

December 27, 1982

SDCY-82-500

For: The Commissioners  
From: William J. Dircks  
Executive Director for Operations  
Subject: TMI-1 RESTART - PSYCHOLOGICAL STRESS

Purpose: To inform the Commission of the status of (1) the psychological stress survey proposal developed by Dr. George Warheit to predict stress resulting from restart of TMI-1 and (2) the reanalyses of three studies of psychological stress caused by the accident and aftermath at TMI-2.

Discussion: On October 19, 1982 the staff briefed the Commission on the status of the litigation in *PANE v. NRC* and provided a summary of the status of technical efforts on psychological stress. Subsequent to that meeting in a November 12, 1982 memorandum from the Secretary, the staff was instructed, among other things, to revisit with the Commission on the NIMH question when informed whether the Supreme Court had agreed to grant certiorari. On November 1, 1982 the Supreme Court granted certiorari.

Dr. George Warheit has submitted to the staff a proposal to conduct a research survey designed to be responsive to the D. C. Court of Appeals decision that would require the consideration of the psychological manifestations of restart of TMI-1. A summary of the proposal and its technical justification are enclosed. Unless otherwise directed, the staff plans to take no further action on the Warheit survey.

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*XA Copy Has Been Sent to PDR*

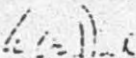
SECY NOTE: The staff intends to proceed on January 13, 1983 unless we are advised to the contrary by the Commission.

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The Commissioners

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We are also enclosing a summary of the results of the ongoing research on psychological stress in the vicinity of TMI by Drs. Baum, Brought, and Houts. The staff has no plans for further action on this subject other than reviewing and commenting on the draft reports of these three contractors.

  
William J. Dircks  
Executive Director for Operations

Enclosures:

1. Summary of Survey Proposal
2. Summaries of Research Results

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Summary of Technical Proposal: Psychological Impact Study--TMI Unit 1  
Submitted by Dr. George Warheit, Principal Investigator

The investigator proposes a three phase study to assess the impact of restarting Three Mile Island Unit 1 on the psychological health and social well being of the population residing within 20 miles of the nuclear power plant. The proposed study would assess potential psychological health effects prior to a restart, immediately after a restart, and four months later.

Abstract

The study proposes to establish a pre-restart data base which includes an epidemiologically derived identification of the mental health status of the population which will be used to predict possible psychological impacts from restart. In the two follow-up studies, the distribution, magnitude and duration of any psychiatric symptoms among the populations in the TMI area will be compared to the comparison site population of Wilkes-Barre, Pennsylvania as well as to the large data base accumulated by the investigator from other mental health studies he has conducted.

The method of study proposed is a three time panel design using a structured telephone survey instrument. The instrument was developed by the investigator, Dr. Warheit, and others for use in mental health epidemiological studies.

Administration and Costs

The study, as proposed, will be directed by Dr. George Warheit. Dr. Warheit is a Ph.D. social-psychologist with extensive experience in epidemiological mental health research. He was a consultant to the President's Commission on the Accident at Three Mile Island and is familiar with the literature on the psychological impacts of the accident. He has been involved with disaster research since 1965. He has served on the NIMH review committee for the Center for Epidemiologic Studies from 1975-1979 and as the chairman from 1977 to 1979.

The total cost for completing all three phases of the study is \$311,805. Phase One, to be completed within two to three months of the effective date of the contract, is projected to cost \$113,829. The follow-up phases would cost \$96,663 and \$101,312 respectively.

Andrew Baum, Ph.D. Principal Investigator  
Contract No. NRC-03-83-125  
Uniformed Services University

### Summary

In June, July, and August 1980, Dr. Andrew Baum and colleagues at the Uniformed Services University of the Health Sciences conducted a study for NRC of the stressful effects of venting Kr-85 from the Unit 2 containment building at TMI. The subjects in this study were 54 residents of TMI and 31 residents in a comparison site in Frederick, Maryland. Additional comparison sites were later added with 32 residents living within five miles of Oyster Creek and 24 residents within five miles of a coal fired power plant in Dickerson, Maryland. The subjects were tested in three domains for indicators of stress. Physiological indicators included levels of catecholamines present in urine samples. Behavioral data were collected regarding two tasks, proofreading and embedded figures, to index the performance aspects of stress. Finally, four instruments were used to assess the psychological indicators of stress. Two standard instruments were used: the SCL-90 from Johns Hopkins University for self-reporting of symptoms and the Beck Depression Inventory. Two other instruments were developed for this study. Dr. Baum has continued to gather data from his original sample. In July, 1982, he posed questions related to stress symptoms and attitudes towards restart.

