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HEALTH-RELATED BEHAVIORAL IMPACT OF  
THE THREE MILE ISLAND NUCLEAR INCIDENT

PART III

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## ABSTRACT

A telephone survey of households within 5 miles of TMI and a group from 41-55 miles from TMI was conducted in October, 1980. Three questions were addressed. 1) Had distress levels in the 5 mile radius changed in comparison to earlier studies? 2) How did respondents feel about the situation at Three Mile Island and how it was being handled? 3) How did respondents react to the venting of Krypton gas at TMI in July of 1980.

### Distress

Five distress measures were repeated from earlier surveys, thus allowing comparisons over an 18 month period from April, 1979 to October 1980. The five measures were: being upset about TMI, feeling TMI was a threat to safety, reporting of stress related symptoms (2 clusters of symptoms: somatic and behavioral) and, for those respondents who had symptoms, whether they attributed the symptoms to Three Mile Island. Results showed reductions in distress for both the close and far groups over the 18 month period studied. There was a sharper rate of reduction for the group close to TMI than for the group 41-55 miles away. The 0-5 mile group had significantly higher distress than the 41-55 mile group on all measures through January, 1980 but, in October, 1980, differences were no longer statistically significant for stress-related symptoms and for ratings of upset regarding TMI.

(Abstract Continued)

Attitudes

Opposition toward re-starting unit number one at TMI dropped from 60% in January, 1980 to 47% in October, 1980 for the group within 5 miles of TMI. The Nuclear Regulatory Commission and energy experts working for the Pennsylvania Department of Environmental Resources were given the most support for having a say in how the TMI clean-up is carried out. Respondents in both groups were fairly evenly distributed as to whether to have more or fewer nuclear plants in the future. When asked how much they believed in rumors regarding effects of TMI (e.g., rumors of increased miscarriages, increased cancer rates, increase in mental health problems, etc.) respondents were approximately equally distributed between believing and not believing rumors with a tendency for more people to believe than disbelieve the rumors. For two of the rumors, (an increase in miscarriages and an increase in birth defects) there was greater acceptance of the rumor in the 41-55 mile group than in the 0-5 mile group. Respondents' ratings of media coverage of the TMI situation showed that almost half of the respondents felt the media had blown events and of proportion, approximately 20% thought information had been withheld and less than 1/3 thought that events were reported accurately.

Reactions to Krypton Venting

Fifteen percent of respondents within 5 miles of TMI said that they left the area during the venting and that the venting was an important reason for their leaving. The average length of absence due to venting was 10 days. Attitudes toward the venting were significantly more positive among persons close to TMI than among persons in the 41-55 mile group.

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## INTRODUCTION

Several studies of the psychological, social and economic effects of the Three Mile Island nuclear accident have been conducted since the crisis in March, 1979. One of these studies, (Houts et al, 1980) carried out by the Pennsylvania State University under auspices of the Pennsylvania Department of Health, showed heightened distress levels near the facility that persisted through January, 1980. Subsequent reports by Bromet (1980) and Bromet and Dunn, (1980) came to similar conclusions, namely, that the population close to Three Mile Island contained many people who were very concerned about the situation there and who also reported heightened levels of symptoms frequently associated with stress for as long as a year after the original crisis.

The present study, carried out in October, 1980, eighteen months after the original crisis, had two purposes:

- 1) to determine whether distress levels and concerns shown to be elevated close to TMI had changed in the nine months since the Department of Health Survey in January, 1980.
- 2) to obtain attitudes and opinions on a variety of issues germane to the situation at Three Mile Island which had not been investigated earlier. These issues included rumors about bad effects of the nuclear accident, what groups should influence how TMI is cleaned up, media coverage, the future use of nuclear power plants in this country, and scientists' knowledge of radiation.

## METHOD

This study was carried out in conjunction with a study of mobility of persons living within 5 miles of Three Mile Island (Goldhaber et al, 1981). The report of that study contains detailed information about sample selection and interview

techniques. Following is a summary of those aspects of the methodology most relevant to this study.

