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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

January 25, 1978

Docket Numbers 50-438  
and 50-439

Tennessee Valley Authority  
Attn: Godwin Williams, Jr.  
Manager of Power  
830 Power Building  
Chattanooga, Tennessee 37401

Dear Mr. Williams:

The U. S. Nuclear Regulatory Commission, (NRC), Office of Nuclear Regulatory Research, has contracted with the Battelle Pacific Northwest Laboratories (PNL) to undertake a study of construction workers. An important feature of the study's design is a worker survey which is to be undertaken for a sample of four nuclear station construction sites. Bellefonte Nuclear Plant Units 1 & 2 is included in the initial list. The final selection of construction sites and completion of the worker survey will require the cooperation of the appropriate utility. I would like to solicit your cooperation in this study.

The basic purpose of the PNL study is the improvement in techniques used to estimate the impacts of migrating construction workers on communities. NRC is sponsoring this research effort because it will (1) improve the quality of socioeconomic forecasts, (2) provide useful information to the industry and local officials, and (3) result in early resolution of questions concerning socioeconomic-related impacts. I believe that all parties involved in the licensing of a nuclear station will benefit from this research project.

Initially, the PNL team would meet with appropriate members of your staff to discuss overall study objectives, seek guidance on survey mechanics, and assess the pros and cons of using Bellefonte Nuclear Plant Units 1 & 2 as one of the construction sites. Final selection of construction sites will depend upon the ability to collect data compatible with minimal effort from you and your contractors and your desire to continue with the study. Once the final selection of construction sites is made it is anticipated that further assistance would only require encouragement of your contractors to cooperate with the research team. I believe your assistance will not require over two to three mandays of your staff's time.

Mr. Godwin Williams, Jr.

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I have enclosed a draft of PNL's questionnaire which should give you an indication of the objectives and scope of the study. Although Tennessee Valley Authority's cooperation in this effort should advance the state-of-the-art, I want to emphasize that your participation is purely optional. If you should desire additional information about the proposed PNL study, please call B. J. Youngblood on 301-492-7161.

I look forward to a response at your earliest convenience and hope that you will be able to participate in our study.

Sincerely,



Harold R. Denton, Director  
Division of Site Safety and  
Environmental Analysis  
Office of Nuclear Reactor Regulation

Enclosure:  
As Stated

cc: Herbert S. Sanger, Jr., Esq.  
General Counsel  
Tennessee Valley Authority  
400 Commerce Avenue, E11333  
Knoxville, Tennessee 37902

## PRELIMINARY

### HYPOTHESES BEHIND QUESTIONNAIRE DEVELOPMENT

#### Introduction

Of primary importance in determining the impact of nuclear power plant construction upon the surrounding area is the number of nonlocal workers that will be necessary for project completion. A worker is considered to be nonlocal, for the purposes of this research, if the worker belongs to either of two groups: (a) workers who migrate to the area in order to accept employment at the construction site, or (b) workers who commute long distances to work at the site (the determination of the exact distance will be made at a later date).

Migrant workers are further divided into three groups on the basis of their intention to remain working in the area. These groups are defined as follows:

- (a) Transient migrant workers are defined to be those workers who look for work of short duration during periods of high unemployment in another region. These workers intend to leave the area irrespective of the availability of continued employment at the nuclear power plant construction site.
- (b) Temporary migrant workers are defined to be those workers who intend to work at the site (or in the region) only for the duration of the power plant construction project.
- (c) Long-term migrant workers are defined to be those workers who intend to work in the area beyond the completion of the project.

The main impacts imposed upon a community by a nuclear power plant construction project stem from local purchases and public service demands of the construction labor force required for the project. The precise nature of these impacts depends upon factors such as the number of nonlocal workers required for construction, the size and household composition of the migrant labor force employed on the project, and the residential location decisions of migrant workers.

