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THE VIEWS OF WEST VALLEY AREA
RESIDENTS CONCERNING THE
NUCLEAR FUEL SERVICES
FACILITY AT
WEST VALLEY, NEW YORK

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A Report to Argonne National Laboratory

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EXECUTIVE SUMMARY

The following statements represent the major findings of this study. The number in parentheses next to each finding is the page on which the finding is discussed.

1. Most people are aware of the presence of the Nuclear Fuel Services plant at West Valley.
2. As one moves closer to the plant level of awareness increases dramatically.
3. Housewives who live close to the plant have heard or read a considerable amount about the plant.
4. Overall, citizens living in the West Valley area have a limited amount of knowledge about the nuclear issue domain.
5. The more people heard or read about the Nuclear Fuel Services facility the higher is their level of knowledge about the nuclear issue.
6. A clear majority (64%) of residents living in the area are concerned about the presence of the plant.
7. Members of all sectors of the population are concerned about the presence of the plant.
8. Most people (85%) are concerned about "health dangers because of contamination of the environment (air and/or water pollution)".
9. A considerable portion of the population make the connection between the presence of nuclear waste at the plant and the serious harm it might have on their health and environment.
10. People want to see something done about the facility, but do not know exactly what.
11. When forced to choose one out of three possible alternatives, twice as many people in the West Valley area preferred to "completely remove the plant and restore the area" than preferred either one of two remaining alternatives.
12. A slight majority of those living in West Valley and Springville, the areas closest to the plant, favor removal of the plant and restoration of the area.
13. Those who report that either a relative or a friend had worked at the plant were less likely to favor removal of the plant and restoration of the area than those who report that a relative or a friend had not worked at the plant.

14. People who are concerned about the facility tend to favor removal of the plant and restoration of the area.
15. Nearly three-fourths of West Valley area residents who believe that the plant did not employ enough people to significantly help the economy of the region favor removal of the facility and restoration of the area.

III

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I. Introduction

During the spring of 1978 the Environmental Studies Center of the State University of New York at Buffalo conducted an in-depth, two part study of the West Valley area in Western New York State, the present site of the Nuclear Fuel Services facility. The first part was a comprehensive socio-economic and demographic analysis of the area. The findings of this inquiry are reported in a monograph titled "Socio-Economic and Demographic Profile of the West Valley, New York Area." That report examines the major economic and demographic trends in the West Valley region between 1950 and 1970.

The second part of the investigation consists of a telephone survey of a random sample of West Valley area residents. Citizens were queried about their views concerning the Nuclear Fuel Services plant. The intensive coverage of the issues surrounding the presence of the plant by the media provided a suitable backdrop for conducting such a survey study. This paper reports and discusses the findings of the survey. Hopefully, the data presented here will familiarize policy-makers with the opinions and concerns of the residents of the area, and help leaders choose an acceptable course of action.

II. Survey Design and Sampling Technique

The survey was designed to measure a number of factors, (see Appendix A for a copy of the questionnaire). The extent to which people were aware of the issues surrounding the Nuclear Fuel Services plant at West Valley was examined. People's level of knowledge about the issue sphere was explored. We also attempted to ascertain the nature and level of citizen concern about the plant. In addition, survey respondents were asked to suggest and respond to proposals to deal with the facility. Finally, background demographic data were obtained for each respondent. Each interview took approximately 8 minutes to conduct. The response rate was about 65 percent, resulting in 533 interviews.

The Survey Research Center at the State University of New York at Buffalo developed the sampling strategy. The Waksberg Method was used to randomly select respondents' telephone numbers (see Appendix B). Once a household was reached the interviewer selected the person in the household to interview by referring to a respondent selection key. If the person was not at home the interviewer made an appointment to call back at another time. The respondent selection key is designed to ensure that a random sample of males and females, and young and old are queried. While the Waksberg Method helps to ensure that a random sample of households is drawn, the respondent selection key helps to ensure that a random sample of house-

hold members is obtained.

Presumably, those who live the closest to the Nuclear Fuel Services plant will be affected the most by actions taken regarding the plant. Because of this we wanted to make sure that a relatively large proportion of people who live close to the plant were interviewed. At the same time we wanted to be certain that a random sample of the West Valley area was obtained. For this analysis the West Valley area is comprised of Arcade, South Buffalo, Boston, Cattaraugus, Ellicottville, Franklinville, Gowanda, Hamburg, Little Valley, Machias, Springville, and West Valley. A simple random sample consists of more people living in the populated areas and less people living in the sparsely populated areas. It provides one with the views of a representative segment of the population. Because the area around the plant is sparsely populated a random sample of the West Valley area's population would not include enough people near the plant itself to permit one to draw valid conclusions about their views. We therefore oversampled in the areas closest to the plant site (West Valley and Springville) and undersampled in areas farthest away from the plant (South Buffalo and Hamburg). This permits one to accurately determine the views of the people living close to the plant.

But what if we desire to analyze the opinions of the West Valley region as a whole? Because of the sampling strategy that was adopted it was necessary to weight each strata (each of the areas mentioned above) differently. Simply speaking, this was done by statistically increasing the number of people interviewed who live far away from the plant and decreasing the number of people interviewed who reside close to the plant. Weights were computed two ways: (1) on the basis of the probability of selecting a respondent in a given strata, and (2) on the basis of the probability of selecting a household in a given strata. This permits one to confidently generalize about the entire West Valley area on an individual basis, or on a household basis. However, if we desire to contrast the views of those who live near the plant with those who live far from the plant we examine the unweighted data. This provides the researcher with added flexibility in analyzing and interpreting the data. As one can see, the data were collected using the most scientific survey research techniques.