Sample Selection Two groups were studied: 100 respondents living from 41 to 55 miles from Three Mile Island and 400 respondents living within five miles of TMI in October, 1980. Respondents from 41 to 55 miles away were selected in the same manner as in the Nuclear Regulatory Commission Survey in July, 1979 (Flynn, 1979) and in the Pennsylvania Department of Health survey in January, 1980 (Houts et al, 1980). This made it possible to compare responses from this study to those from the earlier studies. The sample of persons living within 5 miles of Three Mile Island was constructed from two sub samples of the mobility study: 1) persons who were living within five miles of TMI at the time of the Pennsylvania Department of Health census in August, 1979 and who had not moved from their dwellings since that time and 2) persons who had moved into dwellings within 5 miles of TMI during the year following the census. Since there were a larger number of in-migrants in relation to non-migrants in these samples than in the general population, weighting was used to obtain responses characteristic of the general population.\*

Telephone interviews were carried out with all groups by Chilton Research Services of Radnor, Pennsylvania. Respondents in the 41-55 mile group were selected using random digit dialing while respondents within 5 miles of Three Mile Island were selected either from Department of Health census lists for the area or, for in-migrants, lists of persons who moved into vacated dwellings or new housing since the TMI crisis. (See Goldhaber et al, 1981 for detailed description of sample selection.)

\*Weightings used in the calculations for the 0-5 mile group were based on a mobility rate of 12.5%. After these calculations were completed it was determined that the mobility was actually 11.6%. In order to determine whether new calculations were required, the mean, standard deviation, mode and median were computed for demographic variables (age, sex, education, income, and marital status) using the 12.5% weighting and the 11.6% weighting for in-migrants as compared to non-migrants. The results, shown in appendix III show almost identical results with the two weightings. It was therefore decided not to re-compute other analyses.

### DISTRESS INDICES

Both of the earlier surveys (July, 1979 and January, 1980) showed heightened distress near Three Mile Island compared to farther away. The same distress indices used in earlier studies were included in the present study to determine whether this pattern persisted for an additional 9 months (or 18 months after the original crisis). In the July, 1979 and January, 1980 surveys distress was measured at all distances out to 55 miles from TMI. However, the present study only sampled within the 5 mile radius and between 41-55 miles from TMI. Therefore, to make the results of these studies equivalent, data from the earlier studies were re-analyzed to compare just the group within 5 miles of TMI to the group between 41 and 55 miles away. Analysis of covariance was utilized controlling for age, sex, education, marital status and income. Results for the five distress indices for the four time periods after the TMI crisis are shown in Table 1. The overall pattern is quite interesting. Three of the measures which had indicated higher distress close to TMI compared to farther away in April, 1977, July, 1979 and January, 1980, no longer showed statistically significant differences in October, 1980. On the other hand, the three other distress measures are significantly different at all four time periods.

1. Upset ratings were significantly higher close to TMI compared to far away from April, 1979 through January, 1980, but were no longer statistically different in October, 1980. An examination of the mean ratings at each time period shows that levels of upset came down over time for both the close and far groups, but that the drop was sharper for the groups close to TMI.
2. Both behavioral and somatic symptoms were reported more frequently close to TMI compared to 41-55 miles away in April and July 1979 as well as in January 1980. However, by October,

1980, this difference was sharply reduced and the difference between the two groups was no longer statistically significant. It should be noted that the general levels of symptom reporting fluctuated considerably over this time period. This could have been due to many factors including seasonal variations. Therefore, general levels of reporting are not necessarily indicators of the effects of TMI, while differences between the close and far groups are.

3. Perceptions of TMI as a serious threat to one's family's safety came down over time for both the close and far groups, though, as with ratings of upset, the drop was sharper for respondents within 5 miles of TMI. Nonetheless, the differences between the close and far groups was still statistically significant in October, 1980.
4. The attribution of symptoms to Three Mile Island, which involved only respondents who reported behavioral or somatic symptoms, dropped sharply for both groups during the 15 months studied, but, as with perception of threat, attribution was still significantly higher close to TMI in October, 1980.

The overall pattern of these findings shows reductions in distress for both the close and far groups over the 18 month period studied. There was a sharper rate of reduction for the group close to TMI than far away. Differences between the close and far groups persisted through October, 1980 for perceived threat and for attributed symptoms, but dropped to non-significance in October 1980 for ratings of upset and for number of persons reporting behavioral or somatic symptoms.

