50-390

APPLICANT: Tennessee Valley Authority (TVA) November 3, 1995

FACILITY: Watts Bar Nuclear Plant

SUBJECT: MEETING SUMMARY - MEETING WITH MEMBERS OF THE PUBLIC REGARDING WATTS BAR NUCLEAR PLANT (TAC M72494)

REFERENCE: Meeting notice by P. S. Tam, August 18, 1995

See Reports

On September 5, 1995, NRC met with members of the public at the Quality Inn, Sweetwater, Tennessee. As stated in the meeting notice, the purpose was to give members of the public an opportunity to raise comments or issues associated with Watts Bar Nuclear Plant. Enclosure 1 is a complete list of NRC participants, and a partial list of members of the public.

The meeting sessions lasted from 2:00 p.m. to 5:30 p.m., and 6:30 p.m. to 10:45 p.m. The staff gave a short introduction regarding the past history of Watts Bar and current status. Then the staff called upon participants by name, in order of the sign-up sheet, to provide comments or issues. A court reporter transcribed the verbal exchange of the entire meeting. The transcript is Enclosure 2 and is the official record of the meeting. Written documents were provided by some members of the public (Enclosures 4 - 18); where available, the providers are identified. Some documents were left in the meeting room with no identification of the providers.

The staff is evaluating verbal and written statements made by members of the public for potential allegations under the NRC's allegation handling procedure. The resolution of allegations is, thus, not part of this meeting summary.

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Original signed by F. Hebdon for

Thomas V. Wambach, Senior Project Manager
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures: See next page

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w/ ENCLOSURE 3

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 3, 1995

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FACILITY: Watts Bar Nuclear Plant

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Frederick J. Hebdon

FOR Thomas V. Wambach, Senior Project Manager
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures: See next page

Enclosures:
1. Participants list
2. Transcript of meeting
3. The staff's response, or revised/supplemented response
4. Statement by Myer (Mike) Bender
5. "An Overview of the TVA Employee Concerns Special Program," by Myer (Mike) Bender
6. TVA IRP (Integrated Resource Plan) Fact Sheet
7. Letter, Mansour Guity to A. Ignatonis (NRC), 9/5/95
8. Note, Ruth and Bob Peeples to TVA Vision Program, 9/95
9. Undated letter, C. McRae Sharpe to editor
10. Questions by Ann Harris
11. Questions by Myles Jakubowski
12. Letter, Ralph M. Galt to TVA Board of Directors, 9/4/95
13. Questions by Beth Zilbert of Greenpeace
14. Questions by Gene Kelly of Greenpeace
15. Questions by Sherry Meddick, 9/5/95
16. Reprint from International Journal of Health Services, Volume 25, Number 2 (1995), Comments on "Cancer Mortality near Oak Ridge, Tennessee."
17. Notice of Public Meeting on Watts Bar, by Greenpeace
18. Petition (blank form) to Stop Watts Bar, by Greenpeace

cc w/Enclosures 1 and 3: See next page

# LIST OF PARTICIPANTS

## MEETING WITH MEMBERS OF THE PUBLIC REGARDING WATTS BAR UNIT 1

## QUALITY INN, SWEETWATER, TENNESSEE

## September 5, 1995

| NRC Participants | Organization |
|---|---|
| Bill Bearden | NRC Region II |
| Steve Cahill | NRC, Resident Inspector at Watts Bar |
| Tom Foley | NRC, Office of Nuclear Reactor Regulation |
| Roger Hannah | NRC Region II |
| Frederick J. Hebdon | NRC, Office of Nuclear Reactor Regulation |
| Ann Hodgdon | NRC, Office of General Counsel |
| Johns Jaudon | NRC, Region II |
| Julio Lara | Resident Inspector at Watts Bar |
| Peter S. Tam | NRC, Office of Nuclear Reactor Regulation |
| Mohan Thadani | NRC, Office of Nuclear Reactor Regulation |
| Glenn Tracy | NRC, Office of Executive Director of Operation |
| Peter (Kim) Van Doorn | Senior Resident Inspector at Watts Bar |
| Glenn Walton | Senior Resident Inspector at Watts Bar |
| James Wilson | NRC, Office of Nuclear Reactor Regulation |

| Members of Public | Organization |
|---|---|
| (In order of signing up. The staff estimated about 100 to 150 members of the public showed up, but only the following individuals signed up.) | |
| Steven Smith* | Foundation for Global Sustainability |
| Mansour Guity* | |
| Shirley Fry* | |
| Ted Besmann* | |
| John Gunning* | |
| Frank Bruce* | |
| Charles Barton* | |
| Myer (Mike) Bender* | |
| Joel Buchanan* | |
| Arthur Fraas* | |
| Donald Drauger* | |
| George Gillilan | (Identified in transcript as Mr. Gillem) |
| William Fulkerson | |
| Matt McKnight | Tennessee Emergency Management Agency |
| Gill Francis | TVA |
| Duncan Mansfield | AP |

*Requested by phone or mail to speak.

ENCLOSURE 1

| Members of Public | Organization |
|---|---|
| Donald Janeway | |
| Tommy Smith | NEI |
| Ted Besmann | |
| Donna Hudson | |
| Kieran Fenlon | |
| Patrick Brown | |
| Paul Pace | TVA |
| Karen Boyd | TVA |
| Bruce Schofield | TVA |
| Joel Vinsant | Hamilton County |
| K. E. (Tony) Giggy | TVA |
| Russell Newman | Tennessee Emergency Management Agency |
| W. T. Furgerson | |
| Grace Kowanetz | |
| Ruth Grant | |
| Jim Riccio | Public Citizen |
| Holly Brothers | Congressman Van Hilleauy's office |
| Don Lee | Spring City Chamber of Commerce |
| Myles Jakubowski | Cumberland Green |
| Ruth Cohen | Students Promoting Environmental Action in Knoxville |
| Beth Zilbert | Greenpeace |
| Sherry Meddick | Greenpeace |
| John Johnson | Katuah Earth First! |
| Olivia Liem | Katuah Earth First! |
| Jesse Aims | |
| Virginia Dollar | Greenpeace |
| Sean Gale | Greenpeace |
| Donna Smith | Greenpeace |
| Gene Kelly | Greenpeace |
| Dr. Ernest G. Silver | |
| Kim Farmer | |
| Mark Wyatt | American Nuclear Society (UTK) |
| Nick Brown | American Nuclear Society |
| Deborah Bentzinger | American Nuclear Society (UTK) |
| Brian Paddock | Paddock & Mastin Attorneys At Law |
| Mary Mastin | Paddock & Mastin Attorneys At Law |
| Judy Fox | Women Against Watts Bar |
| Dana Chernicky | Katuah Earth First! |
| Susan Harwood | TTU |
| Ralph Galt | |
| Cathy Kemp | Office of Senator Bill Frist |
| Patrick Kimmons | |
| Monique Mollet | |
| Jim Halt | |
| Ann Harris | |
| Leonard Stark | |
| Sheila Cheyenne | |
| Carol Kimmons | |
| Denise Mollet | |
| Lisa Vinsant | |

50-390 TVA WATTS BAR 1

MEETING SUMMARY - MEETING WITH MEMBERS
OF THE PUBLIC RE WATTS BAR.
ENCLOSURES NUMBERS 3 THRU 18.

REC'D W/MEMO DTD 11/03/95....9511080293

## THE NRC STAFF'S RESPONSE, OR REVISED/SUPPLEMENTED RESPONSE

## TO QUESTIONS AND COMMENTS AS RECORDED IN THE TRANSCRIPT

This response addresses the questions and comments received orally at the public meeting, as well as those that were left in written form with the NRC representatives, at the meeting (Enclosures 4 through 18 to the meeting summary). The response in most cases applies to the concerns of many participants and, therefore, a single response is referenced to several people. In some cases, the comments or questions were interpreted as rhetorical, and therefore, no response is attempted. The transcript includes some issues which have previously been raised to the NRC as allegations. In these cases, the alleger has been (or will be) provided with a detailed response and a copy of the inspection report that dealt with the allegation. Inspection reports often deal with allegations in an oblique manner to protect the alleger's confidentiality. These detailed responses are not available to the general public and, therefore, are not referenced.

In most cases, the responses are in previous documents such as published safety evaluations and inspection reports. These evaluations and reports are referenced herein; they are available in the local public document room located at Chattanooga-Hamilton Library, 1101 Broad Street, Chattanooga, Tennessee 37402. The Watts Bar Nuclear Plant information is filed under Docket No. 50-390. Members of the public may also obtain copies of the referenced documents by calling 1-800-638-8081.

1.0 NRC's Jurisdiction

*Commenters:* *Guity (Transcript page 101)*
*Smith (Transcript pages 201-203)*
*Gault (Transcript page 240)*
*Stark (Transcript pages 252-253)*
*Cheyene (Transcript page 268)*
*Hale (Transcript pages 294-295)*

The NRC is a statutory agency, whose authority is defined and limited by a number of statutes. The three main ones are the Atomic Energy Act of 1954, the Energy Reorganization Act of 1974, and the National Environmental Policy Act of 1969. A number of issues raised by members of the public are outside NRC's jurisdiction authorized by these statutes. As a result, the staff cannot legally address these concerns. Examples are: cost of a nuclear plant, electricity rates, alleged criminal acts, the utility's financial health, TVA's debts, the use of asbestos.

2.0 Requirements that Watts Bar Must Meet to Get An Operating License

*Commenters:* *Johnson (Transcript page 174)*
*Gault (Transcript page 241)*
*Cheyene (Transcript page 267)*
*Mollet (Transcript pages 304-305)*

Watts Bar will have to meet all applicable regulations in Title 10 of the Code of Federal Regulations before an operating license is granted. See the first page of draft operating license (copies available from the Local Public Document Room on Microfiche 9503070236).

The Commission will grant an operating license only upon a finding that Watts Bar is complying with all applicable regulations. The staff's findings have been, and will be, documented in the Watts Bar Safety Evaluation Report (NUREG-0847), and supplements. The latest is Supplement 18. In addition, TVA will need to complete its corrective actions. Supplement 18 listS the staff's inspection reports for each of these corrective actions.

After receiving an operating license, TVA will have to continue to comply with all applicable regulations. The statutes and regulations require the Commission to continue inspections, reviews, and enforcement activities throughout the life of the plant, and beyond.

3.0 Hearing, Public Participation, "Haste in Granting Operating License"

*Commenters: Farmer (Transcript pages 207-209)*
*General comments by others*

An adjudicatory hearing is not the only way the public can participate in the licensing process. In 1976, when the NRC announced opportunity for intervention, only one person requested leave to intervene and her petition was rejected for lack of standing. For additional information regarding hearings, see Section 9.10.3 of Supplement 1, Watts Bar Final Environmental Statement (NUREG-0498).

The staff is always ready to receive comments from members of the public; for example, within the last several years, the staff was frequently in face-to-face and telephonic contact with organizations, such as the Foundation for Global Sustainability, Greenpeace, and Public Citizen, to hear their comments and suggestions. There have been numerous occasions during which the staff had dialogue with members of the public, including formal meetings (reference meeting summaries dated 11/16/93 by P. Tam, and 9/27/94 by S. Flanders regarding meetings with the public on environmental issues). The staff has followed up on comments received during such informal or formal occasions.

As stated in Section 2.0, Watts Bar must meet all applicable requirements before the Commission grants an operating license. TVA applied for an operating license on September 27, 1976, and in the ensuing 19 years, the staff has not yet found that TVA has met all applicable requirements and has, thus, not granted an operating license. It is not clear what the speaker(s) mean regarding "haste."

4.0 "NRC Has Never Refused To Grant An Operating License"

*Commenter: Zilbert (Transcript page 160)*

The Atomic Energy Act requires the Commission to grant an operating license when all applicable requirements are met. In a number of cases in the past, the owners of some nuclear plants decided that it would not be prudent for them to expend additional resources to pursue operating licenses, and cancelled the applications for the nuclear plants (e.g. Zimmer, Midland, Humboldt Bay).

5.0 Reasonable Assurance

*Commenters: Smith (Transcript pages 126-128)*
*Harris (Transcript page 256, and Enclosure 10)*

The staff has prepared an overall assessment of quality and effectiveness of quality assurance (Supplement 17 of the Safety Evaluation Report). The staff will issue an operating license only if it has reasonable assurance that, based on observed improvements and corrective actions, Watts Bar will be operated safely.

The term "reasonable assurance" as used in operating licenses refers to future events. In this case, since a nuclear plant cannot be operated until it receives a license, the future event is operation of the plant. Hence, the clause "There is reasonable assurance that the activities authorized by this operating license can be conducted without endangering the health and safety of the public...."

For operating nuclear plants, the staff has existing programs to monitor operation and to take timely actions to forestall unsafe trends that could lead to undesirable circumstances (e.g. the Systematic Assessment of Licensee Performance (SALP) program, the performance indicator program).

The staff recently completed an Operating Readiness Assessment Team (ORAT) inspection (Inspection Report IR 50-390/95-201), and found "no obstacles that would prohibit the safe operation of the facility, pending completion of those issues currently identified and being tracked by the NRC and TVA."

6.0 Emergency Preparedness

*Commenters: Kowanetz (Transcript pages 81-84)*
*Liem (Transcript pages 183-184)*
*Kimmons (Transcript pages 243-245, 276-277)*
*Riccio (Transcript pages 285-286)*
*Grant (Transcript page 85)*

TVA submitted an emergency preparedness plan, and the staff found it complies with all applicable regulations (i.e., 10 CFR 50.47(b), 10 CFR 50.47(d), and Appendix E), and all guidance documents. See Chapter 13 of the staff's Watts Bar Safety Evaluation Report (NUREG-0847), Supplement 13. The staff's evaluation addresses all aspects of emergency preparedness, including the issues raised by members of the public: offsite notification, public information, distribution of potassium iodide pills.

State and local transportation authorities propose the evacuation routes based on TVA's evacuation time estimates, which are reviewed and approved by FEMA. The NRC confirms that the evacuation time estimates have been developed in conformance with Appendix 4 of NUREG-0654/FEMA-REP-1, Revision 1.