III. Level of Awareness

Everyone interviewed was asked whether he had heard or read anything about the Nuclear Fuel Services facility at West Valley and, if so, how much (see Q. 12 and 13). Table 1 reveals area residents' level of awareness weighted by respondent. Slightly less than one-third of the people living in the West Valley region have not heard or read anything about the plant. Forty-one percent have heard or read only a little about the facility, while almost one-third of those interviewed have heard or read at least a moderate amount. *Generally speaking, most people are aware of the presence of the Nuclear Fuel Services plant at West Valley.*

TABLE 1

Level of Awareness of the Nuclear Fuel
Services Plant at West Valley

<u>Level of Awareness</u>	<u>Percent</u>
Have not heard or read anything	29%
Have heard or read only a little	41
Have heard or read a moderate amount	18
Have hear or read quite a lot	13
<hr/>	
Total Percent	101%*
Total Number of Cases	533

* - Due to rounding error.

A number of socio-economic and demographic factors influence level of awareness. *Not suprisingly, as one moves closer to the plant level of awareness increases dramatically.*¹ This is true for the weighted and unweighted data. People who have had members of their family or close friends work at the plant are more likely to exhibit a high level of awareness than other people are. Level of awareness tends to increase with age and education. People who are married and employed tend to be more aware than people who are single and unemployed, Males

tend to possess a higher level of awareness than females do. Housewives, the self-employed, professionals, managers, and craftsmen tend to have a high level of awareness. *Housewives who live close to the plant (twenty miles or less), in particular, have heard or read a considerable amount about the Nuclear Fuel Services plant.* Finally, income and socio-economic class are not related to level of awareness.

IV. Level of Knowledge

A measure of people's knowledge about the nuclear issue domain was included in the survey (see Q. 14 and 15). People who heard or read anything about the Nuclear Fuel Services plant were asked what the plant was built to do. Everyone interviewed was asked what nuclear or atomic energy is used for. Of those who had not heard or read anything about the plant only a few were able to say what nuclear energy is used for. Forty percent (weighted by respondent) of those who had heard or read something about the plant did not know what the plant was built for. Thirty-eight percent correctly knew the plant was built for storing nuclear wastes, and 30 percent knew the plant was built for processing or recycling nuclear fuels (multiple mentions were possible). Sixty-two percent of the entire sample was able to name at least one use of nuclear energy.

Using the responses to the two questions above, a level of knowledge index was constructed. This was done by adding the number of correct responses to both questions for each person. Table 2 shows the distribution of the scores for the entire sample (weighted by respondent). Although a score of 7 was possible, no one received it. Thus the index ranges from 0 to 6. Only 4 percent scored at least a 5 on the index while 62 percent scored no more than a 1 on the index. *Overall, citizens living in the West Valley area have a limited amount of knowledge about the nuclear issue domain.*

• Level of knowledge is related to a number of other variables. There is a particularly strong, positive correlation between awareness and knowledge (the Pearson Product-Moment Correlation is .50, significant at the .01 level, $n = 533$, weighted by respondent). *In other words, the more people heard or read about the Nuclear Fuel Services plant the higher is their level of knowledge about the nuclear issue domain.* As education, income, and age rise so does level of knowledge. Males and those who are employed are more likely to exhibit a high level of knowledge than females and the unemployed are. In comparison to other occupational groups, housewives, sales workers, unskilled laborers, and technicians tend to have little knowledge about the nuclear issue area. Yet, housewives who live near the plant tend to have more knowledge than those who live far away. Except for housewives, distance from the plant is not related to level of knowledge. In addition, class and marital status are not related to level of knowledge.

TABLE 2

Level of Knowledge About the
Nuclear Issue Sphere

<u>Level of Knowledge</u>							<u>Totals</u>	
Low						High	Percent	N
0	1	2	3	4	5	6		
31%	31	20	9	5	3	1	100%	533

V. Concern About the Nuclear Fuel Services Plant

Respondents who heard or read about the Nuclear Fuel Services plant at West Valley were asked whether they were concerned in any way about the plant (see Q.16). *A clear majority of residents living in the area are concerned about the presence of the plant; 64 percent of the sample (weighted by respondent) said they are.* The percentages of people in the weighted and unweighted samples who expressed concern are almost identical.