TABLE 1: MEAN DISTRESS SCORES FOR PERSONS LIVING EITHER WITHIN 5 MILES OF TMI OR BETWEEN 41 AND 55 MILES AWAY FROM TMI AT FOUR TIME PERIODS

| Distance from TMI<br>(miles) | <u>DISTRESS MEASURES</u>        |  |                                     |                                  |   |
|------------------------------|---------------------------------|--|-------------------------------------|----------------------------------|---|
|                              | Upset about<br>TMI <sup>1</sup> | TMI a<br>Serious <sup>2</sup><br>Threat <sup>2</sup> | Behavioral<br>Symptoms <sup>3</sup> | Somatic<br>Symptoms <sup>4</sup> | Attributed<br>Symptoms<br>to TMI <sup>5</sup> |
| <u>April 1979***</u>         |                                 |  |                                     |                                  |   |
| Within 5                     | 3.36                            | 3.10   | .30                                 | .18                              | .69   |
| 41-55                        | <u>2.21</u>                     | <u>2.13</u>  | <u>.07</u>                          | <u>.05</u>                       | <u>.29</u>                                    |
| Difference                   | 1.15**                          | .97**  | .23**                               | .13**                            | .40**   |
| <u>July 1979</u>             |                                 |  |                                     |                                  |   |
| Within 5                     | +                               | 3.16   | .32                                 | .37                              | +   |
| 41-55                        | +                               | <u>2.46</u>  | <u>.17</u>                          | <u>.21</u>                       | +   |
| Difference                   |                                 | .70**  | .15**                               | .16**                            |   |
| <u>January 1980</u>          |                                 |  |                                     |                                  |   |
| Within 5                     | 2.59                            | 2.39   | .40                                 | .51                              | .25   |
| 41-55                        | <u>1.95</u>                     | <u>1.60</u>  | <u>.18</u>                          | <u>.35</u>                       | <u>.04</u>                                    |
| Difference                   | .54**                           | .79**  | .22**                               | .16*                             | .21**   |
| <u>October 1980</u>          |                                 |  |                                     |                                  |   |
| Within 5                     | 2.32                            | 2.11   | .40                                 | .42                              | .28   |
| 41-55                        | <u>2.14</u>                     | <u>1.68</u>  | <u>.40</u>                          | <u>.38</u>                       | <u>.12</u>                                    |
| Difference                   | .18                             | .43**  | .00                                 | .04                              | .16*  |

Effects of age, sex, education, marital status and income have been controlled.

1. How upset are/were you about TMI? Scale 1-5; 5 - Very upset, 1 - Not at all upset.
2. How serious a threat is/was TMI to family's safety? Scale 1-4; 4 - Very serious, 1 - Not at all serious.
3. Do/Did you have one or more of the following symptoms in the past 2 weeks (or, in the case of April, in the 2 weeks of the crisis): lack of appetite, overeating, sleeplessness, shakes, trouble thinking, irritability, or anger? 1- Yes, 0 - No.
4. Do/Did you have any one or more of the following symptoms in the past 2 weeks (or, in the case of April, in the 2 weeks of the crisis): stomachaches, headaches, diarrhea, frequent urination, rash, abdominal pain, sweating spells? 1- Yes, 0 - No.
5. Do you think your symptoms are due to TMI? 1 - Yes, 0 - No. (Only for persons reporting symptoms)

\* Indicates that the difference between groups is significant at the  $p < .05$  level.

\*\* Indicates that the difference between groups is significant at the  $p < .01$  level.

+ July 1979, data is not available for upset and attribution of symptoms.

\*\*\* Data for April, 1979 were collected in the July, 1979 survey and, therefore are retrospective

### ATTITUDES AND BEHAVIOR REGARDING THREE MILE ISLAND

Two questions concerning Three Mile Island were repeated from earlier studies, allowing comparisons over time. These will be discussed first. The first question concerned restarting reactor number one, the undamaged reactor, at Three Mile Island. Results, shown in Table 2 indicate that, in January, 1980, when the question was first asked, sixty percent of respondents close to TMI and thirty-one percent of respondents 41-55 miles away opposed re-starting the facility. In October, 1980, the percentages were much closer, with forty-seven percent of respondents within 5 miles of TMI opposing re-starting and forty-two percent of respondents living 41-55 miles away opposing restarting. The difference between the two groups was statistically significant in January, 1980, but was not so in October, 1980. It is interesting that both groups changed over time, but in opposite directions. However, when the changes of each group are tested statistically, the change close to TMI (from 60% to 47%) is statistically significant ( $\chi^2 = 5.41$ ,  $df=1$ ,  $p < .05$ ) but the change in the 41-55 mile group is not ( $\chi^2 = 2.63$ ,  $df=1$ ,  $p > .05$ ).