The staff evaluated the October 1993, full-participation exercise; see Inspection Report 50-390/93-64. The staff will do the same for the next exercise, scheduled for November 1995.

Watts Bar has, by letter dated 7/19/95, requested an exemption from the ingestion pathway portion of 10 CFR Part 50, Appendix E, Section IV(F)(2)(a), which requires that a full-participation exercise be conducted within 2 years of issuance of the full-power license, with participation by each State and local government within the 10-mile plume exposure pathway emergency planning zone (EPZ) and each State within the 50-mile ingestion exposure pathway EPZ. The exemption is only for the ingestion pathway portion of the exercise. TVA must conduct an exercise which will include State and local government within the 10-mile plume exposure pathway EPZ.

With regard to the concern about sirens and public information about emergency response, TVA publishes a quarterly "Welcome Neighbor Letter" with information for newcomers. There are notices placed in public accommodation facilities (e.g., motels) and a yearly calendar with test dates for all customers. If a siren cannot be heard, TVA should be notified at 1-800-467-1388 or the Tennessee Emergency Management Agency at 1-615-741-0001.

A generic discussion concerning emergency planning and preparedness is provided in Attachment 6.

7.1 Routine Release of Radiation and Effect of Low-Level Radiation

*Commenters:* *Cohen (Transcript pages 154-155)*
*Meddick (Transcript pages 172-173, and Enclosure 15)*
*Johnson (Transcript pages 178-181)*
*Farmer (Transcript pages 207-215)*
*Mastin (Transcript pages 232-234)*
*Triniki (Transcript page 239)*
*Galt (Transcript page 241, and Enclosure 12)*
*Kimmons (Transcript pages 274-276)*

The routine release of radiation is governed by NRC regulation 10 CFR Part 20. In Chapter 11 of Supplement 16 of the Watts Bar Safety Evaluation Report, the staff has evaluated the Watts Bar equipment to control and monitor releases, and TVA's proposed release operation. The staff found Watts Bar meets the stated requirement.

The staff recognizes that the scientific community, from time to time, produces new literature on the effects of radiation. While the NRC Office of Research evaluates such literature for future revision of regulations, 10 CFR Part 20 imposes the current requirements regulating routine release. In Section 9.6.4.16 of Supplement 1 of the Watts Bar Final Environmental Statement (NUREG-0498), the staff addressed in detail the health effects of radiation.

Several comments were made expressing concern about the biological effects of ionizing radiation, particularly the effect on the incidence of breast cancer. Also, reference was made to certain documents that

seem to support these concerns. The staff is sensitive to these concerns and reviews of the relevant literature. Furthermore, it seems appropriate to provide a brief summary of the bases for radiation standards and control measures.

Any approach to radiation safety must accommodate natural radioactivity. We all are exposed to radiation at all times. It follows that safety cannot be based on the prevention of radiation exposure or the absence of radioactive material. Safety must be based on the amount of radiation exposure and, since about 1934, radiation protection criteria and limits have been based on radiation dose, usually expressed in millirem (mrem).

Awareness of the effects of radiation on people is not new. Reports of what we now know to be radiation effects date back to about 1530 and injuries from man-made radiation were reported in 1896, almost immediately after the discovery of X-rays. By 1911, essentially all the ill effects of radiation on people had been identified. It was not until 1934, however, that an international dose criterion was established. That criterion, the equivalent of 50,000 mrem annually, was intended for the protection of radiation workers, primarily radiologists, and it was effective. No ill effects have been detected where that criterion was not exceeded. Improvements in technology, however, have made it practicable to work with much lower limits. The lower limits are reflected in the legal limits which have been in effect since 1955. Today, the NRC limits annual doses to (a) 5,000 mrem to radiation workers and (b) 25 mrem to members of the public. Furthermore, special constraints are imposed on effluents from nuclear power plants so the annual dose to no member of the public may exceed 5 mrem. Of course, these limits apply only to the radioactive materials regulated by the NRC, as the average annual dose from nature to individuals in the USA is about 300 mrem.

While the average annual dose from nature is about 300 mrem, there are substantial differences between doses received by individuals. For example, living in a home with high radon levels may result in annual doses exceeding 1,000 mrem. Even small changes can increase doses from nature more than the allowed dose from a nuclear power plant. Examples are (a) moving a few miles to a place where the soil and rocks contain more radioactive material, (b) occasionally traveling by commercial airliners, and (c) vacationing either in the mountains or in the high-phosphate regions of Florida. Thus, the doses from nuclear power plants are kept smaller than the changes in dose associated with one's choice of commonplace activities.

The biological effects of radiation have been studied intensively since the 1890s. Radiation proved effective in therapy against such afflictions as *lupus vulgaris*, and hypertrichosis, as well as cancer. It also proved harmful at high doses. The principal concerns have been about radiation's ability to cause cancer and genetic damage. While even the most extensive and costly epidemiological studies have not identified any radiation-induced genetic damage in humans nor any increase in cancer rates from radiation doses below about 25,000 mrem, no threshold for radiation injury has been identified. Accordingly, it

has been considered prudent to assume that the risk is proportional to the dose and to keep doses as low as practicable. This approach dates back (at least) to 1938, when a recommendation of the Advisory Committee on X-Ray and Radium Protection was "... to carry out all manipulations in such a way as to reduce the exposure to a minimum." This approach is continued in the NRC requirements for keeping doses as low as is reasonably achievable (ALARA).

Radiation has been the subject of public controversy since about 1898. This controversy has entailed extreme positions about the effects of very low doses of ionizing radiation. In meeting its responsibilities to protect the public, the NRC staff evaluates a large number of publications, including the Sternglass and Gould article in the 1993 *International Journal of Health Services* (IJHS) and the Mangano article in the 1994 IJHS. The average dose from a nuclear power plant to people in a region is largely determined by the fraction of the population that work in the plant and the dose from effluents is largely determined by the fraction of the population living near the plant and their life styles.

While the staff and its contractors have performed independent studies of radiation risks, heavy reliance is placed on the works of recognized authorities such as the United Nations Scientific Committee on Atomic Radiation (UNSCEAR) and the U.S. National Academy of Sciences, which report that radiation effects are not seen from doses below 10,000 mrem and that extrapolation to low doses places the lethal cancer risk (if any) from a 5 mrem dose at less than three chances in a million.

Breast cancer has become a serious concern in recent years, because (a) breast cancer mortality has increased as the population increases and becomes older, and (b) efforts to encourage mammography have called attention to the hazard. The American Cancer Society, however, reports that the age-adjusted breast cancer mortality rate has remained constant for the last 70 years. It is known that high doses of radiation can increase the incidence of breast cancer. Using the National Academy of Science's methods for extrapolation to low doses to calculate the risk indicates that all the offsite radiation doses from all nuclear power plant effluents in the last 20 years would be expected to produce less than one lethal breast cancer.

In summary, the NRC is sensitive to concerns about radiation exposure, is cognizant of the relevant literature, and does not believe that more stringent controls are necessary to ensure public safety. However, because the NRC believes that the protection of the public safety is paramount, it is prepared to impose any such controls as may be necessary if public safety is challenged.

## 7.2 Accidental Release of Radiation

*Commenter: Kimmons (Transcript page 276)*

The accidental release of radiation and radioactive materials is limited by the exposure guidelines of 10 CFR Part 100. The staff has evaluated such releases as postulated design-basis accidents, and reported

evaluation results in Chapter 15 of the Watts Bar Safety Evaluation Report (NUREG-0847), which was most recently updated by Supplement 15. As reported in these documents, Watts Bar complies with 10 CFR Part 100.

The staff recognizes that the scientific community from time to time produces new literature on the effects of radiation. While the NRC Office of Research evaluates such literature for future revision of regulations, 10 CFR Part 100 imposes the current requirements regulating accidental release. In Section 9.6.4.17 and 9.6.4.19 of Supplement 1 of the Watts Bar Final Environmental Statement (NUREG-0498), the staff addressed in detail the health effects of radiation resulting from accidents.

8.0 Indemnity Agreement, Price-Anderson Act

*Commenter: Kelly (Transcript pages 203-204, and Enclosure 14)*

The Watts Bar operating license will specify: "TVA will be required to maintain financial protection of such types and in such amount as the Commission shall require in accordance with Section 170 of the Atomic Energy Act of 1954, as amended, to cover public liability claims." See 10 CFR Part 140, Financial Protection Requirements and Indemnity Agreements. Also, see Attachment 4 for a discussion of the Price-Anderson system, particularly the footnote (Page 2, column 1) regarding accidents involving damages in excess of the amount of aggregate liability.

9.0 Decommissioning Financial Assurance

*Commenters: Hudson (Transcript page 69)*
*Neil (Transcript pages 91-92)*
*Meddick (Transcript pages 168-170)*
*Paddock (Transcript page 231)*
*Harris (Transcript page 253)*
*Kimmons (Transcript pages 271-273)*
*Mollet (Transcript pages 301-302)*

In Supplement 16 of the Watts Bar Safety Evaluation Report, the staff stated: "By letter dated June 16, 1995, the applicant submitted its statement of intent by its Board of Directors to provide funds when needed for the decommissioning of Watts Bar, Unit 1. The staff reviewed this letter and attached statement and concludes that TVA, as a Federal government utility, has complied with NRC decommissioning funding assurance regulations by issuing a statement of intent for providing decommissioning funds for Watts Bar, Unit 1, pursuant to 10 CFR 50.75(e)(3)(iv) in an amount consistent with the formulae specified in 10 CFR 50.75(c)."

For a detailed discussion of decommissioning, refer to Section 8.4 and 9.9 of Supplement 1 of the Watts Bar Final Environmental Statement Related To the Operation of Watts Bar Nuclear Plant, Units 1 and 2 (NUREG-0498, Supp. 1).

In addition, see Attachment 1 for a generic discussion regarding decommissioning.

10.1 Processing, Transportation and Storage of Low-Level Radioactive Wastes

*Commenters: Cohen (Transcript page 151)*
*Meddick (Transcript pages 166-167, and Enclosure 15)*
*Aims (Transcript page 188)*
*Dollar (Transcript pages 191-200)*
*Mastin (Transcript page 234)*
*Cheyene (Transcript pages 264-266)*
*Peeples (Enclosure 8)*

Operating nuclear plants generate radioactive wastes in the form of liquids, solids and gases. The staff has reviewed the Watts Bar radioactive waste management systems and found them meeting all applicable regulatory requirements (see Chapter 11, Supplement 16 of the Watts Bar Safety Evaluation Report, NUREG-0847).

The staff provided detailed information regarding low-level waste sites in Section 9.6.4.12 of Supplement 1 of the Watts Bar Final Environmental Statement (NUREG-0498). The Barnwell site is licensed by the State of South Carolina. The licensee is Chem Nuclear Systems, Inc. The site is now remaining open for disposal for an indefinite period. As we understand it, there has been tritium leakage from older trenches onsite. There has not been leakage offsite. We understand that there is a financial assurance requirement under the State license similar to the requirements in 10 CFR Part 61. Attachment 2, "Low-Level Radioactive Waste," provides a discussion of low-level waste disposal.

As stated in Supplement 16, transportation of processed solid and liquid wastes will be done by licensed transportation contractors, who will use NRC-approved equipment and methods. The staff has evaluated in detail transportation of radioactive material in Section 5.5.4 and 9.6.4.14 of Supplement 1 of the Watts Bar Final Environmental Statement (NUREG-0498). A discussion of transportation of radioactive material is presented in Attachment 3. The financial responsibility for transportation of radioactive material falls within the scope of the Price-Anderson system (see scope of Price-Anderson coverage in Attachment 4).

10.2 High-Level Waste, Spent Fuel

*Commenters: Hudson (Transcript pages 70-72)*
*Aims (Transcript pages 188)*
*Dollar (Transcript pages 191-200)*
*Paddock (Transcript pages 227-229)*
*Hale (Transcript pages 295-297)*
*Fenlow (Transcript pages 78-79)*
*Neil (Transcript page 91)*
*Peeples (Enclosure 8)*
*Meddick (Enclosure 15)*

An operating reactor licensee is not allowed by NRC regulation to reprocess spent fuel. If radioactive spent fuel is to be shipped offsite, it will be done by licensed transportation contractors, who will use NRC-approved equipment and methods.

The staff has evaluated and found acceptable the onsite spent fuel storage facilities (see Sections 9.1.2 and 9.1.3 of the Watts Bar Safety Evaluation Report, NUREG-0847, and Supplement 16). The staff has further addressed the issue of spent fuel storage in Sections 9.6.4.13 and 9.6.4.15 of Supplement 1 of the Watts Bar Final Environmental Statement (NUREG-0498). The staff stated that "If necessary, the applicant could build and use dry cask storage at any of its facilities, including the WBN Plant. Spent fuel generated at WBN Plant could be stored at other TVA sites if its application satisfies all applicable NRC requirements."

Ultimate disposition of high-level waste is being investigated by the Department of Energy. It is an activity that is regulated by the NRC. The absence of a national high-level waste disposal choice is not an obstacle to granting an operating license to a commercial nuclear power plant (Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc., 435 U.S. 519 (1978)).

Attachment 5 contains the up-to-date status of high-level waste storage.

Attachment 7 contains a discussion of dry cask storage/multipurpose canisters/ISFSIS.

11.0 Quality Problems Encountered During Construction

*Commenter: Smith (Transcript pages 120-128)*
*Jakubowski (Enclosure 11)*

Watts Bar encountered many problems concerning quality of construction. Sections 11.1 and 11.2 below address those that meeting participants brought up. A quality problem usually means that Watts Bar did not comply fully with one or more NRC regulations. Thus, as long as a quality problem exists, the staff will not issue an operating license, as stated in Section 2.0 above. Before the staff issues an operating license, the staff must conclude that Watts Bar quality problems have been resolved and that it is in full compliance with applicable regulations.

The staff's overall assessment of Watts Bar quality, and effectiveness of quality assurance program, is set forth in Supplement 17 of the Watts Bar SER (NUREG-0847, Supp. 17).

