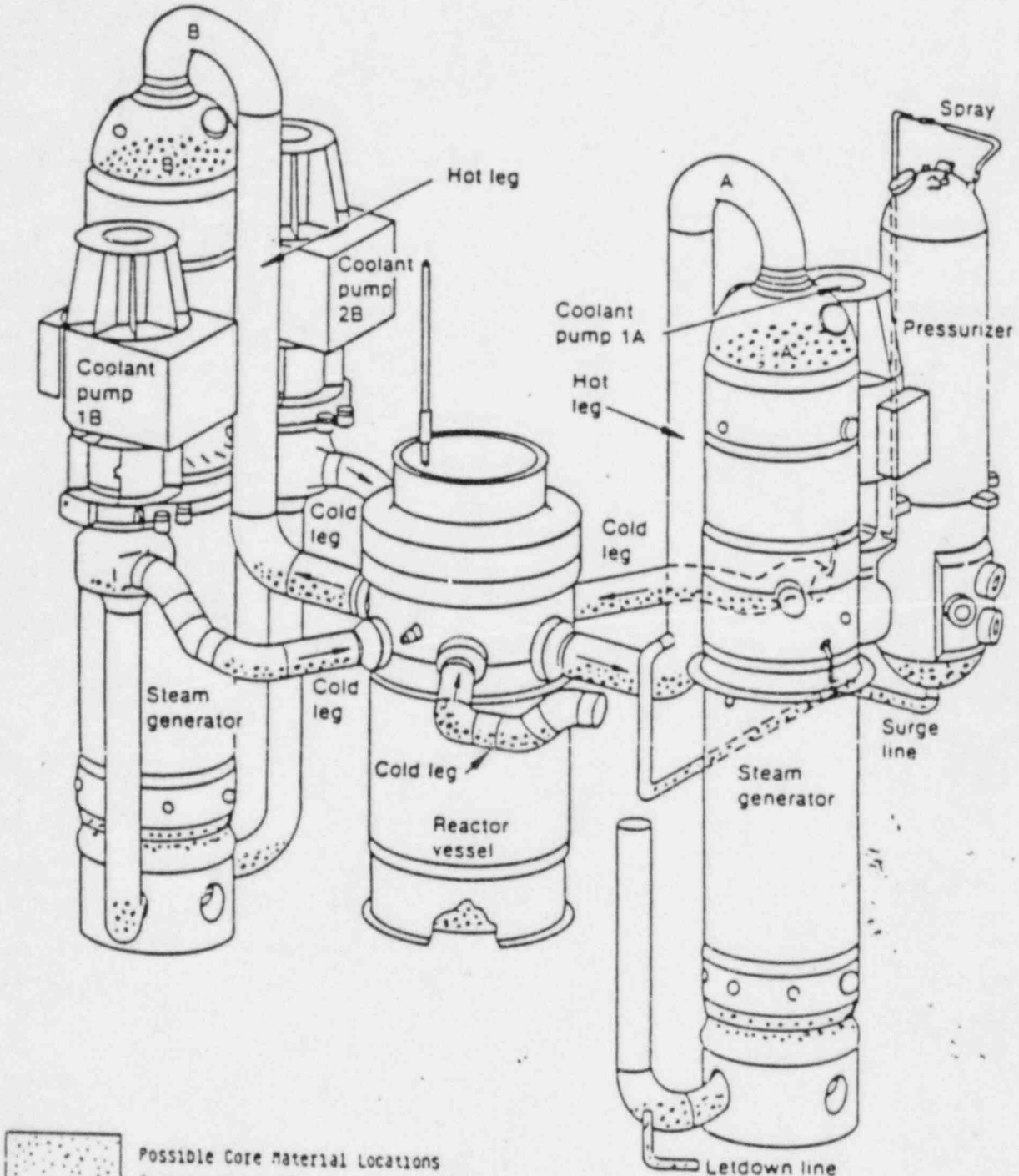


Figure 4-5. Diagrammatic representation of "overkill." For a cell to be killed, energy must be deposited in a number of critical sites within the cell. Sparsely ionizing radiation is inefficient because more than one particle must pass through the cell in order to kill it. Very densely ionizing radiation is also inefficient because it deposits more than enough energy in the critical sites within the cell; energy is wasted, the cells are "overkilled." Radiation of optimum LET deposits just enough energy to inactivate the critical targets.

integrity; but it must be emphasized that the same argument will apply in the general case where there are n sites, and there is no information concerning the actual number of sites that must be damaged within the cell. In Figure 4-5, sparsely ionizing radiation, such as x rays, is depicted as being of low LET; the ionizing events are widely separated, and in most cases only one ionizing event will be deposited per cell, which is insufficient to cause that cell to lose its reproductive capacity.



Location of Core Material

Location	Percent	Pounds (260,000/TOTAL)
Core Region	84-92	235,000-257,000
Reactor Vessel Bottom	6-14	17,000-39,000
Outside Reactor Vessel	2-8	6,000-22,000

FIGURE 15

DAV/bc

We believe about two-thirds of that is at the bottom of the reactor vessel, probably as granular material, as we see on top of the rubble bed at the present time. The balance is in the primary system, probably mostly in the seam and generators and most parts of the primary piping.