The hypotheses enumerated below address the factors that influence these impacts. In particular, hypotheses are formulated regarding the total number of nonlocal workers required for the project, the number and characteristics of migrants, the relocation of dependents, and migrants' intentions to remain in the area. Likewise, with respect to the residential location decisions, hypotheses have been formulated regarding the types of housing selected, the decision to own or rent, and the locational characteristics of the residences. These hypotheses, which are based on a review of both the theoretical and the case-study literature, will be used to identify the information to be obtained in the construction worker survey.

#### Hypotheses

##### I. What proportion of the construction workforce will be comprised of nonlocal workers?

The prime factor in determining the social and economic impacts of the construction of nuclear power plants is the number of nonlocal workers who will be required for the project. The proportion of nonlocal workers in the construction workforce is expected to vary by craft. For each craft, the percentage of nonlocal workers in the construction workforce is hypothesized to be:

- (a) positively related to the number of workers required for construction of the project;
- (b) negatively related to the unemployment rate/number of unemployed workers in the area;
- (c) positively related to the unemployment rate/number of unemployed workers in surrounding regions;
- (d) related to union referral and hiring practices (e.g., means employed by union business agents to obtain out-of-area workers);
- (e) positively related to the extent of the health and welfare benefit reciprocity arrangements that the construction locals have with out-of-area locals; and
- (d) negatively related to the size of the resident population of the region;

The proportion of these nonlocal workers who will migrate to the area is expected to be related to a number of regional characteristics. The proportion of the nonlocal workforce who will migrate to the area is hypothesized to be:

- (g) positively related to availability of housing of the area;
- (h) positively related to community attractiveness in the region (e.g., schools, utilities, public services); and
- (i) positively related to the previous rate of immigration to the area.

Similarly, the number of long distance commuters, as a percentage of the nonlocal workforce, is hypothesized to be:

- (j) negatively related to the availability of housing in the area;
- (k) negatively related to community attractiveness in the region; and
- (l) positively related to transportation allowances offered by unions.

II. What will be the socioeconomic and demographic characteristics of the migrant workers?

The migrant workforce is likely to differ from the local non-migrant workforce. A comparison of migrant and non-migrant workers by craft is expected to reveal differences with respect to:

- (a) age - migrant workers are likely to be younger than non-migrants;
- (b) marital status - migrant workers are less likely to be married than non-migrants;
- (c) family size - migrant workers are likely to have smaller families than non-migrants;
- (d) union seniority - migrant workers are likely to have lower union seniority than non-migrants;
- (e) income - migrant workers are likely to have a higher income than non-migrants;
- (f) education - migrant workers are likely to be more educated than non-migrants; and
- (g) craft - migrant workers are likely to have more specialized craft skills than non-migrants.

Furthermore, migrant workers are likely to differ from long-distance commuters. Profiles of migrants and long-distance commuters are likely to vary along the following dimensions:

- (h) marital status - migrant workers are less likely to be married than long-distance commuters;
- (i) family size - migrant workers are likely to have smaller families than long-distance commuters; and
- (j) spouse employment - migrant workers are less likely to have the spouse employed than are long-distance commuters.

With these and succeeding hypotheses, we expect that the strength of the relationships will vary by migrant status; e.g., transient, temporary, or long-term.

### III. How long will the migrant worker stay in the area?

The length of time that migrants will remain in the construction site region greatly influences the impact of nuclear power plant construction on the surrounding area. A migrant's intention to remain in the area will depend upon several factors, many of which are the same as those which influenced the initial migration decision. These factors can be divided into two groups - regional characteristics and individual characteristics.

#### Regional Characteristics

Intention to remain in the area is hypothesized to be:

- (a) positively related to employment opportunities in the area (e.g., expected duration of the project, other employment opportunities in the area both during and after power plant construction);
- (b) positively related to the availability of housing;
- (c) positively related to community attractiveness in the region, (e.g., schools, utilities, public services); and
- (d) positively related to employment opportunities for the spouse.