11.1 Electric Cable Problems

*Commenters: Smith, Guity (Transcript pages 8-20, 104-113)*
*Guity (Transcript pages 104-113; letter to A. Ignatonis, 9/5/95, page 4 of 12, Enclosure 7)*
*Johnson (Transcript pages 175-176)*

TVA instituted a corrective action program to remedy quality problems with electric cables. The staff reviewed the program and published safety evaluations to address cable bend radius, cable pullby damage, cable jam, and use of high-potential testing to determine which cables to replace. These safety evaluations are published and in: NUREG-1232, Vol. 4; Letter, P. S. Tam (NRC) to D. A. Nauman (TVA), April 25, 1991 (the safety evaluation was reproduced in SSER 7 as Appendix P); supplemental safety evaluation dated April 24, 1992 (Appendix T of SSER 9); letter, P. S. Tam (NRC) to M. O. Medford (TVA), February 14, 1994.

Part of TVA's effort in this regard included replacing about 1.3 million feet of cables. The cables evaluated by the NRC are the Class 1-E cables (i.e. those required for safe shutdown and accident mitigation). With regard to the non-Class 1-E cables, TVA's program for replacement or evaluation is not within the scope of NRC jurisdiction. See Section 8.3.3.1.6 of Supplement 18 of the Watts Bar Safety Evaluation Report (NUREG-0847, Supp. 18). Detailed responses to the concerns in Mr. Guity's September 5, 1995, letter to Mr. Ignatonis are being provided to him separately.

The staff performed numerous inspections of TVA's correction of cable problems. The following Inspection Reports partly or wholly address cable issues: 50-390, 391/90-09 (June 22, 1990); 50-390, 391/90-20 (September 25, 1990); 50390, 391/90-22 (November 21, 1990); 50-390, 391/9024 (December 17, 1990); 50-390, 391/90-27 (December 20, 1990); 50-390, 391/90-30 (February 25, 1991); 50-390, 391/91-07 (May 31, 1991); 50-390, 391/91-09 (July 15, 1991); 50-390, 391/91-12 (July 12, 1991); 50-390, 391/91-31 (January 13, 1992); 50-390, 391/92-01 (March 17, 1992); audit report of June 12, 1992 (Appendix Y of SSER 9); 50-390, 391/92-05 (April 17, 1992); 50-390, 391/92-13 (July 16, 1992); 50-390, 391/92-18 (August 14, 1992); 50-390, 391/92-22 (September 18, 1992); 50-390, 391/92-26 (October 16, 1992); 50-390, 391/92-30 (November 13, 1992); 50-390, 391/92-35 (December 15, 1992); 50-390, 391/92-40 (January 15, 1993); 50-390, 391/93-10 (March 19, 1993); 50-390, 391/93-11 (March 25, 1993); 50-390, 391/93-35 (June 10, 1993); 50-390, 391/93-40 (July 15, 1993); 50-390, 391/93-48 (August 13, 1993); 50-390, 391/93-56 (September 20, 1993); 50-390, 391/93-63 (October 18, 1993); 50-390, 391/93-70 (November 12, 1993); 50-390, 391/93-74 (December 20, 1993); 50-390, 391/93-85 (January 14, 1994); 50-390, 391/93-91 (February 17, 1994); 50-390, 391/94-11 (March 16, 1994); 50-390, 391/94-18 (April 18, 1994); 50-390, 391/94-32 (May 16, 1994); 50-390, 391/94-35 (June 20, 1994); 50-390, 391/94-45 (July 15, 1994); 50-390, 391/94-51 (August 11, 1994); 50-390, 391/94-53 (September 20, 1994); 50-390, 391/94-55 (September 16, 1994); 50-390, 391/94-61 (October 12, 1994); 50-390, 391/94-66 (November 16, 1994); 50-390, 391/94-75 (December 19, 1994); 50-390, 391/94-82 (January 13, 1995); 50-390, 391/94-88 (February 15, 1995); 50-390, 391/95-17 (April 13, 1995); 50-390, 391/95-45 (August 15, 1995).

The staff has addressed and resolved the cable-splice issue in meeting summary by L. Dudes, dated November 16, 1994, and in Section 8.3.3.1.4 of the Watts Bar Safety Evaluation Report (NUREG-0847), Supplement 15.

11.2 Microbiologically Induced Corrosion (MIC)

*Commenter: Harris (Transcript page 261)*

MIC was addressed in the following safety evaluations: NUREG-1232, Vol. 4; Appendix Q of Supplement 8 and 10 of the Watts Bar Safety Evaluation Report (NUREG-0847). The staff reported its inspection findings in Inspection Reports 50-390, 391/90-09 (June 22, 1990); 50-390, 391/90-13 (August 2, 1990); 50-390, 391/93-01 (February 25, 1993); 50-390, 391/93-09 (March 26, 1993); 50-390, 391/93-67 (November 1, 1993). Since the commenter provided no technical information, the commenter should review the above documents to determine if her concerns have been resolved.

12.0 Geology and Seismology

*Commenters: Cohen (Transcript page 149)*
*Zilbert (Transcript pages 156-158)*
*Mollet (Transcript page 299)*

Participants brought up the issue of a fault line near Watts Bar. The staff has previously addressed this question in Section 9.4.6 of Supplement 1 of the Watts Bar Final Environmental Statement (NUREG-0489, Supp. 1).

13.0 Probabilistic Risk Assessment

*Commenter: Mastin (Transcript pages 234-236)*

Some commenters expressed concern regarding the estimated probability of a core meltdown accident at Watts Bar, referring to a study released by TVA on September 1, 1992. Other commenters asserted that there is a 45% probability of a core-melt accident at Watts Bar.

The staff has responded to similar questions in Section 9.8.2 of Supplement 1 of the Watts Bar Final Environmental Statement (NUREG-0498). It should be pointed out that in an updated TVA study dated May 2, 1994, the estimated probability is 0.00008 per year of Watts Bar operation. The staff has evaluated and accepted the updated study (letter, P. S. Tam to O. D. Kingsley, October 5, 1994).

14.1 Fire Barriers, Thermo-Lag

*Commenters: Guity (Transcript pages 24-25, and his letter to A. Ignatonis dated 9/5/95)*
*A voice (Transcript pages 94-95)*
*Johnson (Transcript page 174)*

TVA has performed extensive work on design, testing and installation of fire retardant materials. The staff's evaluation has been published in Supplement 18 to the Watts Bar Safety Evaluation Report (NUREG-0847, Supp. 18).

14.2 Fire Protection

*Commenters: Guity (Transcript pages 100 and 108)*
*Jakubowski (Enclosure 11)*

Fire protection requirements were upgraded and made more detailed by Appendix R to 10 CFR Part 50 after the Browns Ferry fire on March 22, 1975. The Browns Ferry plant was issued a separate safety evaluation report and approval to restart prior to the issuance of Appendix R. The Browns Ferry plant is governed by 10 CFR 50.48(d) and not Appendix R. TVA used Flamastic as a fire retardant on cable trays. NRC had approved the derating methodology for cable ampacity in the Sequoyah licensing. The same methodology was used for Watts Bar.

15.0 Watts Bar and TVA Quality Assurance Program

*Commenters: Guity (letter to A. Ignatonis dated 9/5/95, pages 5-6 and 10-11)*
*Jakubowski (Transcript pages 146-148)*
*Smith (Transcript page 22)*

The quality assurance problems at Watts Bar led to many activities, including two corrective action programs: QA Record and Q-List. Both of these have been fully implemented. The corrective action programs are addressed in the NRC safety evaluations and inspection reports listed in Section 1.13.1 of the Watts Bar Safety Evaluation Report (NUREG-0847), Supplement 16.

The staff has prepared an overall assessment of quality and effectiveness of quality assurance in Supplement 17 of the Watts Bar Safety Evaluation Report. The staff will issue an operating license only if the staff finds full compliance with applicable regulations (including 10 CFR Part 50, Appendix B), and reasonable assurance that, based on observed improvements and corrective actions, Watts Bar will be operated safely.

16.0 Readiness for Operation

*Commenters: Harris (Transcript pages 259-260)*
*Harris (handout material, Enclosure 10)*
*Riccio (Transcript pages 288-289)*
*Guity (Transcript 29-34)*

TVA recently completed a series of tests collectively called Hot Functional Test 2 (HFT 2). HFT 2 was conducted as a "full dress rehearsal" for nuclear operation, i.e., the various tests were performed as if there were nuclear fuel in the reactor and as if there were radiation. All requirements applicable to this assumed situation were followed. The staff sent an operational readiness assessment team (ORAT) of experienced inspectors to observe HFT 2, which was successfully completed in late August. Before HFT 2, the staff and TVA were aware of problems to be resolved, and issues to be addressed, such as those listed in the meeting summary
Enclosure 10.

The readiness of the plant for operation is addressed in Supplement 17 to the Safety Evaluation Report (NUREG-0847, Supplement 17), and in Inspection Report 50-590/95-201, dated October 12, 1995. In Enclosure 10, a member of the public included a list of NRC ORAT issues, items 1 thru 15. Appropriate response to her comments may be found in Inspection Report 50-390/95-201 as follows:

| Item | Report Section |
|---|---|
| (1) | 6.5 |
| (2) | 3.8 |
| (3) | 3.4.6 |
| (4) | 3.4.3 |
| (5) | 3.5 |
| (6) | 3.6 |
| (7) | 3.4.5 and 3.9 |
| (8) | 3.4.2 |
| (9) | 5.3 |
| (10) | 4.1.3 |
| (11) | 3.9 |
| (12) | 5.3 |
| (13) | 7.1 to 7.10 |
| (14) | 6 and 8.2 |
| (15) | 5.1 |

17.0 Water Hammer Issues

*Commenter: Riccio (Transcript pages 282-283)*

This generic issue was addressed and resolved in Appendix C of the Watts Bar Safety Evaluation Report (NUREG-0847) and Supplement 15. However, the staff has not been able to identify the "water hammer" event to which Mr. Riccio alluded.

18.0 Ice Condenser

*Commenter: Riccio (Transcript pages 290-291)*

The staff evaluated, and found acceptable, the Watts Bar ice condenser design in Section 6.2.1 of the Watts Bar Safety Evaluation Report (NUREG-0847) and Supplement 5. The weight of ice in the ice condenser is specified by Section 3.6.11 of the Watts Bar Unit 1 Technical Specifications (TS). If the weight is less than specified, corrective action is required, including plant shutdown if acceptable conditions are not met.

19.0 Hypothetical Flooding Problems

*Commenter: Mollet (Transcript page 299)*

The staff evaluated the flooding potential, using a probable maximum flood, at Watts Bar. The staff's evaluation is set forth in Section 2.4.3 of the Watts Bar Safety Evaluation Report (NUREG-0847).

20.0 Risk of Fatal Cancers (Upton Bill)

*Commenter: Meddick (Enclosure 15)*

The staff has provided a response to a similar concern to Congressman Edward J. Markey (House Subcommittee on Energy and Power) on July 13, 1995. The response is repeated here:

"With respect to the dose-based release standard in H.R. 1020 (Upton Bill), the Commission does not object to a performance standard of 100 mrem (1 mSv) for the high-level waste repository. In demonstration of compliance with this limit, the Commission would expect DOE to evaluate alternatives among the major repository design features so as to provide greater confidence in performance. Therefore, annual exposure from the repository would likely be less than 100 mrem (1 MSv).

The health effects resulting from a dose limit of 100 mrem (1 mSv) are uncertain, but low. Even though large doses of radiation have been shown to be carcinogenic, the estimation of risk at radiation levels equal to natural background radiation requires a significant downward extrapolation from the observed effects at much higher doses and dose rates. The Committee on the Biological Effects of Ionizing Radiation (BEIR V) of the National Academy of Sciences/National Research Council (1990) states: Studies of population chronically exposed to low-level radiation, such as those residing in regions of elevated natural background radiation, have not shown consistent or conclusive evidence of an associated increase in the risk of cancer.

BEIR V has estimated a risk coefficient for low doses of radiation. Such risk estimation is only valid if a large population is exposed. The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) stated in their 1988 report to the General Assembly that:

> The product of the risk coefficient appropriate for individual risk and the relevant collective dose will give the expected number of cancer deaths in the exposed population, provided that the collective dose is at least of the order of 100 person-Sv (10,000 person-rem). If the collective dose is only a few person-Sv (a few hundred person-rem), the most likely outcome is zero deaths.

To achieve a lifetime collective dose of 10,000 person-rem (100 person-rem-Sv) at an annual dose limit of 100 mrem (1 mSv) would require a population of approximately 1400 individuals exposed at the limit for 70 years. The exposed population at the repository site is expected to be substantially smaller. Therefore, because the actual doses are projected to be lower than the limit and the collective dose will be small, the expected public health and safety consequences of changing the radiation release standard are minimal."

21.0 Spent Fuel Storage Racks

*Commenter: Riccio (Transcript page 130-135)*

The staff's evaluation of the Watts Bar spent fuel storage racks is set forth in Supplement 16 of the Watts Bar Safety Evaluation Report (NUREG-0847, Supp. 16). In the public meeting, Mr. Hebdon stated that he believed the capacity of the racks had to be sufficient to accommodate full-core offload. Although licensees consider it prudent to provide such capability, there is no such regulatory requirement, as failure to provide such capability does not raise a safety concern.

22.0 President's Executive Order No. 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations"

*Commenter: Meddick (Enclosure 15)*

The NRC has developed its initial environmental justice implementation strategy and sent it by letter dated March 24, 1995 to Carol Browner, Chair, Environmental Justice Interagency Working Group, U.S. Environmental Protection Agency. A copy of the letter and the strategy statement is provided as Attachment 8. The application of this strategy to Watts Bar site is provided in Section 5.8 of the Final Environmental Statement, Supplement No. 1 (NUREG-0498), issued April 1995.

23.0 Nuclear Plant Capacity

*Commenter: Meddick (Enclosure 15)*

A nuclear power plant is analyzed, evaluated and licensed for 100% capacity. The plant cannot operate continuously at that rating. There are periods of shutdown for refueling and maintenance. There are periods of reduced power operation; such as start-ups, shutdowns, maintenance of certain components, and summer heat-related limits. Thus, no plant can average 100 percent capacity when in operation.