The second question repeated from earlier surveys concerned political activity and asked respondents whether they had, personally, been active in any organization or gone to any meeting to influence what happened at TMI. The results, shown in Table 3, indicate a slight increase from 13% to 15% among respondents within 5 miles of TMI and little change in the 41-55 mile group. As explained in an earlier report (Houts et al, 1980 part one) the participation rate near TMI is high by usual standards of political activity in this country. However, it has not increased substantially in the nine month period from January to October 1980, for either the group within 5 miles ( $\chi^2 = .088$ ,  $df=1$ ,  $p > .05$ ) or the group living between 41 and 55 miles away ( $\chi^2 = .007$ ,  $df=1$ ,  $p > .05$ ).

TABLE 2 : ATTITUDES TOWARD RE-STARTING TMI

| <u>Position on re-starting<br/>undamaged reactor</u> | January 1980          |                      | October 1980          |                      |
|--|-----------------------|----------------------|-----------------------|----------------------|
|  | <u>within 5 miles</u> | <u>41 - 55 miles</u> | <u>within 5 miles</u> | <u>41 - 55 miles</u> |
| Support restart                                      | 17%                   | 33%                  | 37%                   | 35%                  |
| Don't care or don't know                             | 23%                   | 36%                  | 16%                   | 23%                  |
| Against restart                                      | 60%                   | 31%                  | 47%                   | 42%                  |

TABLE 3 : PARTICIPATION IN ORGANIZATIONS OR ATTENDANCE AT MEETINGS

TO INFLUENCE WHAT HAPPENS AT TMI

| January 1980          |                      | October 1980          |                      |
|-----------------------|----------------------|-----------------------|----------------------|
| <u>within 5 miles</u> | <u>41 - 55 miles</u> | <u>within 5 miles</u> | <u>41 - 55 miles</u> |
| 13%                   | 0%                   | 15%                   | 1%                   |

The remaining attitude questions had not been asked earlier and, therefore, data were only available for this survey. The first group of questions dealt with how much influence respondents felt different groups should have in decisions to clean up TMI. Respondents were asked if each of 8 groups should have "a lot" "some" or "no" influence in decisions to clean up TMI. Respondents were scored 1 = a lot, 2 = some, 3 = none. Don't know responses were assigned mean values. The 0-5 and 41-55 miles groups were compared utilizing analysis of covariance to control for age, sex, education, marital status and income. Results, shown in Table 4, indicate a relatively high level of support for all groups. Even the group with the lowest level of support, organized groups of citizens, received a mean value which indicated that they should have some influence. It is interesting that the highest ratings were given to the Nuclear Regulatory Commission and to energy experts working for the Pennsylvania Department of Environmental Resources (DER). It appears that the public prefers technical experts working under government auspices to have the most influence. Respondents in both groups agreed rather closely in their ratings, though the DER was ranked significantly higher by persons in the 41 to 55 miles group. However, it should be noted that both groups ranked the DER first.

TABLE 4: MEAN SCORES ON QUESTIONS CONCERNING THE INFLUENCE WHICH DIFFERENT GROUPS SHOULD HAVE IN DECISIONS TO CLEAN UP TMI FOR PERSONS LIVING EITHER WITHIN FIVE MILES OR BETWEEN 41 AND 55 MILES AWAY FROM TMI

| <u>Questions</u>  | <u>Mean Scores<br/>(Within 5 Miles)</u> | <u>Mean Scores<br/>(41 to 55 Miles)</u> | <u>Significance<br/>Of Difference</u> |
|---|---|---|---------------------------------------|
| In deciding how to clean up TMI<br>how much influence should<br>different groups have in<br>determining how it's done. <sup>1</sup> |   |   |                                       |
| Organized groups of citizens  | 1.98                                    | 1.97                                    | n.s.                                  |
| Energy experts from colleges,<br>universities and other<br>impartial organizations  | 1.78                                    | 1.80                                    | n.s.                                  |
| Decisions voted by the general<br>public  | 1.75                                    | 1.76                                    | n.s.                                  |
| Elected local officials   | 1.86                                    | 1.94                                    | n.s.                                  |
| Metropolitan Edison Company   | 1.92                                    | 1.77                                    | n.s.                                  |
| Nuclear Regulatory Commission   | 1.54                                    | 1.42                                    | n.s.                                  |
| Energy experts working for the<br>Pennsylvania Department of<br>Environmental Resources   | 1.53                                    | 1.40                                    | *                                     |
| Elected state or federal<br>officials   | 1.94                                    | 1.87                                    | n.s.                                  |

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Effects of age, sex, marital status, education and income have been controlled.

<sup>1</sup>How much influence should each group have in decisions to clean up TMI? Scale 1-3.  
1 = A lot, 2 = Some, 3 = None

\*The difference between groups is significant at the  $p < .05$  level.

n.s. - The difference between groups is not statistically significant.