### Individual Characteristics

Intention to remain in the area is hypothesized to be:

- (e) positively related to age and experience in the craft;
- (f) positively related to seniority in the union;
- (g) related to marital status;
- (h) positively related to family size; and
- (i) negatively related to prior migration frequency.

#### IV. What proportion of migrants will relocate their families?

For the subset of migrants with dependents, the decision to relocate dependents indicates a commitment to the new community of residence. It is a major importance in determining community impacts of construction. The migrant's decision to relocate his family is hypothesized to be:

- (a) positively related to family income;
- (b) positively related to community attractiveness; (e.g., schooling, utilities, public services);
- (c) positively related to housing availability;
- (d) positively related to the availability of employment for the spouse; and
- (e) positively related to the migrant's intention to remain in the local area.

#### V. What type of housing will migrants select?

The sudden influx of a large number of construction workers into the communities surrounding the construction site will create a considerable demand for housing in the region. The residential choice of migrant construction workers will be jointly determined by housing availability and by housing demand.

With respect to housing availability, it may be hypothesized that:

- (a) the choice of housing will be constrained by the housing availability (e.g., mobile home occupancy is expected to be negatively related to the availability of other housing types in the region);
- (b) migrants are likely to pay more than non-migrants and long-distance commuters for the equivalent housing; and
- (c) residential choice will be related to collectively negotiated arrangements for temporary housing.

With respect to housing demand, it may be hypothesized that the type of housing selected will be related to migrant characteristics and migrant status in the following ways:

- (d) migrants with higher incomes are likely to seek single family housing;
- (e) long-term migrants are likely to seek single family housing;
- (f) transient migrants are more likely to seek temporary housing (e.g., mobile homes, hotels/motels, rooming houses, or apartments); and
- (g) temporary and transient migrants are likely to seek combined living arrangements with other unrelated individuals.

Household size and composition will also influence the demand for housing. Household size is hypothesized to affect residential choice in the following ways:

- (h) the choice of single family housing expected to be related to the relocation of dependents; and
- (i) housing size is expected to be positively related to family size.

#### VI. Will migrants choose to own or rent their homes?

The second element of residential choice involves home ownership. Home ownership is also constrained by housing availability. Given an existing housing supply, it may be hypothesized that:

- (a) home ownership is expected to be lower for migrants than for non-migrants; and
- (b) home ownership is expected to be lower for migrants than long-distance commuters.

Ownership of current residence will also be related to a number of individual characteristics of the migrants. Ownership of current residence is hypothesized to be:

- (c) positively associated with relocation of dependents;
- (d) positively related to family income;
- (e) related to marital status;
- (f) positively associated with ownership of prior residence; and
- (g) positively associated with the intention to remain in the area.

VII. Where will migrants choose to live?

Location of the migrants' residences will be constrained by the location of vacant housing units. Given the supply of housing, various personal characteristics of the migrants will influence their choice of residential location. In general, residential location (measured with respect to distance from the construction site) is hypothesized to be:

- (a) positively related to intention to remain in the area, (e.g., it is expected that transient migrants will reside closer to the construction site than will long-term migrants);
- (b) positively related to family size;
- (c) associated with family income;
- (d) positively related to ownership of current residence; and
- (e) related to transportation allowances offered by unions.

A number of site characteristics will also influence a migrant's residential location decision. These site characteristics are the characteristics of the dwelling and the area immediately surrounding the residence. It is hypothesized that residential choice of migrants will be related to:

- (f) the urban or rural setting of the housing;
- (g) the quality of schools in the neighborhood;
- (h) the adequacy of fire and police protection;
- (i) the availability and quality of public utilities; and
- (j) other community and neighborhood characteristics.