24.0 Tritium Production

*Commenter: Meddick (Enclosure 15)*

NRC would be required to evaluate the use of commercial reactors for tritium production; however, none have been proposed for such use.

Attachments:
1. Decommissioning
2. Low-Level Waste
3. Transportation
4. NUREG/BR-00 79, Rev. 1
5. High-Level Waste
6. Emergency Planning
7. Dry Cask Storage
8. Ltr. to C. Browner
   fm H. Thompson, dtd. 3/24/95

Attachment 1
(to Enclosure 3)

BP24 (3/95)

# DECOMMISSIONING NUCLEAR POWER PLANTS

## Background

Several licensees have announced their decisions to permanently cease power operation at their nuclear power generating facilities. The licensee's reasons are based on economic and technical considerations. Thus, these facilities and several others have entered the decommissioning process before their operating licenses expire, earlier than originally anticipated. Decommissioning highlights are presented in Tables 1 and 2.

## Decommissioning

Title 10 of the Code of Federal Regulations, Section 50.2 (10 CFR 50.2), defines decommissioning as the safe removal of a facility from service and reduction of residual radioactivity to a level that permits release of the property for unrestricted use and termination of the license. Decommissioning involves three different alternatives: DECON, SAFSTOR, or ENTOMB. Under DECON (immediate dismantlement), equipment, structures, and portions of the facility containing radioactive contaminants are removed or decontaminated to a level that permits release for unrestricted use and termination of the license. Under SAFSTOR, often considered "delayed DECON," a nuclear facility is placed and maintained in a condition that allows the decay of radioactivity to reduce radiation levels at the facility; after this it is dismantled. Under ENTOMB, radioactive contaminants are encased in a structurally long-lived material such as concrete and the entombed structure is appropriately maintained and monitored until the radioactivity decays to a level permitting unrestricted release of the property. To be acceptable, however, the method selected must provide for completion of decommissioning within 60 years; a time beyond 60 years will be considered only when necessary to protect public health and safety in accordance with Nuclear Regulatory Commission (NRC) regulations.

## Regulations

The procedure for decommissioning a nuclear power plant is set out principally in 10 CFR 50.75, 50.82, 51.53, and 51.95. (An underlying assumption embodied in the current regulations is that decommissioning would occur after the facility operating license expired.) Five years before the licensee expects to end operation of the plant, it is obligated to submit a preliminary decommissioning plan containing a cost estimate for decommissioning and an up-to-date assessment of the major technical factors that could affect planning for decommissioning. Then, within one year before expiration of the license, (or two years after operation for plants closing before their license expires) a licensee must submit to NRC an application for

authority to decommission that facility, together with an environmental report covering the proposed decommissioning activities. The application must also be accompanied, or preceded, by a proposed decommissioning plan that includes:

(1) A description of the decommissioning alternative chosen and activities involved;

(2) A financial plan showing an up-to-date cost estimate for decommissioning, the amount of funds currently available for decommissioning, and plans for ensuring the availability of adequate funds for completion of decommissioning.

The NRC reviews the decommissioning plan, prepares an environmental impact statement or environmental assessment, as appropriate, and gives notice to interested persons. If the NRC finds the proposed decommissioning plan to be satisfactory, it issues a decommissioning order that approves the proposed decommissioning plan and authorizes decommissioning. Upon completion of decommissioning activities, including the termination radiation survey, the NRC issues an order that terminates the license.

Prematurely Shutdown Plants

After the final decommissioning rule was published six power reactor facilities were shut down prematurely: Fort St. Vrain Nuclear Generating Station; Shoreham Nuclear Power Station; Rancho Seco Nuclear Generating Station; Yankee Rowe Nuclear Station; San Onofre Nuclear Generating Station, Unit 1; and Trojan Nuclear Plant. Three Mile Island Nuclear Station, Unit 2, also ceased operation after the March 28, 1979, accident. In addition, Indian Point Nuclear Generating Station Unit 1 and Dresden Nuclear Power Station Unit 1, which were shut down in 1974 and 1978, respectively, are in the decommissioning process.

Current Status

In June 1992, the NRC issued an order to Long Island Power Authority, approving the Shoreham decommissioning plan. Long Island Power Authority is dismantling that facility. On November 23, 1992, the NRC issued an order approving the Fort St. Vrain decommissioning plan and dismantlement activities are now ongoing. In 1992, Yankee Atomic Electric Company and Southern California Edison Company announced their decisions to prematurely shut down and decommission the Yankee Rowe and San Onofre Unit 1 facilities, respectively. In January 1993, Portland General Electric announced its decision to terminate operations at the Trojan plant. All three of these facilities now have been permanently shut down. Portland General Electric, the licensee for Trojan, is planning the removal and shipment of

the Trojan steam generators and pressurizer to the low level waste burial site in Hanford, Washington, in 1995.

Rancho Seco

On June 16, 1993, the NRC staff issued its safety evaluation and environmental assessment of the Rancho Seco decommissioning plan. The plan proposes safe storage (SAFSTOR) of the facility for about 20 years followed by dismantlement and decontamination. Approval of the decommissioning plan was delayed because of contentions raised by the Environmental and Resources Conservation Organization (ECO). However, ECO reached a settlement with the Sacramento Municipal Utility District, the licensee for Rancho Seco, and on August 1, 1994, withdrew from the proceeding. The staff is now reviewing and updating its previous safety evaluation and preparing the order authorizing decommissioning of Rancho Seco. The NRC approved Rancho Seco's decommissioning plan for SAFSTOR on March 21, 1995.

Yankee Rowe

In January 1993, the Commission issued guidance regarding activities that may be permitted before a decommissioning plan is approved. Licensees of plants that do not have operating licenses or have shutdown orders should be allowed to undertake any decommissioning activity that does not (1) foreclose the release of the site for possible unrestricted use, (2) significantly increase decommissioning costs, (3) cause any significant environmental impact not previously reviewed, or (4) violate the terms of the existing license. Also, licensees may be permitted to use their decommissioning funds for approved decommissioning activities, even though their decommissioning plans have not yet been approved by the NRC.

In accordance with NRC guidance, Yankee Atomic Electric Company (YAEC) proposed early removal of the four steam generators, the pressurizer, and the reactor vessel internals from the Yankee Rowe plant. In a July 15, 1993, letter to YAEC, the NRC stated that it had no objection to these activities. The components were shipped from the plant to the low level waste burial site in Barnwell, South Carolina, between November 16 and December 8, 1993. In June 1994, YAEC completed the disposal of additional components and contaminated asbestos before Barnwell was closed to non-Southeast compact members on June 30, 1994. The NRC approved Yankee Rowe's decommissioning plan on February 14, 1995.

Dresden Incident

On January 25, 1994, Commonwealth Edison Company (CECo) workers at the Dresden Unit 1 site discovered a significant quantity of water in the containment building. The source of the estimated

55,000 gallons of water was a service water line that had frozen and ruptured within the unheated containment. The water was pumped from the containment building for processing by the site radwaste system. The NRC responded by conducting a two-week special team inspection to review and evaluate the circumstances and significance of this event. The team consisted of headquarters and Region III staff members. The inspectors identified a pattern of progressively worsening management oversight at the facility after the unit was permanently shut down in 1978. Significant inconsistencies existed between decommissioning plan information and commitments provided to the NRC by CECo and actual conditions, equipment configurations, and programs at the facility. On June 13, 1994, the NRC proposed a civil penalty of $200,000 on CECo for its failure to maintain required systems and the staffing of Dresden Unit 1 in accordance with the Dresden Unit 1 decommissioning plan. On July 13, 1994, CECo submitted a check for $200,000 and a list of corrective actions that it would take to resolve the identified deficiencies.

In addition, the incident at Dresden Unit 1 prompted an NRC review of the likelihood of similar events at other facilities in the decommissioning process. The staff issued Bulletin 94-01 on April 14, 1994, to each of the licensees of the permanently shutdown nuclear power reactors with spent fuel in the spent fuel pool to inform them of the results of the special NRC inspection at Dresden Unit 1 and to request that they take actions to ensure that the cooling and shielding for fuel in the spent fuel pool were not compromised. The NRC conducted team inspections at each of the eight affected facilities in calendar year 1994. These inspections were used to confirm licensee adherence to Bulletin 94-01 and completion of the actions requested in the bulletin.

Rulemaking

On July 7, 1994, the staff issued SECY-94-179, "Notice of Proposed Rulemaking on Decommissioning of Nuclear Power Plants," in response to a Commission request of June 1993. The proposed rule would define terminology related to decommissioning and would require licensees to provide the NRC with early notification of planned decommissioning activities at their facilities. In addition, the rulemaking would explicitly set forth the applicability, or limited applicability, of certain 10 CFR Part 50 requirements to permanently shut down reactors. On October 5, 1994, the Commission returned the proposed rulemaking to the staff for further development. The revised proposed rulemaking is scheduled for submittal to the Commission in February 1995.

On December 14, 1994, regulatory responsibility for the Humboldt Bay Power Plant Unit 3, LaCrosse Boiling Water Reactor, and

Vallecitos Boiling Water Reactor nuclear facilities was transferred from the Office of Nuclear Material Safety and Safeguards to the Office of Nuclear Reactor Regulation (NRR). In the future, NRR will maintain responsibility for power reactor facilities while fuel is stored on-site, in wet storage.

CONTACT:
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# TABLE 1

## DECOMMISSIONING HIGHLIGHTS

### INDIAN POINT UNIT 1

- October 31, 1974, plant was permanently shut down because its emergency core cooling system did not meet current regulatory requirements.
- January 1976, reactor was defueled.
- June 19, 1980, NRC order revoked authority to operate plant.
- October 17, 1980, licensee submitted proposed decommissioning plan. NRC review has been ongoing since then and has prompted numerous supplemental licensee submittals through October 1993.

### DRESDEN UNIT 1

- October 31, 1978, plant was shut down to meet new Federal regulations and to perform chemical decontamination of major piping systems.
- January 7, 1986, while plant was still out of service, licensee announced its decision to decommission the plant, rather than comply with regulations imposed because of the accident at Three Mile Island Unit 2 in March 1979.
- July 23, 1986, license was amended to possession only license (POL) status.
- September 3, 1993, decommissioning plan was approved.
- January 25, 1994, licensee personnel discovered significant quantity of water in the containment building. The source of the estimated 55,000 gallons of water was a service water line which that had frozen and ruptured within the unheated containment. The water was pumped from the containment building for processing by the site radwaste system. The NRC responded by conducting a two-week special team inspection that identified numerous discrepancies that the licensee had to address.
- July 13, 1994, licensee submitted a check for $200,000 in response to the NRC-imposed civil penalty for its failure to maintain required systems and to staff unit in accordance with Dresden Unit 1 decommissioning plan.

### FORT ST. VRAIN

- August 18, 1989, plant was permanently shut down because of failure of the control rod drives and degradation of the steam generator ring header.
- May 21, 1991, license was amended to possession only license (POL) status.
- June 11, 1992, all fuel was placed in an onsite independent spent fuel storage installation (ISFSI).

- November 23, 1992, Commission issued order approving licensee decommissioning plan.
- September 1, 1993, removal of the prestressed concrete reactor vessel top head was completed.
- April 1, 1994, all of the graphite reflector blocks had been removed from the reactor vessel and shipped to the low level waste burial site at Hanford, Washington.

SHOREHAM

- June 28, 1989, licensee's shareholders approved agreement with the New York State to not operate the facility.
- August 24, 1989, reactor vessel was defueled.
- June 14, 1991, license was amended to POL status.
- February 29, 1992, license was transferred to Long Island Power Authority for decommissioning of plant.
- June 11, 1992, Commission issued order approving licensee decommissioning plan.
- July 1, 1994, decommissioning of the facility was 95 percent complete. Final and confirmatory surveys are in progress.
- September 1993, transfer of fuel to Limerick began. Fuel transfer was completed June 1994.

RANCHO SECO

- June 7, 1989, plant was shut down because voters approved non-binding referendum prohibiting licensee from operating facility.
- December 8, 1989, reactor vessel was defueled.
- March 17, 1992, license was amended to POL status.
- Environmental and Resources Conservation Organization (ECO) was active intervenor in regards to proposed decommissioning plan.
- June 3, 1993, U.S. Court of Appeals (Ninth Circuit) ruled in favor of NRC in the matter of issuance of the Rancho Seco POL.
- June 16, 1993, NRC staff issued safety evaluation and environmental assessment of proposed decommissioning plan.
- November 30, 1993, the Atomic Safety and Licensing Board (ASLB) admitted for hearing certain contentions associated with decommissioning funding and costs of Rancho Seco independent spent fuel storage installation.
- August 1, 1994, ECO reached settlement with Sacramento Municipal Utility District and filed notice of withdrawal; ASLB terminated proceeding.
- September 2, 1994 Commission order (CLI-94-14) authorized NRC staff to issue decommissioning order.
- NRC is reviewing and updating previous safety evaluation; expects to issue order in early Calendar Year 1995.

- NRC approved the decommissioning plan for SAFSTOR on March 21, 1995.

YANKEE ROWE

- October 1, 1991, plant was shut down because of concerns about reactor vessel integrity.
- February 27, 1992, licensee announced permanent cessation of operations because of inability to address uncertainties associated with the safety margin of the reactor vessel. The reactor vessel was previously defueled.
- August 5, 1992, license was amended to POL status.
- July 15, 1993, NRC staff stated it had "no objection to early component removal activities."
- The four steam generators and pressurizer were shipped from the plant to the low level waste burial site in Barnwell, South Carolina, between November 16 and December 8, 1993.
- March 11, 1994, NRC staff stated it had "no objection" to use of decommissioning trust funds for proposed second phase of activities associated with early removal of components, including reactor coolant pumps, contaminated piping, and asbestos. Activities were completed by June 30, 1994.
- March 31, 1994, Citizens Awareness Network (CAN) filed a complaint in the Massachusetts District Federal Court claiming the NRC did not follow National Environmental Protection Act (NEPA) in its review of licensee's early component removal program. The court denied the complaint on jurisdictional grounds; however, CAN appealed to First Court of Appeals in Boston. Oral arguments were heard on January 10, 1995, and decision by the court is expected by spring 1995.
- NRC conducted informal hearing near Yankee Rowe site on August 16, 1994, to receive public testimony related to the decommissioning plan, which is under NRC staff review.
- NRC approved the decommissioning plan for SAFSTOR on February 14, 1995.