Response frequencies to each question are listed in detail in Appendix II.

Six attitude questions concerning belief in rumors were included in the October survey. Each rumor had received publicity during or after the crisis. Each rumor had also been shown to be either incorrect or else lacked objective verification. Responses were on a four point scale with 4 indicating disbelief and 1 definite belief. An "undecided" response was given a score of 2.5. The results, shown in Table 5, average close to 2.5. It is interesting to note that all of the means for the group from 41 to 55 miles from TMI were below 2.5, while only three out of six means were below 2.5 for the group close to TMI. Further, the two rumors where there was a statistically significant difference, (increased miscarriages, stillborns and infant deaths plus increased birth defects) showed greater acceptance of the rumors in the 41-55 mile group than in the 0-5 mile group. This suggests the hypothesis that the group farther from TMI was more willing to accept rumors than the group close to TMI. This hypothesis was tested by summing the six rumor scores for each respondent and testing whether the total rumor scores were different for the two groups. The analysis of covariance test was not statistically significant, thus the hypothesis of a difference in general acceptance of rumors is rejected.

The final attitude question dealt with media coverage of the TMI situation. Results, reported in Table 6, show that almost half of the respondents in both groups felt that the media had blown events out of proportion, and one in five thought that information was withheld or covered up. Less than one third felt that the events were reported accurately. It is interesting that the two groups had almost identical percentages for each response option.

TABLE 5: MEAN SCORES ON THE CREDIBILITY OF RUMORS ABOUT TMI  
FOR PERSONS LIVING EITHER WITHIN 5 MILES OR BETWEEN 41 AND  
55 MILES AWAY FROM TMI

| <u>Items From the Survey</u>   | <u>Mean Scores<br/>(Within 5 Miles)</u> | <u>Mean Scores<br/>(41 to 55 Miles)</u> | <u>Significance<br/>Of Difference</u> |
|--|---|---|---------------------------------------|
| I'm going to read some<br>statements about TMI.<br>Please tell how true you<br>think each statement is. <sup>1</sup>     |   |   |                                       |
| There has been an increase in<br>the number of miscarriages,<br>stillborns, and infant<br>deaths since the TMI accident. | 2.66                                    | 2.41                                    | *                                     |
| There has been an increase in<br>birth defects in the area<br>since the TMI accident                                     | 2.72                                    | 2.45                                    | *                                     |
| Cancer rates will increase<br>because of TMI   | 2.35                                    | 2.34                                    | n.s.                                  |
| Farm animals in the area have<br>had an increase in health<br>problems since TMI   | 2.43                                    | 2.28                                    | n.s.                                  |
| There has been an increase in<br>general health problems<br>because of TMI   | 2.53                                    | 2.34                                    | n.s.                                  |
| There has been an increase in<br>mental health problems<br>because of TMI  | 2.21                                    | 2.28                                    | n.s.                                  |

Effects of age, sex, education, marital status and income have been controlled.

<sup>1</sup> All rumors were scored on a scale of 1-4. 4 = Rumor was definitely not true,  
2.5 = Respondent was undecided, 1 = Rumor was definitely true.

\*The difference between groups is significant at the  $p < .01$  level.

n.s. The difference between groups is not statistically significant.

Response frequencies to each question are listed in detail in Appendix II.

TABLE 6: MEAN RATINGS OF MEDIA COVERAGE OF THE SITUATION AT THREE MILE  
ISLAND FOR PERSONS LIVING EITHER WITHIN 5 MILES OR BETWEEN 41 AND 55  
MILES AWAY FROM TMI

|  | (Within 5 Miles) | (41 to 55 Miles) |
|--|------------------|------------------|
| What has been your impression of the<br>way newspaper, television and radio<br>has been reporting events at TMI? |                  |                  |
| Blown events out of proportion   | 46%              | 46%              |
| Reported events fairly accurately  | 28%              | 29%              |
| Withheld or covered up information   | 22%              | 21%              |
| Don't know   | 4%               | 4%               |

The difference between the two distance groups is not statistically significant  
(utilizing analysis of covariance controlling for age, sex, education, income,  
and marital status).