A migrant's residential location decision will also be influenced by the broader situation characteristics of a location. Situation characteristics describe a location in relation to other places in the region (i.e., accessibility). It is hypothesized that residential location will be related to:

- (k) proximity to urban areas;
- (l) accessibility to consumption opportunities;
- (m) availability of recreational opportunities; and
- (n) accessibility to public transportation.

The Battelle Human Affairs Research Centers, Seattle, Washington, are conducting a study sponsored by the Nuclear Regulatory Commission at four nuclear power plant sites around the U.S. The results of the study will be used to more accurately estimate the possible impacts of power plant construction on neighboring communities. It should benefit future power plant construction workers by enabling towns and communities to prepare for the incoming workers.

All workers at each of the four sites are being asked to complete this questionnaire to help determine how workers decide to move to new job locations and how they choose housing. Whether you recently moved here or not, we need your help in answering these questions. The questions will take less than 15 minutes of your time to complete.

Your participation in this study is voluntary, though we strongly encourage you to take it. The information you provide will be treated as confidential and will not be associated with your name. Data will be reported by groups, not by individuals. Your employer will not be told who has participated. If you have questions about the study or the questionnaire, there is a Battelle representative available on site to talk with you.

QUESTIONNAIRE

PLEASE FILL IN THE BLANK OR CHECK THE BOX BESIDE THE BEST ANSWER(S) FOR YOU. ANSWER EACH QUESTION, SKIPPING ONLY THOSE WHERE THERE IS AN INSTRUCTION TO DO SO.

1. What is your occupation? Please check the one box which best describes your job.
- |   |  |                          |
|---|--|--------------------------|
| Bricklayer . . . <input type="checkbox"/> 01    | Ironworker . . . . . <input type="checkbox"/> 08   | Pipefitter . . . . .     |
| Boilermaker . . . <input type="checkbox"/> 02   | Laborer . . . . . <input type="checkbox"/> 09      | Plumber . . . . .        |
| Carpenter . . . . <input type="checkbox"/> 03   | Management . . . . . <input type="checkbox"/> 10   | Secretary/clerical       |
| Cement mason . . . <input type="checkbox"/> 04  | Medical personnel . . <input type="checkbox"/> 11  | Security . . . . .       |
| Electrician . . . . <input type="checkbox"/> 05 | Millwright . . . . . <input type="checkbox"/> 12   | Teamster . . . . .       |
| Engineer . . . . . <input type="checkbox"/> 06  | Operating engineer . . <input type="checkbox"/> 13 | Welder . . . . .         |
| Insulator . . . . . <input type="checkbox"/> 07 | Painter . . . . . <input type="checkbox"/> 14      | Other (describe: _____ ) |

2. Where do you live during the work week?

\_\_\_\_\_

(street address) (city or town) (state) (zip)

3. Did you move to this residence because of your job at this site? Yes . . . . .

No. . . . .

IF NO, GO TO QUESTION 5

4. Where did you live before this job?

\_\_\_\_\_

(city or town) (state) (zip)

5. Do you live somewhere different when you are off work (for example, on weekends, days off, etc.) Yes . . . . .

No. . . . .

6. How many times have you made a job-related change of residence in the past 5 years?

(times)

7. Do you plan to remain in this town or immediate area at least as long as acceptable employment is available at this job site?

Yes . . . . .

No. . . . .

8. Do you plan to remain in this town or immediate area beyond completion of this project if acceptable employment is available here?

Yes . . . . .

No. . . . .

9. Are you a member of a union?

Yes . . . . .

No. . . . .

**IF NO, GO TO QUESTION 12**

10. Were you referred to this job or told about it by the business representative of this local or your previous union local?

Yes . . . . .

No. . . . .

11. How long (in months and years) have you been a member of the union local with jurisdiction over this project? (Place a "0" in the blank if you have not transferred your membership to this local.)

/ (months)

12. Which one of the following best describes the residence where you live during the work week?

Single family-owned. . . . .

Single family-rented . . . . .

Apartment or duplex-owned. . . . .

Apartment or duplex-rented . . . . .