THREE MILE ISLAND UNIT 2

- March 28, 1979, accident occurred in the plant that caused permanent cessation of operations.
- January 30, 1990, reactor was defueled.
- August 12, 1993, processing of accident-generated water was completed.
- September 14, 1993, POL amendment was issued.
- December 28, 1993, post-defueling monitored storage technical specifications were issued.

SAN ONOFRE, UNIT 1

- November 30, 1992, licensee permanently shutdown plant

rather than bringing it into compliance with current NRC safety requirements.

- October 23, 1992, POL amendment was issued. Amendment became effective March 9, 1993, when reactor vessel was certified as completely defueled.
- December 28, 1993, permanently defueled technical specifications were issued.

TROJAN

- January 4, 1993, licensee announced permanent cessation of operations.
- January 27, 1993, reactor was defueled.
- May 5, 1993, POL amendment was issued.
- Licensee is considering removal and shipment of steam generators and pressurizer to the low level waste burial site at Hanford, Washington.

TABLE 2

REACTOR DECOMMISSIONING STATUS
SHUTDOWN POWER REACTORS

| DOCKET NO. REACTOR | THERMAL POWER | LOCATION | SHUT DOWN | PRESENT STATUS | FUEL ONSITE? |
|---|---|---|---|---|---|
| 50-3 Indian Point 1 (PWR) | 615 MW | Buchanan New York | 10/31/74 | Possession Only Lic. | Yes |
| 50-10 Dresden 1 (BWR) | 700 MW | Morris Illinois | 10/31/78 | SAFSTOR Approved | Yes |
| 50-16 Fermi 1 (Fast Breeder)* | 200 MW | Monroe Co. Michigan | 9/22/72 | SAFSTOR Approved | No |
| 150-18 GE VBWR (BWR) | 50 MW | Alameda Co. California | 12/9/63 | SAFSTOR Approved | No |
| 50-29 Yankee Rowe (PWR) | 600 MW | Franklin Co. Massachusetts | 10/1/91 | Possession Only Lic. | Yes |
| 50-114 CVTR (Pressure Tube, Heavy Water) | 65 MW | Parr S. Carolina | 1/67 | Byproduct Lic. (St.) | No |
| 50-130 Pathfinder (Nuclear Superheat BWR)* | 190 MW | Sioux Falls South Dakota | 9/16/67 | DECON NRC Part 30 | No |
| 50-133 Humboldt Bay 3 (BWR) | 200 MW | Eureka California | 7/2/76 | SAFSTOR Approved | Yes |
| 50-171 Peach Bottom 1 (HTGR)* | 115 MW | York Co. Pennsylvania | 10/31/74 | SAFSTOR Approved | No |
| 50-206 San Onofre 1 (PWR) | 1347 MW | San Clemente California | 11/30/92 | Possession Only Lic. | Yes |
| 50-267 Fort St. Vrain (HTGR)* | 842 MW | Platteville Colorado | 8/18/89 | DECON Approved | Yes |
| 50-312 Rancho Seco (PWR) | 2772 MW | Sacramento California | 6/7/89 | Possession Only Lic. | Yes |
| 50-320 Three Mile (PWR) Island 2 | 2772 MW | Middletown Pennsylvania | 3/28/79 | Possession Only Lic.** | No |
| 50-322 Shoreham (BWR)* | 2436 MW | Suffolk Co. New York | 6/28/89 | DECON Approved | Yes |
| 50-344 Trojan (PWR) | 3411 MW | Portland Oregon | 11/9/92 | Possession Only Lic. | Yes |
| 50-409 LaCrosse (BWR) | 165 MW | LaCrosse Wisconsin | 4/30/87 | SAFSTOR Approved | Yes |

* Project management assigned to Office of Nuclear Material Safety and Safeguards.
**post-defueled monitored storage

Attachment 2
to Enclosure 2

BP20 (8/95)

# LOW-LEVEL RADIOACTIVE WASTE

## Background

The Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA) (Pub. L. 99-240) established a series of milestones, penalties, and incentives for regional compacts and states to site low-level waste (LLW) disposal facilities. However, slow progress has been experienced in developing new LLW disposal facilities. The only remaining LLW disposal facilities are located in Barnwell, SC and Hanford, WA. Envirocare, in Utah, takes limited types of waste from certain generators. LLW generators in all states except North Carolina currently have access to commercial disposal facilities. This paper includes background information on implementation of the law and the status of LLW disposal facility development.

## LLW Disposal

Low-level radioactive waste is a general term for a variety of contaminated wastes generated by nuclear power plants, hospitals, medical and educational research institutions, private and governmental laboratories, and other commercial activities that use radioactive materials as a part of their normal operations. Approximately 860,000 cubic feet of LLW from these operations were disposed of in 1994. LLW from these sources is currently stored onsite or disposed of using shallow land burial at privately operated facilities located in the states of South Carolina and Washington. Access to the facility in Washington is restricted to LLW generators in the ten states that comprise the Northwest and Rocky Mountain Compacts. Access to the South Carolina facility had been restricted to the ten states in the Southeast Compact. However, on July 1, 1995, South Carolina enacted legislation which withdrew the State from the compact and authorized access to the facility for generators in all states except North Carolina. In addition, LLW with limited concentrations of radioactivity, normally in bulk form resulting from decommissioning and remediation activities, is accepted for disposal at the Envirocare facility in Clive, Utah.

## Low-Level Radioactive Waste Policy Act

The Low-Level Radioactive Waste Policy Act of 1980 (LLRWPA) made the states responsible for the disposal of commercially generated and certain federally generated LLW. The legislation encouraged the states to form compacts to dispose of LLW regionally.

The LLRWPA also designated January 1, 1986, as the date after which compacts could restrict the use of their disposal facilities by excluding waste generated outside the compact region. However, by 1983, it had become clear that no new disposal facilities would be operational by the 1986 milestone.

As a result, in January 1986, the LLRWPA Amendments Act was enacted. The LLRWPAA extended the January 1, 1986, deadline by ten years, to January 1, 1996. By that date, many new LLW disposal facilities were expected to be operational, and the rights of the LLW generators, to dispose of their LLW at the three operating sites, would end.

To help ensure that the states make adequate progress to develop new LLW disposal facilities, the Act established six milestones by which the states should make decisions and commit to certain actions. The majority of the states met the requirements of the milestone dates.

Compact Status

At present, nine compacts have been formed, representing 42 states. The accompanying figure shows the current arrangements of compacts and unaffiliated states (i.e., those states not in a compact). Legislation to establish the Texas Low-Level Radioactive Waste Disposal Compact (Texas Compact) was enacted by Texas on June 9, 1993. The compact was adopted by the state of Maine in November 1993 and the state of Vermont in April 1994. The remaining step is for the U.S. Congress to consent to the Texas Compact.

Progress to Develop New LLW Disposal Facilities

No new facilities are scheduled to be operational by January 1996. LLW disposal facilities in the host states of California, North Carolina, and Texas are expected to be operational between the period 1997 and 1998. Facilities in the host states of Connecticut, Illinois, Massachusetts, Nebraska, New Jersey, Pennsylvania, and New York are scheduled for operation in the period 1999 and 2002. There is no firm schedule available for the host state of Ohio, because siting activity cannot begin until the Ohio General Assembly enacts enabling legislation, expected this year. The unaffiliated states of Michigan, New Hampshire, Rhode Island, District of Columbia, and Puerto Rico have no plans to develop a LLW disposal facility. A number of these states believe that they may be able to fulfill their responsibilities through the contracting and/or compact process. The accompanying table shows the dates by which compact host states and unaffiliated states accomplished, or expect to accomplish, key steps in developing new disposal facilities.

Storage of LLW

NRC has a licensing and inspection program in place to ensure the safe storage of LLW if onsite storage of LLW is required as a result of the lack of access to a LLW disposal facility. The principal NRC guidance documents related to LLW storage are listed below.

- Generic Letter 81-38, "Interim Storage of Licensee-Generated Low-Level Radioactive Waste at Reactor Sites"
- Generic Letter 85-14, "Commercial Storage at Power Reactor Sites of Low-Level Radioactive Waste Not Generated by the Utility"
- Information Notice 89-13, "Alternative Waste Management Procedures in Case of Denial of Access to Low-Level Waste Disposal Sites"
- Information Notice 90-09, "Extended Interim Storage of Low-Level Radioactive Waste by Fuel Cycle and Materials Licensees"
- Information Notice 93-50, "Extended Storage of Sealed Sources"

Summary

Although no new LLW disposal facilities have been built, and one existing LLW disposal site has restricted access, access to LLW disposal has recently been restored for most generators. For those generators that do not have access, onsite storage will likely be required until new disposal facilities are developed.

Highlights of this media briefing background paper can be found in the attachment.

CONTACT:
James E. Kennedy, Low-Level Waste and Decommissioning Projects Branch, Office of Nuclear Material Safety and Safeguards, USNRC, Washington, DC 20555 (301) 415-6668

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INSERT FIGURE HERE

Contact Jim Kennedy at (301) 415-6668 for a copy

Actual and Estimated Dates for Completing Steps in Facility Development (Estimated Dates Obtained from Compacts/States)

| Compact/Host State | Select Site | Submit License Application | Operate Facility |
|---|---|---|---|
| Appalachian/Pennsylvania | 1995 | Early 1997 | Mid-1999 |
| Central/Nebraska | Dec 1989 | Jul 1990 | Fall 1999 |
| Central Midwest/Illinois | Unscheduled | Nov 1997 | Jul 2000 |
| Midwest/Ohio | Unscheduled | Unscheduled | Unscheduled |
| Northeast/Connecticut & | Unscheduled | 1999 | 2002 |
| New Jersey | Unscheduled | Jan 1998 | Jul 2000 |
| Southeast/North Carolina | Dec 1993 | Dec 1993 | Mid-1998 |
| Southeast/California | Mar 1988 | Dec 1989 | Mid-1997 |
| **Unaffiliated States** | | | |
| Maine (See Note) | | | |
| Massachusetts | Unscheduled | Feb 1998 | 2000/2001 |
| Michigan | Unscheduled | Unscheduled | Unscheduled |
| New York | Unscheduled | Jun 1999 | Nov 2001 |
| Texas | Aug 1991 | Mar 1992 | Mid-1997 |
| Vermont (See Note) | | | |

Note: Formation of a compact pending with Texas as the host State.

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**HIGHLIGHTS**

# STATE COMPLIANCE WITH 1993 MILESTONE AND 1996 LEGISLATIVE OBJECTIVE OF THE LOW-LEVEL RADIOACTIVE WASTE POLICY AMENDMENTS ACT OF 1985 (LLRWPAA)

- LLRWPAA established milestones, incentives, and penalties for States to develop new low-level radioactive waste (LLW) disposal facilities. Milestones were established for 1986, 1988, 1990, 1992, 1993, and 1996.

- Majority of States met the first three milestones.

- Only four States (California, Illinois, Nebraska, and Texas) met the 1992 milestone; however, no State met the 1993 milestone and none is scheduled to meet the 1996 legislative objective of the LLRWPAA.

- Access to the LLW disposal facility in Barnwell, South Carolina, is currently available to generators in all states except North Carolina.

Attachment 3
to Enclosure 3

BP30 (8/95)

# TRANSPORTATION OF RADIOACTIVE MATERIALS

## Background

The Nuclear Regulatory Commission (NRC), the Department of Transportation (DOT), and the Federal Emergency Management Agency (FEMA) share federal responsibility for safety in the transportation of radioactive material. NRC is responsible primarily for safe packaging to ensure radiological health and safety, and for safeguards to assure the security of designated shipments against sabotage. DOT is responsible for regulating safe transport during shipment. FEMA is responsible for coordinating federal and state participation in developing emergency response plans. In addition, federal assistance for radiological protection in the event of an accident is available primarily through the Department of Energy (DOE). DOE maintains teams of technically trained nuclear safety specialists at about 30 sites throughout the country, (DOE can approve packages for its own use; NRC licensees do not use these packages.)

## Discussion

Primary reliance for safety in transportation of radioactive material is placed on the packaging. The DOT regulations prescribe general standards and requirements for all packages of radioactive material, and for handling and storage of those packages by carriers. For packages that contain no significant fissile radioactive material and only small quantities of other radioactive materials, the DOT standards and requirements provide adequate assurance of containment and shielding of the radioactive material. While these small quantity packages, termed Type A packages, may fail in an accident situation, the radiological consequences would be limited because of the limited package contents.

When the radioactive content of a package exceeds the small Type A quantity limit, it may only be transported in a Type B package, one that will survive transportation accidents. A Type B package must be designed to withstand a series of specified impact, puncture and fire environments, providing reasonable assurance that the package will withstand most severe transportation accidents. The NRC engineering staff must independently review the design to verify its accident resistance. Finally, the NRC must issue a certificate before a Type B package fabricated from that design can be used to transport radioactive material.

The standards in DOT and NRC regulations provide that the packaging shall prevent the loss or dispersion of the radioactive contents, provide adequate shielding and heat dissipation, and prevent nuclear criticality under both normal and accident conditions of transportation. The normal conditions of transport that must be considered are specified in the regulations in terms

of hot and cold environments, pressure differential, vibration, water spray, impact, puncture and compression tests. Accident conditions that must be considered are specified in terms of impact, puncture and fire conditions.

A licensee who wishes to use a packaging, for which the NRC has issued a certificate of compliance, must have a quality assurance program that satisfies the applicable NRC regulations and has been approved by the NRC. The licensee is required to have a copy of the certificate of compliance, the packaging drawings, and other documents referenced in the approval relating to the use and maintenance of the packaging and to the actions to be taken before shipment. The licensee must also register with the NRC as a user of a specific packaging.

DOT regulations require that a package be labeled with a unique radioactive material label. In transportation, the carrier is required to exercise control over radioactive material packages, including loading and storage in areas separated from persons, and to limit the aggregation of packages to lower the chance of exposure of persons.