Dr. Baum found that stress levels at TMI were higher immediately before the venting; symptom reporting (SCL-90) and physiological indicators decreased among TMI residents during the venting and after its completion; overall stress levels were higher at TMI than at Frederick, Dickerson or Oyster Creek; and most indices of stress showed chronic elevations at TMI relative to control groups.

Dr. Baum is currently performing a reanalysis of the stress data gathered in August 1980 and of longitudinal data gathered in 1982. This current work is focused mostly on psychosocial variables since initial analyses had suggested extremely low degrees of relationship between stress measures and demographic variables. In the reanalyses, two psychosocial areas were investigated: social support and differences in coping style.

The results suggest that TMI residents reporting low levels of social support reported more symptoms, depression, anxiety and alienation than did any other subjects. Coping styles were found to be related to symptoms reported for TMI subjects only. In particular, TMI area residents reporting use of denial as a coping style generally reported experiencing more symptoms and greater distress. Similarly, problem-oriented coping was less effective than emotion-focused among TMI residents.

### Status

Dr. Baum has submitted a draft final report. Staff will comment. A revised final report is expected by January 31, 1983.

Evelyn Bromet, Ph.D. Principal Investigator  
NIMH Grant No. MH 35425  
Western Psychiatric Institute  
University of Pittsburgh

### Summary

Dr. Evelyn Bromet, under contract to the National Institute of Mental Health, examined the mental health of mothers of preschool children, workers at the TMI plant and mental health system clients living near TMI. Dr. Bromet interviewed subjects at nine months (Time 1) and at one year (Time 2) following the TMI accident. She used Beaver Valley as a comparison site for all three groups. Dr. Bromet used standardized instruments to assess mental health: the SCL-90 from Johns Hopkins University for self-reporting of symptoms, and the life-time version of the Schedule for Affective Disorders and Schizophrenia. In addition, social support measures were also studied.

The results of the original study showed that TMI mothers had "an excess risk of experiencing clinical episodes." Workers were not significantly more vulnerable nor did TMI mental health clients show significantly higher symptom levels than Beaver County clients.

Under a grant with NIMH, Dr. Bromet has continued her interviews with the original study subjects. In Fall 1981 (Time 3), Dr. Bromet found continued stress among TMI mothers of preschool children. She has performed additional analyses of Time 1, Time 2 and Time 3 data-sets based on an inter-agency agreement between NIMH and NRC. Included in her current reanalysis of the data was the examination of the relationship between TMI attitudes and anxiety about "dangerousness of life" in general.

Results of her current reanalyses of Time 1 and Time 2 interviews suggests that there is no relationship between TMI attitudes and the belief in "dangerousness of life." Moreover, at Time 3 Dr. Bromet has found no differences in stress levels between TMI and control site mothers.

### Status

Dr. Bromet has completed her analyses. A written progress report will be submitted to NIMH as appropriate to meet grant time schedule. A written report to NRC is expected in January 1983.

Peter Houts, Ph.D. Principal Investigator  
Contract No. NRC-33-83-123  
Milton S. Hershey Medical Center  
Pennsylvania State University

### Summary

In July, 1979, NRC sponsored a telephone survey of 1504 persons living within 55 miles of the Three Mile Island Nuclear Power Plant. In January, 1980, Dr. Peter Houts and colleagues conducted a follow-up survey (to the NRC-Flynn July survey) with 550 persons in the area 0-55 miles from TMI. In October, 1980, Dr. Houts et al. conducted a study of mobility in the vicinity of TMI among 400 respondents living within five miles of TMI.

Dr. Houts reanalyzed the data sets collected by the above telephone surveys. He focused on the attitudes towards restart of TMI-1 among persons living within five miles of TMI. In January, 1980, the characteristics of persons opposed to restart (66% of the sample) included those who were active in TMI organizations; would leave in the event of another accident; felt TMI was a serious threat. In October, 1980, those opposed (43% of the sample) had characteristics such as: politically active; evacuated during Krypton venting; negative attitudes towards TMI in general; and more likely to want decisions about TMI voted by the general public or made through other political processes.

Attitudes towards restart show consistently high correlations with other attitudes toward TMI. Dr. Houts, therefore, suggests that it might be necessary to "deal with all TMI attitudes in order to...[affect] restart attitudes." Demographic variables have only weak relationships to restart attitudes. However, over time (1979-1980) certain relationships continued. For example, women consistently perceive more threat from TMI. Those in the 64 and older age group are less upset by TMI.

### Status

Dr. Houts has submitted a draft final report. Staff will comment. A revised final report is expected by January 31, 1983.