## REACTIONS TO KRYPTON VENTING

Three questions were included in the October survey which dealt with how respondents felt about the venting of Krypton gas at Three Mile Island in July of 1980. The venting of this gas had been the subject of considerable public debate in the months prior to its occurrence. Partly as a result of this debate, the public was informed in advance of each venting. This gave persons living in the area an opportunity to evacuate during venting periods if they so wished. Data on who evacuated, when they left and for how long they stayed away was available for persons within five miles of TMI but not for the control group 41 to 55 miles away. Since the representative sample of persons living within 5 miles of TMI may have included some persons who moved into the area after the venting in July, 1979, estimates of evacuation may have been conservative. Results indicate that 15% of the population living within 5 miles of TMI in July, 1980 reported that the venting was an "important reason" for their leaving and an additional 4% said that it was a "somewhat important reason" for their leaving during that period. Furthermore, of those persons who reported that the venting was at least a somewhat or very important reason for leaving, 40% left before the venting began, 52% left in the first week of venting and 8% left in later weeks of venting. The average length of absence due to venting was 10 days.

Two attitude questions about the Krypton venting were asked of respondents within 5 miles of TMI in October, 1980 as well as the control group from 41-55 miles away. The results, shown in Table 7 are quite interesting. For both questions, persons living close to TMI were significantly less negative about the venting than were people living farther away.

TABLE 7: ATTITUDES TOWARD VENTING FOR PERSONS LIVING EITHER WITHIN 5  
MILES OR BETWEEN 41 AND 55 MILES AWAY FROM TMI

|  | <u>0 - 5 Miles<br/>From TMI</u> | <u>41 - 55 Miles<br/>From TMI</u> |
|--|---------------------------------|-----------------------------------|
| Do you think that venting was the right way to get rid of the Krypton gas or should they have gotten rid of it some other way? |                                 |                                   |
| Should have vented   | 56%                             | 40%                               |
| Used some other way  | 28%                             | 33%                               |
| Don't know   | 16%                             | 27%                               |

The differences in the two groups' responses was statistically significant<sup>1</sup> ( $p < .01$ ) indicating more support for venting in the 0-5 mile group compared to the 41-55 mile group.

|   | <u>0 - 5 Miles<br/>From TMI</u> | <u>41 - 55 Miles<br/>From TMI</u> |
|---|---------------------------------|-----------------------------------|
| How dangerous do you think the krypton venting was? |                                 |                                   |
| Dangerous   | 15%                             | 13%                               |
| Somewhat dangerous                                  | 39%                             | 55%                               |
| Not too dangerous                                   | 23%                             | 15%                               |
| Not at all dangerous                                | 18%                             | 9%                                |
| Don't know  | 5%                              | 8%                                |

The difference in the two groups responses was statistically significant<sup>1</sup> ( $p < .01$ ) indicating lower ratings of danger for the 0-5 mile group compared to the 41-55 mile group.

<sup>1</sup> Utilizing analysis of covariance where age, sex, education, marital status and income have been controlled.

GENERAL ATTITUDES

Two questions dealt with general attitudes toward nuclear energy. The first question asked how much scientists know about radiation and the second asked if there should be more, the same or fewer nuclear plants in the future. The results, shown in Table 8, show no statistically significant differences between the two groups on either question. The averages for these questions indicate that the public tends to take a middle position on both issues. Respondents perceived scientists as knowing between "something" and "a great deal" about radiation and they tend to favor the same number of nuclear plants in the future as now.

TABLE 8: GENERAL ATTITUDES TOWARD NUCLEAR ENERGY FOR PERSONS LIVING  
WITHIN 5 MILES OR BETWEEN 41 AND 55 MILES FROM TMI

|  | <u>0 - 5 Miles<br/>From TMI</u> | <u>41 - 55 Miles<br/>From TMI</u> |
|--|---------------------------------|-----------------------------------|
| Do you think, in the future, this country<br>should have |                                 |                                   |
| More nuclear power plants                                | 28%                             | 36%                               |
| The same number as now                                   | 29%                             | 28%                               |
| Fewer nuclear power plants                               | 40%                             | 31%                               |
| Don't know   | 3%                              | 5%                                |

The difference between the two groups' responses was not statistically significant.<sup>1</sup>

|  | <u>0 - 5 Miles<br/>From TMI</u> | <u>41 - 55 Miles<br/>From TMI</u> |
|--|---------------------------------|-----------------------------------|
| How much do you think scientists know<br>about the effects of radiation? |                                 |                                   |
| A great deal   | 36%                             | 37%                               |
| Some   | 44%                             | 50%                               |
| Very little  | 19%                             | 11%                               |
| Don't know   | 1%                              | 2%                                |

The difference between the two groups' responses was not statistically significant<sup>1</sup>.