In case of an accident, the carrier must notify the shipper and the DOT, isolate any spilled radioactive material from personnel contact pending disposal instructions, and hold vehicles, buildings, areas, or equipment from service or routine occupancy until they are cleaned to specified values. Radiological assistance teams are available through a federal interagency program to provide equipment and trained advisory personnel, if necessary, to help manage accidents involving radioactive materials.

The DOT has requirements concerning highway routing and driver training requirements for larger quantity radioactive material shipments. Under the DOT rule, shipments made by truck would generally follow the most direct interstate route and would be required to avoid large cities where an interstate bypass or beltway is available. States are permitted to designate alternate routes when those routes are demonstrably as safe as the routes specified in the rule. As a related matter, the NRC regulations require timely notification to the governor or his designee of any state prior to transport of potentially hazardous nuclear waste, including spent fuel, to, through or across the boundary of the state. The NRC also approves routes for the shipment of spent fuel based upon concern for deliberate acts to seize or damage the shipment. The physical security requirements to prevent such acts include but are not limited to: communications capability, driver and escort training, armed escorts through densely populated areas, transport immobilization features, and plans to deal with contingencies.

Past studies indicate that approximately 2.5 million packages of

radioactive materials are being shipped in the United States each year by road, rail, and air. Within the limitations of the regulatory standards, radioactive materials may be safely transported in routine commerce using conventional transportation equipment.

To assure continued adequacy of measures required for the public health and safety, the NRC completed a reevaluation of its regulations concerning transportation of radioactive materials. During the reevaluation, the NRC published a final environmental statement, designated NUREG-0170, which examined radioactive material transportation by all transport modes. Considering the information developed, the public comments received, and the safety record associated with the transportation of radioactive materials, the NRC determined that its present regulations provide a reasonable degree of safety and that no immediate changes are needed to improve safety. Nevertheless, the NRC continues to study safety aspects of transportation of radioactive materials to determine where improvements for safety should be made.

## SHIPMENT OF PLUTONIUM BY SEA

### Background

Section 2904 of the Energy Policy Act of 1992 requires that the President, in consultation with the Nuclear Regulatory Commission, conduct a study on the safety of shipments of plutonium by sea, and submit a report to Congress within 60 days (December 23, 1992). The act also requires the President to submit an implementation plan for the study's recommendations not later than 90 days after transmittal of the report.

The act requires that the study consider the following: (1) the safety of the casks containing the plutonium; (2) the safety risks, to States, of such shipments; (3) the adequacy of a State's emergency plan with respect to such shipments (if requested by the State); and (4) the Federal resources needed to assist the States because of such shipments.

### Discussion

The report, which was transmitted to Congress on February 8, 1994, represents a joint effort by the Departments of State (DOS), Defense (DOD), Energy (DOE), and Transportation; the Coast Guard; the Environmental Protection Agency; the Federal Emergency Management Agency (FEMA) and NRC. The report discusses the health and safety risks of shipping plutonium by sea. It concludes that plutonium can be safely shipped, by sea, under current international and domestic requirements and practices. The report did not identify any areas where specific actions

would be required to protect public health and safety. The report also discusses the emergency response roles of Federal agencies, and addresses the specific issues raised in Section 2904 of the Energy Policy Act of 1992.

The report makes the following recommendations:
(1) Executive Branch agencies and NRC should maintain awareness of future plutonium shipments and monitor the need for revising transportation standards if present circumstances change;
(2) the report should be noticed in the Federal Register and distributed to State and international organizations, such as the International Atomic Energy Agency (IAEA) and the International Maritime Organization (IMO);
(3) relevant Federal agencies should continue to participate in study groups or working groups organized by the IAEA, IMO, or other international organizations;
(4) FEMA should promptly review State emergency plans with respect to plutonium shipments, as already requested by certain States, and should solicit submission of emergency response plans by all coastal States;
(5) Federal agencies should take into account the need for additional resources, identified during the review of State emergency plans, when preparing agency budget submissions for FY94 and beyond; and
(6) Federal agencies responsible for maintaining the Federal Radiological Emergency Response Plan (FRERP) should revise the plan to clearly establish the appropriate level of response for accidents involving transient shipments of radioactive material.

The implementation plan was transmitted to Congress by DOE on April 27, 1995.

Contact:
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Attachment 4
to Enclosure 3

NUREG/BR-0079, Revision 1

# THE PRICE-ANDERSON SYSTEM

## OFFICE OF NUCLEAR REACTOR REGULATION

## U.S. NUCLEAR REGULATORY COMMISSION


For additional information, contact:

**Office of Nuclear Reactor Regulation**
**U.S. Nuclear Regulatory Commission**
**Washington, D.C. 20555**
**(301) 492-1289**

# Introduction to Indemnity and Insurance

The Price-Anderson Act, which became law on September 2, 1957, as part of the Atomic Energy Act of 1954, was enacted by Congress to meet two basic objectives:

(1) to ensure that adequate funds would be available to satisfy liability claims of members of the public in the unlikely event of a very low probability catastrophic nuclear accident;

(2) to remove the deterrent to private sector participation in the use of nuclear power presented by the threat of potentially large liability claims if such an accident were to occur.

Price-Anderson provides a system to pay funds for claims by members of the public for personal injury and property damage resulting from a nuclear accident. It requires utility holders of licenses of large commercial nuclear power plants to provide proof to the Nuclear Regulatory Commission (NRC) that they have private nuclear liability insurance (or some other form of what is called "financial protection") equal to the maximum amount of liability insurance available from private sources. Licensees for smaller reactors provide financial protection in lesser amounts. Colleges and universities that operate research reactors and Federal agencies that hold reactor licenses are not required to buy insurance.*

The Price-Anderson Act, as it now operates and will continue to operate until its expiration on August 1, 2002, entails a two-part insurance system for liability payments. The first consists of primary nuclear liability insurance available in the private market whereby utilities operating large power reactors pay a premium each year for a fixed amount of liability coverage. The coverage, which was increased effective July 1, 1989, is $200 million for each large power reactor site. This primary insurance is supplemented by the second part of the Price-Anderson insurance system that applies only to operators of large licensed power reactors. In the event of a nuclear accident causing damages exceeding $200 million, each licensed nuclear power plant would be assessed a prorated share of damages in excess of the primary insurance coverage of up to ~~$63~~ $75.5 million per reactor per accident. This increase to $63 million from $5 million was the major amendment made to the Price-Anderson Act by the enactment on August 20, 1988, of Public Law 100-408, "The Price-Anderson

*The Price-Anderson Act also authorizes the Department of Energy (DOE) to indemnify some of its contractors from liability resulting from a nuclear accident. DOE does not require its contractors to maintain nuclear insurance or other financial protection.

Amendments Act of 1988." With ~~115~~ 109 commercial reactors currently under this system as of ~~July 1, 1989,~~ the secondary or "deferred premiums" insurance totals ~~$7.245~~ $8.227 billion.

Whenever a licensee is required to maintain financial protection, Price-Anderson requires that the licensee execute and maintain an indemnification agreement with the Commission that extends for the life of the license. The indemnification agreement specifies the obligations of the government with respect to its licensees. One of the obligations of the government is to make indemnity payments for claims in excess of private insurance or in those cases where no private insurance is required.

In effect, the Act places a ceiling on the total amount of liability in an accident.* For many years, the "limit of liability" was the sum of private insurance coverage plus government indemnity and totaled $560 million. In November 1982, when the primary and secondary insurance layers for large power reactors reached $560 million, the government's indemnity was essentially eliminated and the limit of liability became the total of these two layers. The present limit will continue to increase in increments of ~~$63~~ $75.5 million for each new commercial reactor licensed to operate.

## Formation and Operation of Nuclear Insurance Pools

Two insurance pools provide the utility industry with the nuclear insurance capacity envisioned under Price-Anderson. One pool, American Nuclear Insurers (ANI), is composed of investor-owned stock insurance companies. The other pool, Mutual Atomic Energy Reinsurance Pool (MAERP), is made up of policyholder-owned mutual insurance companies. About half of each pool's total liability capacity comes from foreign sources, e.g., Lloyd's of London, and the Japanese and German insurers.

Member companies constituting the pools decide independently the amount or capacity they wish to commit to nuclear risks. The pools write two basic forms of nuclear energy liability policies – the Facility Form and the Suppliers' and Transporters' (S&T) Form. Each policy remains in effect until cancelled (rather than being subject to annual renewal) and contains a single amount of maximum insurance for the entire policy period. The Facility Form is for the owners and operators of nuclear facilities and when provided as financial protection is a formal part of the Price-Anderson system. (The Facility Form is also sold to operators of nuclear facilities other than reactors, and in most cases, the policies are not part of the Price-Anderson system.) The S&T Form is not part of the Price-Anderson system and is purchased by those who may supply goods or services to facilities that have not purchased a Facility Form or by those who desire additional coverage. The pools also participate in the secondary part of financial protection required by Price-Anderson by issuing policies that set forth the terms, conditions, and obligations of the parties to cover the secondary part of insurance protection. The pools are authorized to charge the utilities and then pay out the collected premium funds on behalf of the utility that had the accident. The pools also agree to pay for utilities that default in the payments under this secondary coverage for a total of up to $30 million for one accident, and up to $60 million in any one year.*

## Premium Structure

Premium rates for the primary part of nuclear liability insurance are established by an insurance industry rating bureau. Rates for nuclear liability insurance vary depending on the location of the nuclear facility, its size, use, and type of reactor containment building. The average annual premium for a single-unit reactor site is about $545,000. The premium for a second (or third) unit at a multi-unit site is substantially discounted to reflect a sharing of limits. Because of the limited loss experience in the operation of nuclear reactors, which in turn makes determining premiums difficult, the pools have used a system since 1957 called the Industry Credit Rating Plan (ICRP). This plan provides that about 70 percent of each year's premium is earmarked for payment of insured losses and expenses. To the extent that this portion of the premium is not needed for losses or expenses within 10 years of its payment, it is refunded to those insured. In 1988 the pools refunded to policyholders a total of $7.668 million, an amount representing 53.9 percent of the reserve premium paid to the pools in 1978. Since 1967, a total of approximately $52.5 million in premiums has been refunded to policyholders.

In addition to maintaining liability insurance under Price-Anderson to pay claims for offsite property damage and personal injury, utilities are also required, apart from Price-Anderson, to obtain

*However, the Price-Anderson Act also states that "in the event of a nuclear incident involving damages in excess of that amount of aggregate liability, the Congress will thoroughly review the particular incident and will take whatever action is deemed necessary and appropriate to protect the public from the consequences of a disaster of such magnitude. . ."

*Beyond this amount the NRC's indemnity agreement permits the NRC to guarantee defaults of licensees and to seek recovery for these defaults. The NRC reviews annually the guarantees of secondary premiums submitted by large power reactor licensees to reduce the likelihood that the government would have to cover such defaults.

onsite property damage insurance. This requirement ensures that nuclear utilities have adequate funds to cover the costs of decontaminating and cleaning up a reactor site after an accident.

## Claims Experience of the Nuclear Insurance Pools

From 1957 to March 31, 1989, claims were filed for 134 alleged incidents involving nuclear material under various nuclear liability insurance policies. Earlier claims tended to be for property damage arising out of alleged radiation from leakage or other accidents involving the containers of nuclear material in transit. By contrast, more recent claims have emphasized alleged bodily injury arising out of radiation exposure, especially by workers on the sites of operating nuclear power plants.

Insured losses and expenses involved in investigating and settling claims through March 31, 1989, totaled approximately $67 million. Of this amount, about $46 million arose out of the accident at Three Mile Island Unit 2 (TMI-2) that began on March 28, 1979, and covered loss payments, a settlement agreement, and expenses by the pools.

# Additional Features of Price-Anderson

## Scope of Price-Anderson Coverage

The insurance policies held by licensees as financial protection and the indemnification agreement that the Commission enters into with its licensees are "omnibus" in nature, in that the protection extends to the utility licensees and to any other persons who may be legally liable. The scope of Price-Anderson coverage includes any accidents (including those that come about because of theft or sabotage) in the course of transportation of nuclear fuel to the reactor site; in the storage of nuclear fuel at the site; in the operation of the reactor, including discharge of radioactive effluents; in the storage of nuclear fuel and nuclear waste at the reactor site; and in the transportation of nuclear fuel and nuclear waste from the reactor. The Act does not require coverage for spent fuel or nuclear waste stored at interim storage facilities, transportation of nuclear fuel or waste that is not either to or from a nuclear reactor, or acts of theft or sabotage occurring after planned transportation has ended. However, nuclear insurance can be purchased from the pools for up to $200 million to cover some of these activities.

## Mandatory and Discretionary Authority

The Price-Anderson Act currently provides that the Commission will require financial protection, indemnify licensees, and limit liability of persons indemnified for any production or utilization facility for which a construction permit is issued before August 1, 2002, the expiration date of the Act. Included within the term "production and utilization facilities" are all nuclear reactors regardless of their size or use, as well as fuel reprocessing plants (there are no such reprocessing plants licensed today). Although the Commission is required to apply the provisions of the Act to all production and utilization facilities, it is also given discretionary authority to extend indemnity coverage to activities undertaken by other types of licensees. Subsequent to the 1975 renewal of Price-Anderson, the Commission considered whether this discretionary authority should be extended to licensees possessing or using specified quantities of plutonium in plutonium processing and fuel fabrication facilities. After studying the issue, the Commission decided to require financial protection for and extend indemnity to those plutonium processing and fuel fabrication facility licensees possessing at least 5 kilograms (11 pounds) of plutonium or using 1 kilogram (2.2 pounds) or more.

A few years later, NRC also evaluated whether it should require financial protection for materials licensees other than those possessing plutonium. Based on work performed for NRC by the Oak Ridge National Laboratory, and further NRC study of this question, it was decided that no apparent need existed to extend Price-Anderson to other classes of materials licensees. The only other instance in which the Commission has exercised its discretionary authority under the Act was to provide indemnity coverage for spent fuel produced at one reactor and stored at the site of another reactor owned by the same licensee.