Several variables are related to concern about the Nuclear Fuel Services plant. Those who exhibit a high level of awareness and knowledge are somewhat more likely to be concerned about the presence of the plant than those with a low level of awareness and knowledge. People with high levels of income and education also tend to voice concern. Housewives,² professionals, service workers, and clerical workers are more likely to be concerned than other occupational groups are. Meanwhile, craftsmen and technicians are less likely to be concerned than other occupational groups are. Of those living near the plant, young people are more likely to express concern than old people are. Otherwise, there is no relationship between concern and age, marital status, distance from the plant, class, employment status, and sex. *This suggests that members of all sectors of the population are concerned about the presence of the plant.*

VI. What Are People Concerned About?

The 233 people who said they were aware and concerned about the Nuclear Fuel Services plant at West Valley were asked specifically what they were concerned about. Table 3 shows the responses people most commonly gave when asked this question (see Q.17). *Far and away the most frequent response given dealt with "health dangers because of contamination of the environment (air and/or water pollution);" 85 percent mentioned this.* There is almost no difference between the percentages of the weighted and unweighted samples mentioning this concern. Similarly, almost one-fifth of those voicing concern are worried about the "radioactive contamination of workers." Other concerns such as, "costs of waste storage," "security reasons (theft or vandalism)," "jobs or other economic opportunities (loss or gain)," and "taxes (loss or gain)," are seldom mentioned.

Two factors help explain concern about "health dangers because of contamination of the environment (air and/or water pollution)." The more knowledge one tends to have about the nuclear issue domain and the closer one tends to live to the Nuclear Fuel Services facility, the more likely one will exhibit concern about "health dangers because of contamination of the environment (air and/or water pollution)." *Clearly, a considerable portion of the population makes a connection between the presence of nuclear waste at the plant and the serious harm it might have on their health and environment.* Married people also tend to worry about this potential risk. Education, age, social class, employment status, sex, income, and occupation are not related to concern about this possible danger. This suggests that people from all segments of the population are disturbed about the health dangers which can result from the radioactive contamination of the environment, and that people believe that the West Valley facility may cause such contamination.

TABLE 3

Specific Concerns of West Valley Area Residents
About the Nuclear Fuel Services Plant¹

A. Radioactive Contamination of Workers

Mentioned	19%
Not Mentioned	81
	<hr/>
	100%
	(223)

B. Health Dangers Because of Contamination of the Environment (Air and/or Water Pollution)

Mentioned	85%
Not Mentioned	15
	<hr/>
	100%
	(223)

C. Costs of Waste Storage

Mentioned	2%
Not Mentioned	98
	<hr/>
	100%
	(223)

D. Security Reasons (Theft or Vandalism)

Mentioned	5%
Not Mentioned	95
	<hr/>
	100%
	(223)

E. Jobs or Other Economic Opportunities (Loss or Gain)

Mentioned	2%
Not Mentioned	98
	<hr/>
	100%
	(223)

F. Taxes (Loss or Gain)

Mentioned	3%
Not Mentioned	97
	<hr/>
	100%
	(223)

G. Other Mentions

Mentioned	11%
Not Mentioned	89
	<hr/>
	100%
	(223)

1 - The total number of cases for each item is in parentheses.

VII. What Should Be Done About the Plant?

Everyone who had heard or read about the Nuclear Fuel Services plant was asked, "What do you think should be done about the Nuclear Fuel Services plant at West Valley?" (see Q.18). Responses to the question are broken down into "specific" and "groping" suggestions in Table 4 (weighted by respondent, multiple responses were possible). As one can see on the bottom of Table 4, approximately half of the people asked this question (52 percent) had no idea what should be done with the plant. Among those who made a specific suggestion, about one-third said "completely remove the plant and restore the area." Only 16 percent said "resume active operations as before it closed." Even fewer people mentioned: "Do nothing. Leave it as it is now as a waste fuel storage facility for the time being," "make it into a permanent waste fuel repository," and "move the plant to a more remote area."

There is evidence in Table 4 which suggests that people want to see something done about the Nuclear Fuel Services plant, but do not know exactly what. Among the "groping" suggestions mentioned were "more public investigation should be conducted" and "make the plant safer" (18 and 21 percent mentioned these two respectively). A few people said "the state and federal government should do something." Others observed that "since we have spent so much money on it something should be done." *When one adds these percentages to the percentages responding "don't know" one cannot help but conclude that only a minority of the population actually has a clear idea about what should be done with the Nuclear Fuel Services plant at West Valley. Citizens who have a clear idea about what should be done about the plant tend to want to have it removed and the area restored.*

Next we asked the same respondents the following question:

"Three alternatives have been proposed for dealing with the Nuclear Fuel Services plant. Which of the following proposed solutions do you most strongly prefer?

1. Resume active operations as before it closed.
2. Make it into a permanent nuclear waste storage and fuel reprocessing facility.
3. Completely remove the plant and restore the area.

Which do you choose?"

8. Don't know

While the last question sought to ascertain spontaneous (open-ended) remarks, this question forced respondents to choose one out of three specific alternatives.

TABLE 4

Respondents' Suggestions As to What Should
Be Done About the Nuclear Fuel Services
Plant at West Valley¹

Specific Suggestions

- A. Do Nothing. Leave It As It Is Now As A Waste Fuel Storage Facility for the Time Being

Mentioned	6%
Not Mentioned	<u>94</u>
	100%
	(184)

- B. Resume Active Operations As Before It Closed

Mentioned	16%
Not Mentioned	<u>84</u>
	100%
	(184)

- C. Make It into A Permanent Waste Fuel Repository

Mentioned	6%
Not Mentioned	<u>94</u>
	100%
	(184)

- D. Completely Remove the Plant and Restore the Area

Mentioned	32%
Not Mentioned	<u>68</u>
	100%
	(184)

- E. Move the Plant to A More Remote Area

Mentioned	1%
Not Mentioned	<u>99</u>
	100%
	(184)

TABLE 4
(cont'd)

"Groping" Suggestions

F. More Public Investigation Should be Conducted

Mentioned	18%
Not Mentioned	<u>82</u>
	100%
	(184)

G. Make the Plant Safer

Mentioned	21%
Not Mentioned	<u>79</u>
	100%
	(184)

H. The State and Federal Government Should Do Something

Mentioned	5%
Not Mentioned	<u>95</u>
	100%
	(184)

I. Since We Have Spent So Much Money on It Something Should Be Done

Mentioned	1%
Not Mentioned	<u>99</u>
	100%
	(184)

J. Respondent Says "Don't Know"

Mentioned	52%
Not Mentioned	<u>48</u>
	100%
	(380)

1 - The total number of cases for each item is in parentheses.