After fuel removal from the core region is completed, that's about a year after we start next July, there'll be partial disassembly of the core support structure. This will permit access with a vacuum system into the outboard and lower sections of the core support structure; the lower reactor vessel had to remove the fuel particles accumulated in those locations.

We're still investigating methods for removing fuel from the balance of the reactor core system. Several approaches have been considered, including local vacuuming and flushing back into the reactor vessel itself, where vacuuming could be accomplished there.

We expect to fill about 250 fuel cannisters in this process. We now have in effect the contract between GPU Nuclear and the Department of Energy for them to take these fuel cannisters, take custody of them at the TMI-2 site, ship them in a caste which they are currently procuring to the Idaho DOE site for long-term storage.

CHAIRMAN PALLADINO: Have these cannisters been designed and constructed?

DAVbw

We're currently determining how much fuel was transmitted from the core region and deposited in other parts of the system, as shown in Figure 15. There's a small table at the bottom of that figure that is our best estimate of the amount of material that is in the three locations: the core region, the bottom of the reactor vessel and the primary systems outside the reactor vessel. We now estimate that between 8 percent and 16 percent on a weight basis of the fuel was transported from the core region.

Remember Ed mentioned a quick look indicated that about 30 percent of the volume was missing, but we found compaction below that, so on a weight basis, it's somewhere between 8 and 16 percent that is no longer in the core region.

EXHIBIT 6

(brackets added)

Accident without an end

The plutonium incident

The job moved smoothly, at first.

It was early morning, April 15, 1980, and workers inside the fuel-handling building were transferring a highly contaminated filter into a shipping cask.

The workers had taken the filter from the plant's purification system — which removes radioactive-fission products from the reactor's cooling system — and had placed it in a special canister. It was the first time that such a filter had been removed since the accident.

A crane was used to hoist the canister to the top of the shipping cask, which was 6 feet tall and 6 feet in diameter. The canister had a trap door at the bottom. The plan was to open the trap door, allowing the filter to simply slide into the shipping cask.

But according to NRC records and interviews with workers, the operation hit a snag. "When the door was pulled open, the filter did not drop all the way out, and it was jammed," Mike Williams, a health physics foreman, said during an interview.

The filter, coated with radioactive sludge, was left dangling from the bottom of the canister. Eventually, the workers were able to force the filter to drop. But in the process radioactive particles were jarred loose, and they spread through the air.

Within minutes, radiation alarms sounded and contamination was detected on a worker. The building was evacuated.

By the time the night was through, six more workers would be contaminated.

George Houtz, a health-physics technician who took part in the operation, said during an interview, "To make a long story short, I guess it just got away from us."

What Houtz and the other workers did not know at the time was that the filter they were transporting was contaminated by radioactive plutonium, which had escaped from the reactor core during the accident. Plutonium, a product of nuclear fission, is one of the deadliest substances on earth.

They would not learn of the plutonium for more than a year.

It was not until April 1981, after another spread of contamination, that an investigation of the 1980 incident was begun. That investigation concluded in May 1981 that two workers — Houtz and Williams — had inhaled plutonium particles.

Scientists say inhaling even tiny amounts of plutonium may cause cancer of the lungs, liver, bones or the lymphatic system.

An internal company report documents that the company's initial review of the contamination incident did not consider the possibility that the workers might have been exposed to plutonium.

No tests were done to determine the presence of plutonium particles or other fission products that give off a type of radiation called alpha. Substances that give off alpha particles can be deadly if inhaled.

The company report shows that none of the workers underwent fecal analysis, a test used to determine whether radioactive particles have become lodged inside the body.

Consequently, nobody knows exactly how much plutonium Houtz and Williams inhaled.

Hildebrand, who conducted the investigation and wrote the company report on the contamination incident, said neither Houtz nor Williams was wearing a respirator or protective clothing on the job because no one had anticipated that there would be a spread of contamination during the filter transfer.

His report concluded that radiological controls on the job had been poor, that all the workers should have worn respirators and that Houtz and Williams should have undergone fecal analyses to test for internal contamination.

Hildebrand also concluded that the utility had waited too long to investigate the incident, since a June 1980 analysis of a sample taken from the filter had "clearly indicated the presence" of plutonium along with uranium, americium and other materials that give off alpha radiation.

Hildebrand concluded, however, that the amount of plutonium inhaled by Houtz and Williams was a minute fraction of the allowable limits set by the NRC. He said during an interview that the incident was "not significant."

During interviews, Johnson and Gofman said the incident did not appear insignificant at all.

"Plutonium is the most hazardous substance of commercial importance known to man," said Johnson, who has studied health problems among people who were exposed to plutonium and other radioactive materials near the Rocky Flats weapons plant in Colorado. "There definitely is a risk to the workers."