In accordance with the provisions of Section 19 of The Price-Anderson Amendments Act of 1988 the Commission was required to determine, through use of a negotiated rulemaking proceeding, whether persons licensed by the Commission for the possession or use of radiopharmaceuticals for medical purposes should be indemnified. The Commission initiated the rulemaking proceeding on October 14, 1988. Five sessions of the proceeding conducted by a convenor designated by the Commission were held during the next months.

During these sessions the Commission maintained that extension of Price-Anderson indemnification to radiopharmaceutical licensees, who possess small amounts of relatively short-lived radioactive materials, would be inconsistent with the Price-Anderson

Act's philosophy of only indemnifying licensees that possess large or especially dangerous quantities of hazardous materials. In March 1989, the convenor recommended that the NRC not extend Price-Anderson indemnification to radiopharmaceutical licensees. The primary reason given by the convenor was that since most radiopharmaceutical licensee facilities contain inventories that include both licensed byproduct material and nonlicensed naturally occurring and accelerator produced radioactive material (NARM), any damage resulting from the release of the nonlicensed NARM cannot be covered by indemnity agreements between licensees and the NRC. On the basis of the convenor's recommendation not to extend indemnity coverage, the Commission terminated the negotiated rulemaking proceeding.

## The Nuclear Exclusion in Property-Liability Insurance Policies

Virtually all property and liability insurance policies issued in the United States, except the ones issued by the nuclear insurance pools, exclude nuclear damage. The exclusion means that claims for damage to a policyholder's dwelling, automobile, or other property by radiation or contamination from a nuclear facility would not be collectible under that policyholder's own insurance policies. Thus, if a property owner suffered damage to his property because of a nuclear accident, the compensation would come from nuclear liability insurance or government indemnity as provided under Price-Anderson.

Although the Price-Anderson Act does not prohibit private insurers from offering this type of insurance, the standard fire and property policies have contained the exclusion since 1959. The insurers consider that property damage caused by a nuclear accident would be covered by nuclear liability insurance provided under the Price-Anderson Act and that coverage for the same property damage should be excluded from the conventional homeowner's policy to avoid duplication of coverage.

Attachment 5
to Enclosure 3

BP14 (8/95)

# HIGH-LEVEL RADIOACTIVE WASTE

## Background

High-level radioactive waste (HLW) means: (1) irradiated (spent) reactor fuel, (2) liquid wastes resulting from the operation of the first cycle solvent extraction system, and the concentrated wastes from subsequent extraction cycles, in a facility for reprocessing irradiated reactor fuel, and (3) solids into which such liquid wastes have been converted. HLW is primarily in the form of spent fuel from commercial nuclear power plants; it also includes some reprocessed HLW from defense activities, and a small quantity of reprocessed commercial HLW.

## High-Level Radioactive Waste

This country's policies governing the permanent disposal of HLW are defined by the Nuclear Waste Policy Act of 1982 (NWPA) and the Nuclear Waste Policy Amendments Act (NWPAA) of 1987. Under these acts, the U.S. Department of Energy (DOE) has the responsibility for disposing of HLW, the U.S. Environmental Protection Agency (EPA) is responsible for developing appropriate environmental standards for HLW, and the Nuclear Regulatory Commission (NRC) has the licensing authority for the disposal and long-term storage of HLW.

To provide the long-term permanent isolation required, the NWPA specifies that HLW will be placed in one or more deep-underground geologic repositories to be built and operated by DOE. To this end, DOE is developing a waste management system consisting, in part, of a geologic repository in which HLW can be permanently isolated deep beneath the surface of the earth.

Previous DOE plans for management of HLW called for the development of a monitored retrievable storage (MRS) facility by 1998, and a permanent HLW repository deep beneath the surface of the earth by the year 2010. These plans called for the MRS facility to be an integral part of the waste management system being proposed by DOE for achieving timely acceptance of spent fuel. NWPAA allows a dual approach to MRS siting: (1) siting by DOE, through a process of survey and evaluation; and (2) siting through the efforts of the Nuclear Waste Negotiator. The Office of the Nuclear Waste Negotiator was established by the NWPAA to find a state or Indian Tribe willing to host a repository or MRS at a technically qualified site. However, the Office of the Nuclear Waste Negotiator was abolished on January 23, 1995.

DOE is also pursuing the development of a multi-purpose canister (MPC). The MPC would have different overpacks for storage, transport, and disposal. The MPC could be used for interim

storage at an independent spent fuel storage installation (ISFSI) at a reactor site, an away-from-reactor ISFSI, an MRS, or the repository pending ultimate disposal.

Through the NWPAA, Congress designated the Yucca Mountain site in Nevada as the single candidate site for characterization as a potential geologic repository. The Yucca Mountain site has not been selected for a repository; rather, it has been chosen as the only site to be thoroughly examined at this time. This examination is referred to as site characterization and involves exploration and research, both in the laboratory and in the field, undertaken to establish the geologic conditions and the ranges of those parameters at a particular site. Site characterization includes boring, surface excavations, excavation of exploratory shafts or ramps, subsurface lateral excavations and boring, and in situ testing at depth to determine the suitability of the site for a geologic repository.

Regulations

The NRC's requirements for disposal of HLW in a geologic repository (10 CFR Part 60) govern pre-licensing activities, authorization for DOE to begin construction of the facility, authorization for DOE to receive and place the wastes in the facility, and authorization for DOE to close the facility (license termination).

The NRC's regulations governing the storage of HLW in an MRS facility (10 CFR Part 72) establish requirements, procedures, and criteria for the issuance of licenses to receive, transfer, and possess power reactor spent fuel, solid HLW, and other radioactive material associated with spent fuel storage.

The EPA's regulations for the disposal of HLW in a geologic repository establish generally applicable environmental standards for the management and disposal of spent nuclear fuel and other HLW. The NRC is responsible for implementing these standards.

Site Characterization

The HLW repository program is focused on pre-licensing site characterization activities. In the pre-licensing phase, one of NRC's primary responsibilities is to review DOE's site characterization plan and associated activities, and to provide comments to DOE identifying any specific concerns. In addition, the NRC staff observes various site characterization activities in the field, such as drilling and tunneling, and also observes DOE quality assurance surveillances and audits. All pre-licensing consultation activities are open to participation by the state of Nevada, affected Indian Tribes, and affected units of local governments.

DOE completed its site characterization plan for the Yucca Mountain site in December 1988. The NRC staff completed its review of that document in July 1989, and concluded that overall, it was a usable plan for site characterization. Originally, the staff identified two objections to DOE starting site characterization. One objection concerned the DOE quality assurance (QA) program, and the other was related to the design process for the Exploratory Studies Facility (ESF). Additionally, 196 other concerns in the form of comments and questions were raised. To date both objections have been closed, along with a number of the other concerns.

In 1991, the State of Nevada granted DOE the permits necessary for DOE to proceed with surface based site characterization activities. These activities include the excavation of test pits and trenches, borehole drilling, and hydrologic monitoring to address technical issues related to volcanism, radionuclide transport, seismicity, and faulting. DOE continues to actively conduct site characterization field work in these areas at the Yucca Mountain Project Site and vicinity.

In September 1994, the Tunnel Boring Machine (TBM) began excavation of the ESF. By July 19, 1995, the TBM had bored approximately 3789 feet, tunnelling through a series of geologic features including a significant geologic feature of the site known as the Bow Ridge Fault. Excavation into the fault was completed in July 1995. DOE is preparing to investigate the hydrologic and hydrochemical properties of the fault.

One area of concern identified by the staff deals with a lack of an effective QA program for correcting identified problems and ensuring full integration of issues related to the design and construction of the ESF. The staff had raised this issue in letters to DOE in 1993 and 1994. During the week of April 3, 1995, the NRC staff conducted an in-field verification to determine if DOE's commitments to address this issue were being effectively and acceptably implemented. The NRC staff concluded that, within the scope of the in-field verification, compliance with the commitments was satisfactory. By letter of June 16, 1995, the NRC staff transmitted its report of the in-field verification to DOE. The staff will review additional documents, submitted by DOE, and conduct another inspection before it can finally close the open items identified in the 1994 letter.

In spring 1995, DOE implemented its new Program Approach for streamlining the process for determining site suitability, site characterization, and development and submittal of its license application. Although the NRC staff believes that intended improvements in integration will result in program improvements, the NRC staff has concerns with several aspects of the Program Approach. Before the Program Approach, DOE had provided the statutorily required Site Characterization Plan (SCP) which

contained a site characterization program baseline. This baseline was updated and program status provided in SCP Progress Reports. The NRC review of the SCP was focused on the sufficiency of data collected to support the licensing process. The Program Approach streamlines the site characterization process and therefore affects the data collected to support licensing. To date, the NRC staff has not been provided, either through SCP Progress Reports or other documentation, with enough details to determine if the Program Approach will develop sufficient data to demonstrate compliance with the Commission's regulations for licensing a HLW repository. The staff is, therefore, planning to conduct a series of independent "vertical slice" evaluations of DOE's work under the Program Approach of selected key technical issues to assess the sufficiency of the program for collecting licensing data.

In keeping with its responsibilities, the EPA issued generally applicable environmental standards for a HLW repository in 1985. These standards were remanded in 1987 by a federal appeals court due to inconsistencies with other EPA standards with respect to individual dose and ground-water protection. Since that time, EPA has been working on revising its standards. However, in late 1992, Congress passed the Energy Policy Act (EnPA) of 1992 which required EPA to contract with the National Academy of Sciences (NAS) to conduct a study on specific aspects of these standards and issue findings and recommendations. The NAS completed its review and expects to issue recommendations to EPA on August 1, 1995. Briefings are planned on August 1, 1995 for liaison representatives from EPA, DOE, NRC, Nevada State government and Congressional representatives followed by a press conference in the Washington area. Furthermore, on August 2, 1995, NAS will conduct a public meeting in Las Vegas, Nevada. Among the issues the NAS must address are: (1) the reasonableness of a health-based standard based on individual dose; (2) the ability of post-closure oversight to prevent an unreasonable risk of breaching the repository's barriers or increasing the exposure of the public to radiation beyond allowable limits; and (3) the capability to make scientifically supportable predictions of the probability of human intrusion for 10,000 years.

Interest has been expressed by nine groups in evaluating the feasibility of hosting an MRS. Presently, DOE has no plans to develop an interim storage facility. In January, Senator J. Bennett Johnston (D-La) introduced Senate Bill S. 167, "The Nuclear Waste Policy Act of 1995," which, if passed, would direct DOE to establish interim storage at Yucca Mountain at the earliest practicable date. No action has been taken on this bill and the Senate action on pending HLW legislation is uncertain. Similar legislation, H.R. 1020, has been introduced in the House of Representatives by Representative Fred Upton (R-MI). The House Commerce Committee has completed Subcommittee hearings and

a markup of H.R. 1020 and the full Committee may begin markup on Wednesday, August 3, 1995.

Separate Congressional action by the House and Senate Appropriations Committees points toward a redirection of the DOE HLW program. Citing the spending limitations put upon the Committees, the DOE HLW program budget was drastically reduced and the DOE directed to suspend, downgrade or terminate its repository program in favor of developing an interim storage facility to begin acceptance of commercial spent nuclear fuel by 1998. The House has passed the Appropriation bill, H.R. 1905. The Senate Appropriations Committee has completed markup and the full Senate is expected to begin its deliberations on the bill shortly.

On May 19, 1994, DOE's Office of Civilian Radioactive Waste Management (OCRWM) published a Notice of Inquiry (NOI) in the Federal Register. The purpose, it said, was "intended to implement the Secretary's initiative by eliciting the views of affected parties on (1) the Department's preliminary view that it does not have a statutory obligation to accept spent fuel in 1998 in the absence of an operational repository or other facility constructed under the Act; (2) the need for an interim, away-from-reactor storage facility prior to repository operations; and (3) options for offsetting, through the use of the Nuclear Waste Fund, a portion of the financial burden that may be incurred by utilities in continuing to store spent nuclear fuel at reactor sites beyond 1998." In February 1995, DOE published a summary report of the 1100 comments received. On May 3, 1995, DOE published its "Final Interpretation of Nuclear Waste Acceptance Issues" in the Federal Register. The Final Interpretation responds to the comments received and sets forth DOE's conclusions concerning the legal issues raised in the NOI. DOE concluded that it has no legal obligation to begin accepting HLW and spent nuclear fuel in 1998, in the absence of a repository or other facility constructed under the NWPA. DOE also concluded that it has no authority under the NWPA to provide interim storage.

In October 1992, DOE initiated a study to evaluate the feasibility of using multi-purpose canisters (MPC) in the waste management system. The MPC concept is to use a common container that has different overpacks for transportation, storage, and disposal. The purpose of the MPC is, first, to create a compatible approach for the transportation and storage of spent nuclear fuel, and then to consider compatibility with final disposal. DOE completed its MPC study and held workshops in July and November 1993 to obtain input from interested parties in developing the MPC concept. In June 1994, DOE issued a Request for Proposal for MPC designs and held an MPC bidders conference. In April 1995, DOE awarded Westinghouse Electric Corporation (of

Pittsburgh, Pennsylvania) a contract to prepare design information suitable for submittal to NRC for certification review. Under terms of the contract, Westinghouse will complete design and safety analysis reports within twelve months. In June 1995, three unsuccessful bidders protested the Westinghouse contract award. The U.S. General Accounting Office is reviewing these protests and is expected to make a decision regarding the merit of the protest by mid-September 1995. Meanwhile, Westinghouse will continue its work.

CONTACT:
Joseph J. Holonich, Chief, High-Level Waste and Uranium Recovery Projects Branch, Division of Waste Management, Office of Nuclear Material Safety and Safeguards, U.S. NRC, Washington, DC 20555, (301) 415-6643.