According to Table 5, more than twice as many people in the West Valley area preferred to "completely remove the plant and restore the area" than preferred either one of two remaining alternatives. Almost the same percentage of people favored the other two alternatives; "resume active operations as before it closed" (18 percent) and "make it into a permanent nuclear waste storage and fuel reprocessing facility" (19 percent). A little less than one-fifth of those questioned did not know which alternative to select. Interestingly, the 19 respondents who reported they had worked at the Nuclear Fuel Services facility at West Valley were split in their support for the three alternatives. The findings in Table 5 indicate that when people are forced to select one of the three alternatives, a large plurality of the people in the West Valley area (45 percent) prefer to "completely remove the plant and restore the area." Of those who voiced a preference this alternative was a two-to-one favorite.

TABLE 5

Three Alternatives Proposed for
Dealing with the Nuclear Fuel
Services Plant at West Valley

<u>Alternatives</u>	<u>Percent</u>
Resume active operations as before it closed	18%
Make it into a permanent nuclear waste storage and fuel reprocessing facility	19
Completely remove the plant and restore the area	45
Don't know	19
<hr/>	
Total percent	101%*
Total Number of Cases	380

* - Due to rounding error.

VIII. Support for Plan Alternatives: Where Does It Come From?

An in-depth inquiry was undertaken in order to ascertain which segments of the population support each of the three proposed plan alternatives. For the most part, citizens in the West Valley region who responded a particular way to the open-ended question concerning what should be done about the Nuclear Fuel Services plant tended to respond the same way to the closed-ended question. Although in this section of the report we will mainly concentrate on explaining responses to the closed-ended question, discrepancies between the explanations of the responses to both questions will be noted and resolved.

Table 6 reports the percentage of each strata that supports each of the three plan alternatives (from the unweighted sample). *Slightly more than three-fourths of the citizens living in Boston favor removing the plant and restoring the area.* Few Boston residents tend to prefer reactivation of the plant. In addition, 64 percent of those living in Hamburg and 61 percent of those living in Arcade want to see the facility removed. In contrast, less than half of the residents in Machias and Franklinville (both areas are close to the plant) prefer removal of the facility. *Note that a slight majority of those living in West Valley and Springville, the areas closest to the plant, favor the removal of the facility and restoration of the area.* Slightly less than one-third of West Valley residents are in favor of reactivating the facility.

No significant relationship exists between the distance people live from the plant and their responses to the closed-ended question. On the open-ended question, however, people who live near the plant were more likely to favor removal of the plant than people who live far away. Further inquiry revealed that those responding in this fashion to the open-ended question tended to be more concerned about the facility than those responding this way to the closed-ended question. As previously mentioned, people who live close to the facility are more likely to be concerned than people who live far away. It appears that the open-ended question tends to elicit a highly emotional response. Thus, the discrepancy in the findings is due to the different ways the questions were asked (closed versus open-ended).

TABLE 6

Position on Plan Alternatives by

Stratum¹

Plan Alternatives

<u>Stratum</u>	<u>Resume Active Operations</u>	<u>Permanent Nuclear Waste Storage Facility</u>	<u>Remove It</u>	<u>Totals</u>	
				<u>Percent</u>	<u>N</u>
Arcade	26%	13	61	100%	38
South Buffalo	27%	18	55	100%	22
Boston	7%	17	76	100%	29
Cattaraugus	19%	32	49	100%	12
Ellicottville	17%	25	58	100%	26
Gowanda	24%	24	51	99%*	37
Hamburg	15%	21	64	100%	33
Little Valley	14%	27	59	100%	22
Machias	29%	29	41	99%*	17
Springville	26%	21	53	100%	58
West Valley	32%	12	56	100%	50

1 - Unweighted sample.

* - Due to rounding error.

One question we wish to address is whether a person's preference for a plan alternative is influenced by whether a family member or a close friend ever worked at the Nuclear Fuel Services facility. Table 7 indicates that those who report that either a relative or a friend had worked at the plant were less likely to favor removal of the plant and restoration of the area than those who report that a relative or a friend had not worked at the plant. Among the respondents who never knew anyone employed at the facility, 57 percent favor the removal of the plant. Of those who knew someone who had worked at the plant, 44 percent favor the removal of the plant. About one-third of those who knew someone who had worked at the plant prefer reactivating the plant. In contrast, only 19 percent who never knew anyone employed at the facility prefer reactivating the plant. Table 7 shows that West Valley area residents who never had either a

TABLE 7

Whether Any Members of Respondents' Family
or Close Friends Ever Worked
at the Plant by Position on Plan Alternatives

<u>Plan Alternatives</u>	<u>Whether Any Members of Respondents' Family or Close Friends Ever Worked at the Plant</u>	
	<u>Yes</u>	<u>No</u>
Resume active operations	34%	19%
Permanent nuclear waste storage facility	23	24
Remove the plant	44	57
Total Percent	101%*	100%
Total number of cases	48	261

* - Due to rounding error.

relative or a close friend work at the plant are more likely to favor removal of the facility and restoration of the area than those who had a relative or a friend work at the plant.