Hotel/motel. . . . .

Mobile home. . . . .

Rooming house. . . . .

Project provided housing . . . . .

Other (describe: \_\_\_\_\_)

13. How many bedrooms does this residence have?

(bedrooms)

14. How much do you pay each month for this residence in rent or mortgage? (If you own your residence free and clear, please write "0" in the blank.)

\$ (per month)

15. Did you own the residence that you lived in prior to this one?

Yes . . . . .

No. . . . .

16. How do you most often get to work?

Drive alone . . . . .

Drive in union or project arranged carpool or vanpool

Drive in personally arranged carpool. . . . .

Other (describe: \_\_\_\_\_)

17. About how long (in minutes) does it take you to get to work, from the time you leave your door until you arrive at the job-site?

(minutes)

18. How satisfied are you with this town as a place to live? Please check one box in each row.

Very Satisfied	Somewhat Satisfied	Somewhat Dissatisfied	Very Dissatisfied	Not Imp.
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- a. Availability of things I need/want to buy . . .  1  2  3  4  7
- b. Entertainment opportunities . . . . .  1  2  3  4  7
- c. Public schools. . . . .  1  2  3  4  7
- d. Roads to the job site . . . . .  1  2  3  4  7
- e. Public transportation . . . . .  1  2  3  4  7
- f. Police and fire protection. . . . .  1  2  3  4  7
- g. Public recreation facilities. . . . .  1  2  3  4  7
- h. Overall community "attractiveness". . . . .  1  2  3  4  7

19. What is your marital status?

- Married, living with spouse . . . . .
- Married, spouse absent. . . . .
- Separated, widowed, divorced, or single . . . . .

IF NOT CURRENTLY MARRIED, GO TO QUESTION 22

20. Is your spouse currently employed?

- Yes . . . . .
- No. . . . .

IF YES, GO TO QUESTION 22

21. Is your spouse looking for work?

- Yes . . . . .
- No. . . . .

22. How many dependents (excluding spouse) do you have in each of the age groups below? Place a number, "0" if appropriate, in each blank. Do not include adult children who are no longer dependents.

- a. 0-4 years . .
- b. 5-12 years. .
- c. 13-18 years .
- d. Over 18 years

23. With whom do you live during the work week?

- Live alone . . . . .
- Roommate(s) . . . . .
- Spouse or dependents . . . . .
- Other family . . . . .
- Other (describe: \_\_\_\_\_)

IF LIVING WITH SPOUSE OR DEPENDENTS, GO TO QUESTION 25

24. Do you intend to relocate your family (dependents) here?

- No. . . . .
- Yes . . . . .
- Have no dependents. . . . .

25. What is your total annual family income (before taxes) from all sources?  
Check the box beside the category which best describes your income.

- |  |  |
|--|--|
| Less than \$10,000 . . . <input type="checkbox"/> 1  | \$16,000 - \$17,999 . . . <input type="checkbox"/> 5 |
| \$10,000 - \$11,999 . . . <input type="checkbox"/> 2 | \$18,000 - \$19,999 . . . <input type="checkbox"/> 6 |
| \$12,000 - \$13,999 . . . <input type="checkbox"/> 3 | \$20,000 - \$25,000 . . . <input type="checkbox"/> 7 |
| \$14,000 - \$15,999 . . . <input type="checkbox"/> 4 | \$26,000 or more . . . . <input type="checkbox"/> 8  |

26. How old were you on your last birthday?

\_\_\_\_\_ (year)

27. What is your sex?

- Male. . . . .
- Female. . . . .

28. How many years of formal schooling have you completed?

\_\_\_\_\_ (year)

THANK YOU FOR YOUR HELP. YOU HAVE COMPLETED THE QUESTIONNAIRE.  
PLEASE CHECK THAT YOU HAVE CHECKED A BOX OR FILLED IN THE BLANK FOR EVERY QUESTION.