<sup>1</sup> Utilizing analysis of covariance where age, sex, education, marital status and income have been controlled.

### CONCLUSIONS

These findings indicate that the number of people with serious concerns about Three Mile Island dropped substantially from January to October, 1980. First, reductions were noted for both the 0-5 and the 41-55 mile group in: 1) ratings of upset, 2) perceived danger from TMI, and 3) attribution of symptoms to TMI. Second, reductions were greatest in the 0-5 group and, as a result, the two groups became increasingly similar over time in ratings of upset about TMI, perceived danger, reporting of stress-related symptoms and opposition to re-opening the nuclear facility. It should be noted, however, that, in October, 1980, some distress indices were still significantly higher in the 0-5 mile group than in the 41-55 mile group. These indices were perceived threat to safety and attribution of symptoms to TMI.

Attitude and opinion questions which were only included in the October survey showed relatively small differences between respondents close to and far from TMI. However, there were statistically significant differences between these groups in attitudes toward Krypton venting and in belief in some rumors about negative effects of the crisis. It is interesting that, for both types of questions people farther from the plant had more negative views than people close to the plant. There was general agreement among persons both close to and far from TMI that the media had not reported the crisis objectively, that scientists know between "something" and "a great deal" about radiation and that technical experts working under government auspices should have the largest say in how TMI is cleaned up.

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## APPENDIX I

FREQUENCY OF RESPONSES CONCERNING INFLUENCE WHICH DIFFERENT GROUPS  
SHOULD HAVE IN DECIDING HOW TO CLEAN UP TMI

In deciding how to clean up TMI how much influence should different groups have in determining how it's done? How about...

|  | <u>0 - 5 Miles<br/>From TMI</u> | <u>41 - 55 Miles<br/>From TMI</u> |
|--|---------------------------------|-----------------------------------|
| Organized groups of citizens who are<br>either for or against nuclear power.   |                                 |                                   |
| A lot  | 24%                             | 22%                               |
| Some   | 51%                             | 50%                               |
| None   | 21%                             | 23%                               |
| Don't know   | 4%                              | 5%                                |
| Energy experts from colleges, universities<br>or other impartial organizations |                                 |                                   |
| A lot  | 34%                             | 33%                               |
| Some   | 47%                             | 50%                               |
| None   | 14%                             | 13%                               |
| Don't know   | 5%                              | 4%                                |
| Decisions voted by the general public  |                                 |                                   |
| A lot  | 39%                             | 38%                               |
| Some   | 45%                             | 43%                               |
| None   | 14%                             | 17%                               |
| Don't know   | 2%                              | 2%                                |
| Elected local officials  |                                 |                                   |
| A lot  | 30%                             | 23%                               |
| Some   | 51%                             | 57%                               |
| None   | 16%                             | 18%                               |
| Don't know   | 3%                              | 2%                                |

|  | <u>0 - 5 Miles<br/>From TMI</u> | <u>41 - 55 Miles<br/>From TMI</u> |
|--|---------------------------------|-----------------------------------|
| Metropolitan Edison Company  |                                 |                                   |
| A lot  | 29%                             | 36%                               |
| Some   | 46%                             | 43%                               |
| None   | 22%                             | 14%                               |
| Don't know   | 3%                              | 7%                                |
| Nuclear Regulatory Commission  |                                 |                                   |
| A lot  | 48%                             | 60%                               |
| Some   | 42%                             | 31%                               |
| None   | 6%                              | 4%                                |
| Don't know   | 4%                              | 5%                                |
| Energy experts working for the Pennsylvania<br>Department of Environmental Resources |                                 |                                   |
| A lot  | 49%                             | 61%                               |
| Some   | 44%                             | 34%                               |
| None   | 3%                              | 3%                                |
| Don't know   | 4%                              | 2%                                |
| Elected state or federal officials   |                                 |                                   |
| A lot  | 25%                             | 28%                               |
| Some   | 52%                             | 51%                               |
| None   | 19%                             | 18%                               |
| Don't know   | 4%                              | 3%                                |

Note: Means calculated from these data will differ slightly from those reported in Table 2 since Table 2 means are adjusted using analysis of covariance.