Perhaps knowing whether people are concerned about the Nuclear Fuel Services plant at West Valley can help explain people's preferences for the three plan alternatives. *According to Table 8, citizens who are concerned about the facility tend to favor removal of the plant and restoration of the area. Sixty-three percent who are concerned favor removal of the plant and restoration of the area while 42 percent who are not concerned do. Only 13 percent of all concerned citizens support reactivating the plant. In contrast, 35 percent of those not concerned about the facility prefer reactivating the plant. Table 8 demonstrates that those concerned about the plant are more likely to want to see the plant removed and the area restored than those who are not concerned about it.*

Respondents who had heard or read about the Nuclear Fuel Services plant at West Valley were asked the following question:

"Do you think that the Nuclear Fuel Services plant at West Valley employed enough people to significantly help the economy of the area?"

TABLE 8

Concern About the Nuclear Fuel Services
Plant at West Valley by Position on
Plan Alternatives

<u>Plan Alternatives</u>	<u>Concern</u>	
	<u>Yes</u>	<u>No</u>
Resume active operations	13%	35%
Permanent nuclear waste storage facility	25	23
Remove the plant	63	42
Total Percent	101%*	100%
Total number of cases	106	182

* - Due to rounding error.

Table 9 reveals people's responses to this question by their support for the three plan alternatives. *Needless to say, the results are quite striking; nearly three-fourths of West Valley area residents who believe that the plant did not employ enough people to significantly help the economy of the region favor removal of the facility and restoration of the area.* In contrast, only 18 percent of those who feel that the facility employed enough people to help the area's economy prefer this alternative. Most people who think that the plant employed enough people to aid the region's economy are evenly split in their support for reactivating the plant and making the plant a permanent nuclear waste storage facility. *Note that Robert Danziger's report on the "Socio-Economic and Demographic Profile of West Valley, New York Area" found that the operation of the Nuclear Fuel Services facility had almost no economic impact on the region. In the survey, 65 percent of those who are aware of the existence of the plant agree with Danziger's assessment.* As more people learn this fact support for the removal of the plant and the restoration of the area is likely to increase.

Additional relationships between people's preferences of the plan alternatives and other variables surfaced during the course of the analysis. Citizens who are specifically concerned about the contamination of the workers at the plant and the health dangers due to possible contamination of the environment tend to favor removal of the plant at West Valley and restoration of the area.

TABLE 9

Whether Respondents Believe That the Plant Employed
Enough People to Significantly Help the Economy
of the Area by Position on Plan Alternatives

<u>Plan Alternatives</u>	<u>Economic Impact of Plant on Area</u>	
	<u>Yes</u>	<u>No</u>
Resume active operations	40%	12%
Permanent nuclear waste storage facility	42	15
Remove the plant	18	73
Total Percent	100%	100%
Total Number of Cases	60	128

Housewives, and to a lesser extent single females, also tend to prefer this alternative. No relationships were found between class, marital status, age, education, income, occupation, employment status, and level of knowledge, and people's preferences for the three plan alternatives. *In summary, it appears that support for the various alternatives comes from many sectors of the population, and that perceived economic impact of the plant on the region is an important explanatory variable.*

IX. Summary

A number of major findings have emerged from this analysis. Although most people have heard or read about the Nuclear Fuel Services plant at West Valley, few exhibit a high level of knowledge about the issue area. A clear majority of residents living in the region are concerned about the presense of the facility. Many are particularly concerned about the health dangers that can result from radioactive contamination of the environment. People want to see something done about the facility, but do not know exactly what. When forced to choose one out of three possible alternatives, twice as many people preferred to "completely remove the plant and restore the area" than either of the two remaining alternatives. People who are concerned about the facility tend to favor removal of the plant and restoration of the area. Finally, nearly three-fourths of West Valley area residents who believe that the plant did not employ enough people to significantly help the economy of the region favor removal of the facility and restoration of the area. Hopefully, the results of this study will help policymakers choose the most acceptable course of action.

NOTES

1. The Pearson Product-Moment Correlation is $-.35$, significant at the $.01$ level ($n = 355$).
2. Whether housewives have children may explain their high level of awareness and their concern. Housewives with children may be more sensitive to the presence of the plant because of the potential, long run dangers the plant may pose. Unfortunately, we did not ask respondents whether they have children.

APPENDIX A

WEST VALLEY QUESTIONNAIRE

12. Have you heard or read about the Nuclear Fuel Service plant at West Valley?

- 1. NO [GO TO 15 AND DEMOGRAPHIC QUESTIONS]
- 2. YES [GO TO 13]
- 8. NO ANSWER, D. K. [GO TO 15 AND DEMOGRAPHIC QUESTIONS]

☐

29

13. (IF YES) Would you say you have hear or read

- 1. only a little
- 2. a moderate amount, or
- 3. quite a lot?
- 8. CAN'T REMEMBER
- 9. INAPP

☐

30

14. (IF YES TO #12) What was the plant built to do? (PROBE) Anything else?