And Gofman, former associate director of the Lawrence Livermore Laboratory, said workers could develop cancer even if they inhaled far less plutonium than the federal government allowed.

Gofman said it was impossible to say there were no health risks because no one really knew how much plutonium the workers had been exposed to.

200 North Church Street (Oak 203)
Parkesburg, Pennsylvania 19365

April 13, 1985

Commissioners
1717 "H" Street, N.W.
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Sirs:

On March 14, 1985, I notified you that we planned to present additional information that challenges the emergency planning for the public. Although we promised the information within ten days, the job has taken a longer time.

In assembling the materials for the enclosed amendment, other new information, principally the core temperature at the time of the accident and the tons of missing core material, received our consideration in terms of what people have suffered in health effects.

In the interim, we were asked to testify before the Suffolk County (Long Island) legislature about the health effects at Three Mile Island. That transcript is being prepared and will be provided to the Commission as soon as it is ready. All seven legislators present for the hearing have endorsed our presentation and have avowed to pursue the TMI health problems in their considerations concerning the operation of the Shoreham.plant.

The intervenor group, TMIA, has received hundreds of calls from people who have experienced serious health problems, and they have been soliciting information. TMIA is assembling the material it has received. In addition, several citizen groups are planning or have health surveys underway. It is unfortunate that citizens have to continue to undertake the work that the NRC should have done.

Since our telephone number is in a different area than the immediate TMI area, and it is not listed, people with problems they wish to relate have had difficulty in reaching us. We are amazed that a number have persisted in contacting us. As the Commission may be aware, we have left our farm, principally because we felt that our investment and lives were at risk in view of the debacle of the cleanup of Unit 2. We also found, from our intervention in the Unit 1 proceeding, that there is no dependable regulation of the many nuclear plants that are within 25 miles of the farm.

The TMI accident has greatly interrupted and changed our lives, as it has those of thousands of other people. In the event that the Commissioners have been unable to appreciate that fact in reading the affidavits provided with our motions, we are planning to send to each commissioner a taperecording of a human experience with a plume from Unit 2 on Friday evening, March 30, 1979. and of

the subsequent physical and emotional suffering.

Thousands of people will be affected by your decision, both physically and psychologically. You must consider the restart of Unit 1 in the most personal terms. I am sure that you would not be satisfied to reside, with your families, on the west shore of the Susquehanna River, near TMI, where people are still experiencing radiation effects and watch the steam from Unit 1 where the tubes are in such poor condition that the terms "quality control, quality assurance" (as developed at the Bell Telephone Laboratories) are words taken in vain.

In fact the very condition of the tubes which has become the primary problem in returning the plant to operation is one that formed the basis for a contention (Joint Intervenors) that was rejected by the Licensing Board. While the restart proceeding has failed, a reopening (as suggested by Senator Specter, before the Commission with full eight hour days of hearing) could provide the most appropriate investigation of the TMI-2 accident, through the consideration of health effects, and the best appreciation of the impact restart of Unit 1 would have on the area.

We have used increasingly strong language in our approximately 200 filings with the NRC since we began our intervention in 1979. We abhor stridency, however the inaction and disregard of the NRC, as a regulatory and responsible body, has generated it in us and the public. If anything can be said about the people of the TMI area prior to the accident, it is that our communications were reserved. That is not the case, now.

In concluding our amendment, we have challenged the personal integrity of each commissioner concerning his inaction and future decisions in resolving the matter of serious health effects from the TMI accident. We intend no personal offense, or prejudgment of future actions, however we are serious in describing what we believe is an appropriate course of action. It is already late. Many people have died. Many more, who could be appropriately advised, will die if the Commission continues to ignore the evident severe health effects caused by the TMI-2 accident.

Sincerely yours,

Marjorie M. Aamodt

This is to certify that the document AMENDMENT TO AAMODT MOTION OF JANUARY 15, 1985 was served on the Commission and the following Service List by deposit in U.S. Mail, First Class on the 13th day of April, 1985.

Marjorie M. Aamodt

SERVICE LIST

✓ Nunzio J. Palladino, Chairman
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Thomas M. Roberts, Commissioner
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

James K. Asselstine, Commissioner
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Frederick Bernthal, Commissioner
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Lando W. Zeck, Jrl., Commissioner
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Atomic Safety and Licensing
Appeal Board
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Docketing and Service Section (3)
Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Mary E. Wagner, Esq.
U.S. Nuclear Regulatory Staff
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Ellyn R. Weiss, Esq.
Harmon, Weiss & Jordan
2001 S Street, N.W.#430
Washington, D. C. 20009

Thomas Y. Au, Esq.
Office of Chief Counsel
Department of Environmental
Resources
505 Executive House
P.O. Box 2357
Harrisburg, PA 17120

George F. Trowbridge, Esq.
Shaw, Pittman, Potts &
Trowbridge
1800 M Street NW
Washington, D. C. 20036

Three Mile Island Alert
315 Maclay Street
Harrisburg, PA

Tom Devine, Esq.
Government Accountability
Project
1555 Connecticut Avenue
Washington, D. C. 20036