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ON

TECHNICAL STAFF ANALYSIS REPORTS SUMMARY

SUMMARY SEQUENCE OF EVENTS

VOLUME I

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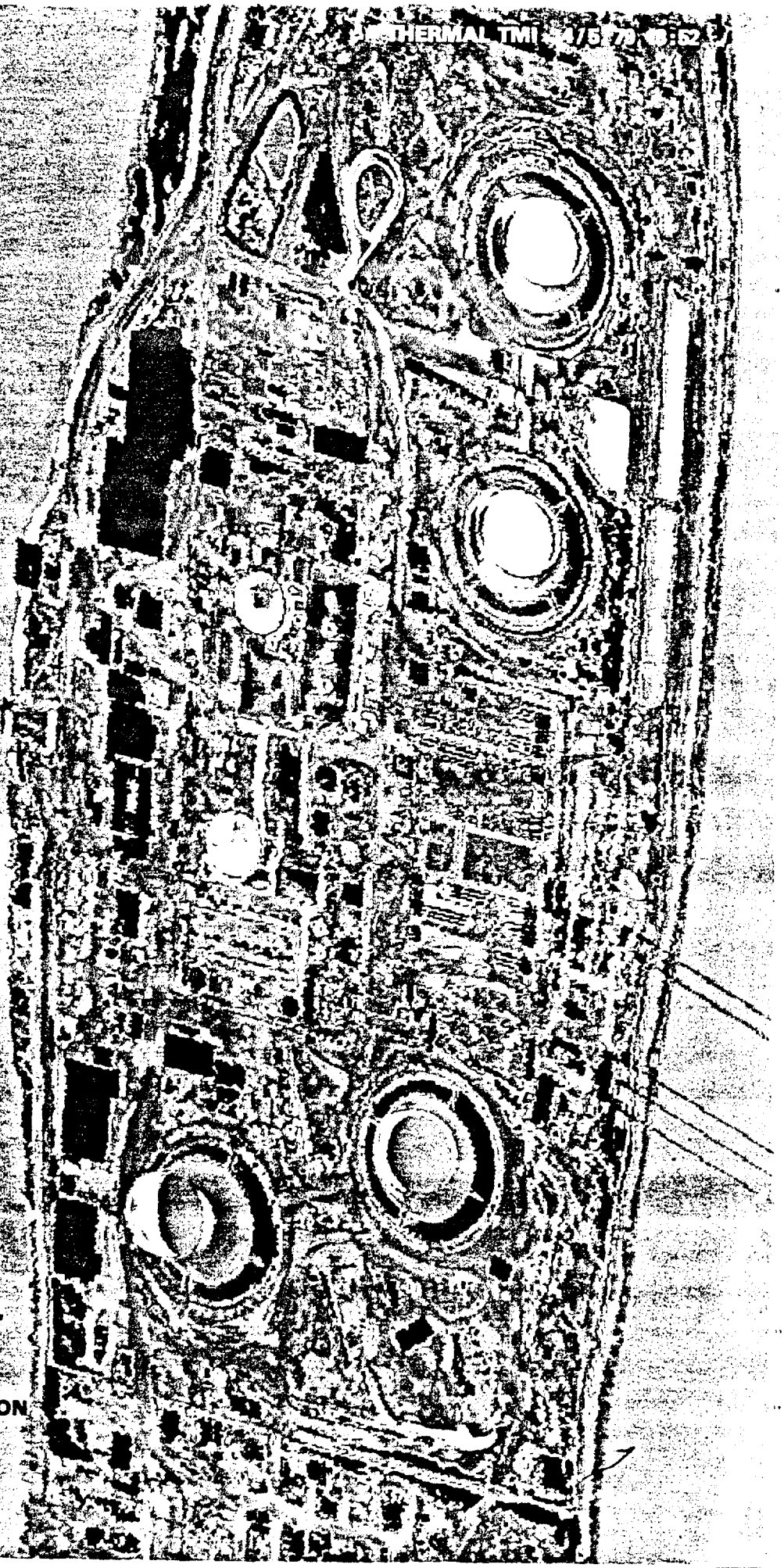

VOLUME I

three mile island

A REPORT TO THE COMMISSIONERS AND TO THE PUBLIC

MITCHELL ROGOVIN
director

GEORGE T. FRAMPTON, JR.
deputy director

NUCLEAR REGULATORY COMMISSION
SPECIAL INQUIRY GROUP

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Vol 1

9 HEALTH EFFECTS FROM RADIOACTIVE RELEASES DURING THE ACCIDENT, AND OCCUPATIONAL HEALTH PHYSICS AT THE SITE

The effects on the population in the vicinity of Three Mile Island from radioactive releases measured during the accident, if any, will certainly be nonmeasurable and nondetectable. During the course of the accident, approximately 2.5 million curies of radioactive noble gases and 15 curies of radioiodines were released. These releases resulted in an average dose of 1.4 mrem to the approximately two million people in the site area.

This average dose is less than 1% of the annual dose from both natural background radiation and medical practice. The 1.4-mrem dose may also be compared to differences in annual doses in background radiation from living in a brick versus a frame house, an additional 14 mrem/yr; or living in the high altitude of Denver rather than in Harrisburg, an additional 80 mrem/yr.

The effect of this total dose, averaged over the population in the site area, will be to produce between none and one additional fatal cancer, and between none and one and a half total (fatal and nonfatal) cancers, over the lifetime of the population. In comparison, approximately a half million cancers are expected to develop from all other sources during this same lifetime.

In assessing the health effects from radioactive releases, we also estimated the maximum probable dose received by any one person located off site. To calculate this figure, we assumed that an individual had been standing on the east bank of the Susquehanna across the river from the plant, near the North Gate to the site (the direction in which the maximum exposure was most likely to occur), 24 hours a day for 6 days, with no clothes on, and in the open. Our calculations estimated that such a person would have received a dose below 100 mrem. The additional lifetime fatal cancer risk to such an individual would have been about 1 in 100,000—compared to a risk of fatal cancer from all other sources that the individual would incur during his lifetime of about one in seven. (The additional lifetime fatal cancer risk to the individual receiving the average offsite dose, 1.4 mrem, is about one in five million.)

We studied the monitoring efforts by Met Ed, the NRC, and others in response to the accident to determine whether it was possible or likely that the average, or maximum probable, dose was underestimated because of inadequacies in monitoring. We found that, although the monitoring efforts could have been better and monitoring capabilities should be improved, the monitoring of releases during the accident was adequate to ensure that the estimates of dose to the population are adequate.

In our view, the fact that there will be no adverse radiation health effects, or very minimal effects, from the Three Mile Island accident has not been clearly understood by the public. It is clear to us that the public misconception about the risks associated with

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Hand-held "friskers" were used by TMI personnel to check plant workers for radiation.

the actual releases measured during the accident, as well as about the risks associated with nuclear powerplants generally, has been due to a failure to convey credible information regarding the actual risks in an understandable fashion to the public. We believe substantial efforts are necessary to provide such information and that the NRC should play an effective role in this task.

We have also determined that plant personnel are unlikely to suffer adverse health effects from radiation exposure during the accident, although some workers received doses of approximately 4 rem, which was in excess of the quarterly limit of 3 rem