A. RESPONDENT SAYS DON'T KNOW TO QUESTION 14

- 1. DON'T KNOW
- 9. INAPP

☐

31

B. PROCESS AND/OR RECYCLE NUCLEAR FUELS

- 1. NOT MENTIONED
- 2. MENTIONED
- 9. INAPP

☐

32

C. STORE NUCLEAR WASTES

- 1. NOT MENTIONED
- 2. MENTIONED
- 9. INAPP

☐

33

D. OTHER MENTIONS (WRITE THEM DOWN)

- 1. NOT MENTIONED
- 2. MENTIONED
- 9. INAPP

☐

34

-21-
APPENDIX A

15. What is nuclear or atomic energy used for? (PROBE) Anything else?

A. RESPONDENT SAYS DON'T KNOW TO QUESTION 15.

1. D. K.

9. INAPP

☐
35

B. GENERATE ELECTRICITY

1. NOT MENTIONED

2. MENTIONED

9. INAPP

☐
36

C. MILITARY PURPOSES (BOMBS, DEFENSE, ETC.)

1. NOT MENTIONED

2. MENTIONED

9. INAPP

☐
37

D. TO PROPEL VEHICLES (SUBMARINES, SATELLITES, ROCKETS)

1. NOT MENTIONED

2. MENTIONED

9. INAPP

☐
38

E. USE IN RESEARCH (MEDICAL RESEARCH, ENGINEERING, ETC.)

1. NOT MENTIONED

2. MENTIONED

9. INAPP

☐
39

F. MEDICAL TREATMENT

1. NOT MENTIONED

2. MENTIONED

9. INAPP

☐
40

G. OTHER MENTIONS (WRITE THEM DOWN)

1. NOT MENTIONED

2. MENTIONED

9. INAPP

☐
41

[IF R HAD NOT HEARD OF WEST VALLEY PLANT, SKIP TO #23]

16. (ASK ONLY IF RESPONDENT HAS HEARD OF NFS PLANT) Are you concerned in any way about the Nuclear Fuel Services Plant at West Valley?

1. NO [SKIP TO 18]
2. YES [GO TO 17]
8. NO ANSWER, D.K. [SKIP TO 18]
9. INAPP

☐
42

17. (IF YES) What are you concerned about? (PROBE) Anything else?

A. RADIOACTIVE CONTAMINATION OF WORKERS

1. NOT MENTIONED
2. MENTIONED
9. INAPP

☐
43

B. CONTAMINATION OF THE ENVIRONMENT (AIR AND/OR WATER POLLUTION)

1. NOT MENTIONED
2. MENTIONED
9. INAPP

☐
44

C. COSTS OF WASTE STORAGE

1. NOT MENTIONED
2. MENTIONED
9. INAPP

☐
45

D. SECURITY REASONS (THEFT OR VANDALISM)

1. NOT MENTIONED
2. MENTIONED
9. INAPP

☐
46

E. JOBS OR OTHER ECONOMIC OPPORTUNITIES (LOSS OR GAIN)

1. NOT MENTIONED
2. MENTIONED
9. INAPP

☐
47

F. TAXES (LOSS OR GAIN)

1. NOT MENTIONED
2. MENTIONED
9. INAPP

☐
48

G. OTHER MENTIONS (WRITE THEM DOWN)

1. NOT MENTIONED
2. MENTIONED
9. INAPP

☐
49

18. What do you think should be done about the Nuclear Fuel Services Plant at West Valley?

A. RESPONDENT SAYS DON'T KNOW TO QUESTION 18

1. DON'T KNOW

9. INAPP

☐
50

B. DO NOTHING. LEAVE IT AS IT IS NOW AS A WASTE FUEL STORAGE FACILITY FOR THE TIME BEING.

1. NOT MENTIONED

2. MENTIONED

9. INAPP

☐
51

C. RESUME ACTIVE OPERATIONS AS BEFORE IT CLOSED

1. NOT MENTIONED

2. MENTIONED

9. INAPP

☐
52

D. MAKE IT INTO A PERMANENT WASTE FUEL REPOSITORY

1. NOT MENTIONED

2. MENTIONED

9. INAPP

☐
53

E. COMPLETELY REMOVE THE PLANT AND RESTORE THE AREA

1. NOT MENTIONED

2. MENTIONED

9. INAPP

☐
54

F. OTHER MENTIONS (WRITE THEM DOWN)

1. NOT MENTIONED

2. MENTIONED

9. INAPP

☐
55

19. Three alternatives have been proposed for dealing with the Nuclear Fuel Services plant. Which of the following proposed solutions do you most strongly prefer?

1. Resume active operations as before it closed.
2. Make it into a permanent nuclear waste storage and fuel reprocessing facility.
3. Completely remove the plant and restore the area.

Which do you choose?

8. D. K.
9. INAPP

56

20. Do you think that the Nuclear Fuel Services plant at West Valley employed enough people to significantly help the economy of the area?