## APPENDIX II

## FREQUENCY OF RESPONSES CONCERNING BELIEF IN RUMORS ABOUT THREE MILE ISLAND

|   | <u>0 - 5 Miles<br/>From TMI</u> | <u>41 - 55 Miles<br/>From TMI</u> |
|---|---------------------------------|-----------------------------------|
| There has been an increase in the number of miscarriages, stillborns, and infant deaths since the TMI accident. |                                 |                                   |
| Definitely  | 9%                              | 13%                               |
| Probably  | 26%                             | 34%                               |
| Don't know  | 10%                             | 11%                               |
| Probably not  | 40%                             | 32%                               |
| Definitely not  | 15%                             | 10%                               |
| There has been an increase in birth defects in the area since TMI.  |                                 |                                   |
| Definitely  | 7%                              | 12%                               |
| Probably  | 24%                             | 33%                               |
| Don't know  | 13%                             | 8%                                |
| Probably not  | 41%                             | 38%                               |
| Definitely not  | 15%                             | 9%                                |
| Cancer rates will increase in the area because of TMI.  |                                 |                                   |
| Definitely  | 17%                             | 11%                               |
| Probably  | 37%                             | 45%                               |
| Don't know  | 7%                              | 9%                                |
| Probably not  | 32%                             | 27%                               |
| Definitely not  | 7%                              | 8%                                |
| Farm animals in the area have had an increase in health problems since TMI.                                     |                                 |                                   |
| Definitely  | 16%                             | 14%                               |
| Probably  | 32%                             | 45%                               |
| Don't know  | 7%                              | 9%                                |
| Probably not  | 34%                             | 23%                               |
| Definitely not  | 11%                             | 9%                                |

0 - 5 Miles  
From TMI

41 - 55 Miles  
From TMI

There has been an increase in general health problems because of TMI.

|                |     |     |
|----------------|-----|-----|
| Definitely     | 14% | 10% |
| Probably       | 29% | 45% |
| Don't know     | 7%  | 7%  |
| Probably not   | 38% | 32% |
| Definitely not | 12% | 6%  |

There has been an increase in Mental Health Problems because of TMI.

|                |     |     |
|----------------|-----|-----|
| Definitely     | 28% | 15% |
| Probably       | 30% | 50% |
| Don't know     | 7%  | 3%  |
| Probably not   | 25% | 23% |
| Definitely not | 10% | 9%  |

Note: Means calculated from these data will differ slightly from those reported in Table 3 since Table 3 means are adjusted using analysis of covariance.

## APPENDIX III

Computation of means, standard deviations, mode and medians for demographic variables for the 0-5 mile group using 12.5% weighting and 11.6% weighting for in-migrants as compared to non-migrants.

|                       | Old wts based on 12.5%<br>mobility | New wts based on 11.6%<br>mobility |
|-----------------------|------------------------------------|------------------------------------|
| <u>Age</u>            |                                    |                                    |
| Mean                  | 4.081                              | 4.046                              |
| SD                    | 1.167                              | 1.176                              |
| Mede                  | 4.000                              | 4.000                              |
| Median                | 4.087                              | 4.046                              |
| <u>Sex</u>            |                                    |                                    |
| % males               | 45.4                               | 45.1                               |
| % females             | 54.6                               | 54.9                               |
| <u>Education</u>      |                                    |                                    |
| Mean                  | 3.313                              | 3.308                              |
| SD                    | 1.531                              | 1.521                              |
| Mede                  | 3.000                              | 3.000                              |
| Median                | 2.995                              | 2.995                              |
| <u>Income</u>         |                                    |                                    |
| Mean                  | 3.339                              | 3.330                              |
| SD                    | 1.158                              | 1.158                              |
| Mede                  | 3.000                              | 3.000                              |
| Median                | 3.033                              | 3.002                              |
| <u>Marital Status</u> |                                    |                                    |
| % married             | 78.4                               | 77.8                               |
| % wid/sep/div         | 13.9                               | 14.0                               |
| % unmarried           | 7.7                                | 8.2                                |

1. Age was scored as follows: Scale 1-6; 1 = Under 18, 2 = 18-24, 3 = 25-34, 4 = 35-49, 5 = 50-64, 6 = 65 or over.
2. Education was scored as follows: Scale 1-7; 1 = Some grade school (1-8), 2 = Some high school (9-11), 3 = Graduated high school, 4 = Technical/vocational school, 5 = Some college, 6 = Graduated college, 7 = Graduate/professional school.
3. Income was scored as follows: Scale = 1-7; 1 = Less than \$5,000, 2 = \$5,000 to \$9,999, 3 = \$10,000 to \$19,999, 4 = \$20,000 to \$29,999, 5 = \$30,000 to \$39,999, 6 = \$40,000 to \$50,000, 7 = Over \$50,000.