1. NO
2. YES
8. DON'T KNOW
9. INAPP

57

21. Have you ever worked at the Nuclear Fuel Services plant at West Valley?

1. YES
2. NO
9. INAPP

58

22. Have any members of your family or close friends ever worked at the Nuclear Fuel Services plant at West Valley?

1. YES
2. NO
8. NOT SURE, D. K.
9. INAPP

59

23. Now I'd like to ask you a few background questions for classification purposes. First, which of the following best describes your current employment situation

1. employed full-time
2. employed part-time
3. temporarily laid off
4. not employed, and looking for work
5. not employed, and not looking for work
8. DON'T KNOW, NO ANSWER

60

24. What (is your present/was your most recent) occupation? PROBE FOR SPECIFIC INFORMATION, E.G., JOB TITLE, KIND OF WORK)

0. NONE	7. LABORERS (UNSKILLED)	14. RETIRED
1. PROFESSIONAL	8. FARMERS OR FARMWORKERS	98. DON'T KNOW, NO ANSWER
2. MANAGER/ADMINISTRATOR	9. SERVICE WORKER	
3. SALES WORKER	10. TECHNICIAN	
4. CLERICAL WORKER	11. STUDENT	
5. CRAFTSMAN	12. OTHER	
6. LABORERS (SKILLED)	13. HOUSEWIFE	

61 - 62	

25. What is the name of the city or town which you live in?

63 - 64	

26. Approximately how far do you live from West Valley?

_____ miles

97 OR MORE MILES

98. D. K.

65 - 66	

27. Are you

1. married,	5. have you never been married?
2. separated,	6. NOT MARRIED, BUT LIVING TOGETHER
3. divorced,	8. DON'T KNOW, NO ANSWER
4. widowed, or	

67

28. What year were you born? _____ year

98. DON'T KNOW, NO ANSWER

CODE ACTUAL AGE →

68 - 69	

29. How many years did you attend school? _____

98. D. K., NO ANSWER

70 - 71	

30. Would you please tell me your approximate household income in 1977. This should include all money received by all members of the household last year. (IF R CANNOT SAY FOR SURE, ASK FOR BEST GUESS) (IF R IS RELUCTANT TO DIVULGE, ASSURE HIM THE INFORMATION IS CONFIDENTIAL AND WE ONLY NEED IT IN CATEGORIES)

01 (UNDER \$3,000)	08 (\$12,000 - \$14,999)
02 (\$ 3,000 - \$ 3,999)	09 (\$15,000 - \$19,999)
03 (\$ 4,000 - \$ 4,999)	10 (\$20,000 - \$24,999)
04 (\$ 5,000 - \$ 5,999)	11 (\$25,000 - \$29,999)
05 (\$ 6,000 - \$ 7,999)	12 (\$30,000 - \$34,999)
06 (\$ 8,000 - \$ 9,999)	13 (\$35,000 - \$49,999)
07 (\$10,000 - \$11,999)	14 (\$50,000 - OVER)

97 REFUSED

98 DON'T KNOW, NO ANSWER

72-73

CODE:

1. MALE
2. FEMALE
8. NOT ASCERTAINED

--

APPENDIX B

The Waksberg Sampling Method: Rationale

A recent development in sampling for telephone interviewing is the Waksberg method. This method is a modification of the simple, one-stage random digit dial (RDD) procedure. With the one-stage RDD method, a sample of telephone numbers is randomly generated from all the 3-digit prefixes (exchange numbers) assigned in a geographic area of interest. A serious drawback of the one-stage RDD procedure is that, commonly, less than 20% of all possible phone numbers are assigned to households, so that, for any given sample, 80% or more of the numbers which have been selected are unassigned, non-residential, etc., and, therefore, ineligible for survey purposes. The Waksberg method was developed to reduce the number of calls made to ineligible numbers, and, thereby, substantially reduce survey costs.

The method is based on the following considerations: telephone numbers of a given category of use (for example, residential, non-residential, unassigned) tend to occur in clusters or blocks of consecutive numbers. By selecting a first stage sample of blocks or clusters of numbers, (rather than individual numbers, as is done with a simple, one-stage RDD sample) a considerable reduction in the number of attempts which are necessary to reach a given number of residential units may be achieved. The reduction in attempts results from the immediate elimination of entire clusters of numbers in which the first assigned number turns out to be a non-residential or a non-working number, that is, those clusters which are likely to have a large proportion of non-residential or non-working numbers within them. Clusters in which the first assigned number is a residential number are retained in the sample, and individual numbers in those clusters are used until some pre-determined number of residences are reached. Conceivably, any cluster size could be used; however, it appears to be especially useful to set the cluster size at 100.

The Waksberg Sampling Method: Practical Application

Actual use of the Waksberg method is, perhaps, slightly more complex than use of the simple RDD method, and somewhat greater care and attention on the part of the interviewer are required in its application.

Materials

The sampling materials required for application of the Waksberg method differ somewhat from those used in simple RDD telephone work. These materials (not considering the survey instrument or the call record, which are standard) consist of:

- (1) the cluster assignment sheet; and
- (2) the individual assignment sheet/respondent selection key.

These are computer printed pages; each cluster assignment sheet is followed by eight individual assignment sheet/respondent selection key pages, since, in each eligible cluster, eight residential numbers will be attempted.

APPENDIX B

The cluster assignment sheet: this sheet, the first in the set that constitutes all the material needed to determine cluster and number eligibility, contains two triple-columns: the first column is the six-digit assignment number -- one associated with each phone number; the second is the phone number; and the third column contains abbreviations of the major assignment disposition categories. Each cluster consists of 100 telephone numbers. These numbers are not in ascending order -- they have been randomly ordered by computer on the page.

The individual assignment sheet/respondent selection key: these sheets contain, preceding the selection key grid, appropriate labels and space for recording:

- (1) The assignment number. All six digits are pre-printed on the first individual assignment sheet/respondent selection key page in a set, since this first page always corresponds to the first number in a cluster. On the remaining pages (2 through 8), only the first four digits are pre-printed on the computer printout sheet. For eligible numbers within a retained cluster, the interviewer must record the final two digits, and these final two must be those of the assignment number associated with the telephone number which has been identified as a residential number.
- (2) The telephone number itself. The first page contains all seven digits of the first telephone number; subsequent pages lack the final two digits as in the case of the assignment number. When a cluster is retained and residential telephone numbers come up in it, the final two digits must be taken from the cluster assignment sheet and recorded on the appropriate individual assignment sheet/respondent selection key page.
- (3) The stratum. The stratum number is pre-printed and nothing need be done with it.
- (4) The disposition. The disposition entered here is the final disposition for an attempted, residential telephone number.
- (5) The interviewer to whom the assignment has been made.
- (6) The date of the assignment.
- (7) The date the assignment is returned to the office after having been pursued to a final disposition.
- (8) The respondent number. The respondent number will be assigned in the office after the assignment has been returned. The interviewer need do nothing with respondent number.

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This information is followed by a standard grid used for selecting an eligible respondent within an eligible household. Below the grid, toward the lower-right corner of the sheet, is a special form of pagination. The first individual assignment sheet/respondent selection key page in a set (of eight) is indicated "SHEET 1 (PRIMARY)", and the remaining seven in a set are indicated "SHEET 2", "SHEET 3", etc., through "SHEET 8." "SHEET 1 (PRIMARY)" is referred to as "primary" since it is to be used for the first telephone number which will determine whether the entire cluster is rejected (non-residential or non-working) or retained (residential or presumed residential) in the sample.

Procedure

A step-by-step outline of the exact procedure to be employed by the interviewer in implementing the Waksberg method follows.

- (1) Place a call to the first telephone number on the cluster assignment sheet.
- (2) If the number is a non-residential one (for example, an institution, a commercial/business establishment) or a non-working one, fill in the required information (that is, the final disposition) on the first individual assignment sheet/respondent selection key ("SHEET 1 (PRIMARY)") and the "current disposition" on the cluster assignment sheet. Then set the cluster aside -- do not make any further attempts using telephone numbers in the cluster.
- (3) If the number is a residential one, proceed as usual with the interview. When the first telephone number is residential, continue working down the list of numbers on the cluster assignment sheet until eight (8) residences have been contacted, regardless of the final disposition of particular residential contacts. Record the "current disposition" on the cluster assignment sheet for each telephone number attempted, and use one of the eight (8) individual assignment sheet/respondent selection key pages for each residential number used from the cluster. Note that, after having attempted eight telephone numbers from a retained cluster, a ninth may be attempted only when one of the eight is determined to be out-of-sample. More generally, a new number may be substituted for one preceding it only when a final disposition of "out-of-sample" is achieved, and any numbers with a "pending" disposition must be temporarily assumed to be residential. In addition to recording the current disposition for the first attempt at each telephone number, the final disposition of the number should be recorded on the cluster assignment sheet by circling the appropriate disposition. Doing so will serve as a running record of when substitutions should be (and are) made and will assure that no more than eight known or presumed residential numbers are being worked with at any given time.

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- (4) Steps (2) and (3) assume that the first call on a number will be successful, so that a clear determination whether to reject or retain a cluster can be made. There will be cases when the initial call (and perhaps subsequent calls) to the first telephone number in a cluster will be non-productive, that is, will result in a "no answer" or "busy signal." In such cases, additional calls (suitably spaced) must be made to the first number (and to no other in the cluster) until a result is achieved which permits rejection or retention of the cluster. In the event the maximum, permissible number of calls is made and a disposition of "no answer" or "busy signal" still obtains, the interviewer should call the operator and ask if the number is in service, and, if so, whether or not it is a public pay phone. If it is in service but not a pay phone, assume it is a residential number, retain the cluster, and proceed to work with it as with any retained cluster. If the operator says it is not in service, or, if in service, it is a pay phone, then it is an out-of-sample number, and, therefore, the cluster is rejected and treated as is any other rejected cluster.
- (5) After having determined that a given cluster should be retained, as many as seven (7) additional telephone numbers may be started without any being clearly identified as "residential," or "out-of-sample," that is, all may have a current disposition of "pending." As these numbers are further attempted, the residential ones among them are not likely to be identified as such in the order in which they occur down the cluster assignment sheet page. The individual assignment sheet/respondent selection key pages should be used in the order of their pagination; that is, start always with "SHEET 1 (PRIMARY)," of course, use "SHEET 2" for the second residential number which is encountered, regardless of its position on the cluster assignment sheet, "SHEET 3" for the third residential number, and so on. On the cluster assignment sheet, just to the right of the set of disposition abbreviations, record the page number of the individual assignment sheet/respondent selection key which was used for each residential number.