## HIGHLIGHTS OF HIGH-LEVEL RADIOACTIVE WASTE (HLW)

- NWPA (1982) and NWPAA (1987) lay out a national program for disposal of HLW in a deep geologic repository and possible interim storage in an MRS
- NWPAA designated Yucca Mountain, Nevada, for characterization as a potential repository site
- NRC requirements for the interim storage of HLW are contained in 10 CFR Part 72
- NRC requirements for the disposal of HLW are contained in 10 CFR Part 60
- EPA standards for the disposal of HLW are contained in 40 CFR Part 191
- The EnPA requires that: NAS conduct a study on specific aspects of the HLW environmental standards and make recommendations on an appropriate technical basis for Yucca Mountain standards; EPA revise its standards based upon, and consistent with, the NAS findings and recommendations within one year after it receives the NAS findings; and NRC amend its technical requirements and criteria to conform to the EPA standard within one year of the promulgation of EPA's standards
- NRC is currently involved in pre-licensing interactions and review of DOE HLW repository site characterization activities
- NRC is currently involved in pre-licensing interactions and review of DOE MRS activities
- DOE to submit to NRC a HLW repository license application for construction authorization in 2001
- DOE to begin waste emplacement in a HLW repository in 2010
- All pre-licensing consultation activities are open to participation by the State of Nevada, affected Indian Tribes, and units of affected local governments

Attachment 6
to Enclosure 3

BP6 (8/95)

# EMERGENCY PLANNING AND PREPAREDNESS

Background:

Following the accident at Three Mile Island in 1979, the Nuclear Regulatory Commission (NRC) reexamined the role of emergency planning for protection of the public in the vicinity of nuclear power plants. The Commission issued regulations requiring that before a plant could be licensed to operate, the NRC must have "reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency." The regulations set forth 16 emergency planning standards and define the responsibilities of licensees and State and local organizations involved in emergency response.

Emergency Planning and Preparedness:

Emergency planning has been adopted as an added conservatism to the NRC's "defense in depth" safety philosophy. Briefly stated, this philosophy: (1) requires high quality in the design, construction and operation of nuclear plants to reduce the likelihood of malfunctions in the first instance; (2) recognizes that equipment can fail and operators can make errors, therefore requiring safety systems to reduce the chances that malfunctions will lead to accidents that release fission products from the fuel; and (3) recognizes that, in spite of these precautions, serious fuel damage accidents can happen, therefore requiring containment structures and other safety features to prevent the release of fission products offsite. The added feature of emergency planning to the defense-in-depth philosophy provides that, even in the unlikely event of a release of radioactive materials to the environment, there is reasonable assurance that emergency protective actions can be taken to protect the population around nuclear power plants.

Regulations:

For planning purposes, the Commission has defined a plume exposure pathway emergency planning zone (EPZ) consisting of an area about 10 miles in radius and an ingestion pathway EPZ about 50 miles in radius around each nuclear power plant. EPZ size and configuration may vary in relation to local emergency response needs and capabilities as affected by such conditions as demography, topography, land characteristics, access routes, and jurisdictional boundaries.

The Commission's 16 emergency planning standards are contained in 10 CFR Part 50.47. They cover the following topics:

1. Assignment of Responsibility
2. Onsite Emergency Organization
3. Emergency Response Support and Resources
4. Emergency Classification System
5. Notification Methods and Procedures
6. Emergency Communications
7. Public Education and Information
8. Emergency Facility and Equipment
9. Accident Assessment
10. Protective Response
11. Radiological Exposure Control
12. Medical and Public Health Support
13. Recovery and Reentry Planning and Post-Accident Operations
14. Exercises and Drills
15. Radiological Emergency Response Training
16. Responsibility for the Planning Effort: Development, Periodic Review and Distribution of Emergency Plans

Detailed information about emergency planning and preparedness is contained in Appendix E of 10 CFR Part 50 and in NUREG-0654 (FEMA-REP-1), a joint publication of the NRC and the Federal Emergency Management Agency (FEMA) entitled "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants."

Current Status

In the U.S., commercial nuclear power reactors are currently licensed to operate at approximately 70 sites in 32 states. For each there are onsite and offsite emergency plans to assure that adequate protective measures are taken to protect the public in the event of a radiological emergency. Federal oversight of emergency planning for licensed nuclear power plants is shared by the NRC and FEMA through a memorandum of understanding. The memorandum is responsive to the President's decision of December 7, 1979, that FEMA will take the lead in offsite planning and response, his request that NRC assist FEMA in carrying out this role, and the NRC's continuing statutory responsibility for the radiological health and safety of the public.

Each licensee exercises its emergency plan with offsite authorities so that State and local government emergency plans for each operating reactor site are exercised biennially, with participation of State and local governments, within the plume exposure EPZ.

CONTACT: Falk Kantor, Emergency Preparedness and Radiation Protection Branch, Office of Nuclear Reactor Regulation, U.S. NRC, Washington, D.C. 20555, (301) 415-2907

BP6 (8/95)

HIGHLIGHTS OF EMERGENCY PLANNING AND PREPAREDNESS

- Three Mile Island accident focused attention on emergency planning.
- NRC must have reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency.
- NRC regulations in 10 CFR 50.47 contain 16 emergency planning standards.
- Emergency planning is part of NRC's "defense in depth" safety philosophy.
- The plume exposure planning zone (EPZ) extends about 10 miles in radius around each licensed nuclear power plant.
- The ingestion pathway EPZ extends about 50 miles in radius.
- Details about emergency planning are contained in Appendix E of 10 CFR Part 50 and in NUREG-0654.
- The NRC and the Federal Emergency Management Agency (FEMA) share federal oversight of emergency planning for licensed nuclear power plants through a memorandum of understanding.
- Nuclear power reactor licensees exercise their emergency plans with those of offsite authorities biennially.

Attachment 7
to Enclosure 3

BP15 (8/95)

**DRY CASK STORAGE / MULTI PURPOSE CANISTERS / ISFSIs**

Background

In 1977, the U.S. defined the nation's policy regarding the permanent disposal of commercial nuclear power plant fuel by rejecting the option of reprocessing spent fuel. The Nuclear Waste Policy Act of 1982 (NWPA) and the Nuclear Waste Policy Amendments Act (NWPAA) of 1987 designated the Department of Energy (DOE) as the Federal agency responsible for disposal of high level waste (HLW) which includes nuclear power plant spent fuel; the Environmental Protection Agency (EPA) as responsible for developing appropriate environmental standards for high level waste; and the NRC as the responsible agency for licensing activities related to the disposal and long-term storage of spent nuclear fuel. The NWPA calls for DOE to begin accepting spent fuel from utilities in 1998.

Discussion

Over the last decade, nuclear power plants have begun to move spent fuel from their fuel pools into dry cask storage or independent spent fuel storage installations (ISFSIs) onsite. The Department of Energy is developing a multi-purpose canister (MPC) which will meet the requirements for storage (10 CFR 72), for transportation of radioactive materials (10 CFR 71), and may be suitable for final disposal. This MPC will be used both for temporary on-site fuel storage and for transporting the fuel to the high level waste repository, thereby reducing fuel handling operations. The NRC is responsible for the review and certification of the MPC design.

Anticipating these additional responsibilities, the NRC created the Spent Fuel Project Office whose charter is to review storage and transportation casks for certification. This will include the certification review for the MPC.

Fuel Storage at Nuclear Power Plants

Most of the 109 operating nuclear power plants are storing used fuel in spent fuel pools (SFPs). Despite fuel pool reracking, which in some cases almost doubled the capacity of the SFPs, older plants are running out of storage room in their pools. The most cost effective and lowest maintenance manner for storing spent fuel is dry cask storage.

Regulations are in place for the design, testing, manufacture, and maintenance of casks used in dry storage. NRC is responsible for reviewing proposed cask designs to insure that they will safely confine the fuel and prevent fuel cladding degradation

over a period of 20 years.

Generally, cask designs consist of a primary confinement vessel, with a steel or concrete overpack that provides both structural strength and shielding. All casks are passive designs with no moving parts, and rely on convective cooling. Spent fuel casks are analyzed for both off-normal and accident conditions, including cask tip-over and drop accidents. Safeguards issues are also considered and periodically reviewed.

Currently, seven plants are storing older spent fuel elements in dry cask storage systems in an independent spent fuel storage installations or (ISFSIs). These are: Surry, Oconee, H.B. Robinson, Calvert Cliffs, Ft. St. Vrain, Palisades, and most recently, Prairie Island. Four additional sites plan on loading fuel into dry casks for storage by early 1996: Davis-Besse, Arkansas Nuclear One, Point Beach and Oyster Creek. Future ISFSIs are planned at North Anna, Fitzpatrick, Trojan, Rancho Seco, and Dresden Unit 1.

Dry Cask Storage License Types

Utilities may operate an ISFSI under two different types of licenses: general and site-specific. The procedure for acquiring a site-specific license is similar to that for reactors in that the technical merit of the design is assessed by the NRC, and utilities may customize the cask design in the initial stages in order to meet their specific needs. An opportunity for a public hearing is provided prior to issuance of the site-specific license and license amendments are processed in a manner much like that for reactors.

A key provision for operation of an ISFSI under a general license is that licensees must use a cask design that has previously been approved by the NRC and have a current Part 50 license. Once a cask design is approved, the NRC issues a Certificate of Compliance to the cask designer/vendor and incorporates the cask, by reference, through rulemaking. The list of approved cask designs is found in Subpart K of 10 CFR 72.

The general license is advantageous in that the utility is not required to formally apply for the license; and, since the design has already been approved by the NRC, site-specific public hearings are not required prior to cask use. The public has the opportunity for involvement through the rulemaking process. However, utilities operating an ISFSI under a general license must insure that they maintain and operate the ISFSI in accordance with the conditions and requirements of the certificate. These requirements may not be optimal for some sites.

Dry Cask Storage Issues

Recent inspection efforts revealed a number of problems during the fabrication and installation of dry cask storage systems. In some cases, utilities and component fabricators did not fully understand the restrictions placed on the fabrication and preoperational testing activities for spent fuel storage casks under the general license. Utilities are permitted to make changes to cask designs, provided that the change does not compromise the safety function of the cask. The NRC found design change evaluations by licensees were superficial and limited in scope. In several cases, utilities have failed to provide adequate oversight over component fabricator activities which resulted in component non-conformances.

Coordination among NRR, NMSS and the Regions during resolution of dry cask storage issues was recently evaluated by Headquarters' staff. An action plan for improving and enhancing NRC activities in the area of licensing and inspection was developed and will be implemented over the next year. Completed actions included issuance of information notices and draft inspection procedures regarding dry cask storage activities. Another key action identified in the plan was improvement of NRC communications with industry. The Office Directors of NRR and NMSS have requested a meeting with nuclear industry executives to discuss improvements.

Multi-Purpose Canister (MPC)

Although the Department of Energy (DOE) is responsible for the disposal of spent fuel from commercial nuclear reactors, a high-level waste repository will not be ready to accept spent fuel before 1998. Thus, DOE is proposing to provide storage canisters for spent fuel to the utilities until the repository is available. The DOE is developing a canister system design that meets NRC's requirements for both storage and transportation. This design consists of a large canister loaded with spent fuel and permanently sealed at the reactor facility. The canister will then be placed in separate casks for storage and transportation, with the addition of a special overpack for disposal.

The canister system design is being developed for DOE by the Westinghouse Electric Corporation (WEC). WEC plans to submit an application to the NRC on behalf of DOE in April 1996. The award of the MPC design contract is currently being contested, therefore the design is being treated as proprietary. Resolution of the contract protests is expected by October 1995, at which time all MPC design information should become non-proprietary.

Three pre-application meetings have been held between NRC and DOE to discuss general design criteria, WEC's preliminary design and quality assurance programs for the MPC. DOE will actually submit

four separate cask designs: two for pressurized water reactor fuel and two for boiling water reactor fuel.

CONTACT:

Fritz Sturz, Spent Fuel Project Office, Office of Nuclear Material Safety and Safeguards, U.S. NRC, Washington D.C. 20555, 301-415-8530

Attachment 8
to Enclosure 3

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 24, 1995

Carol Browner, Chair
Environmental Justice Interagency
Working Group
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20451

Dear Ms. Browner:

The enclosed Environmental Justice Strategy is provided by the Nuclear Regulatory Commission (NRC) in accordance with the President's Executive Order No. 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." Also enclosed is a description of specific current projects where NRC is addressing environmental justice.

If you have any questions, I can be reached at (301) 415-1713.

Sincerely,

Hugh L. Thompson, Jr.

Hugh L. Thompson, Jr., NRC Member
Environmental Justice Interagency
Working Group

Enclosures:
As stated

# U.S. NUCLEAR REGULATORY COMMISSION
# ENVIRONMENTAL JUSTICE STRATEGY
# MARCH 1995

Introduction:

The Nuclear Regulatory Commission (NRC) was created by the Energy Reorganization Act of 1974 as an independent regulatory agency. The mission of the NRC is to assure that civilian uses of nuclear materials in the United States---in nuclear power plants, fuel cycle plants, and in medical, industrial and research applications---are carried out with proper regard for the protection of the public health and safety, of the environment and of national security. The NRC is not a "land management" agency, i.e., it neither sites, owns, nor manages facilities or properties. Therefore, the President's February 11, 1994, Executive Order "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" and the accompanying Presidential memorandum have been determined to primarily apply to our efforts to fulfill the requirements of the National Environmental Policy Act (NEPA) as an integral part of NRC's licensing process.

In this regard, the NRC is committed to giving careful consideration to the Council on Environmental Quality (CEQ) guidelines on how to take environmental justice[1] into account under NEPA. However, pending receipt of these guidelines, the NRC has developed its initial environmental justice implementation strategy based on the five principles discussed below.

Background:

The President's Executive Order directs all Federal agencies to develop, according to prescribed timetables, strategies for assuring environmental justice in their programs, policies, and activities. The Presidential memorandum to all agencies is a reminder of relevant provisions of existing law, including the requirement to consider, when environmental impact statements and other environmental documents are prepared, the effects of Federal actions on minority and low-income communities. Although independent agencies, such as the NRC, were only requested to comply with the Executive Order, the Chairman, in his March 31, 1994 letter to the President, indicated that the NRC would endeavor to carry out the measures set forth in the Executive Order, and the accompanying memorandum.

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[1] For purposes of this document, the NRC is using the following working definition of environmental justice: environmental justice means the fair treatment and meaningful involvement of all people, regardless of race, ethnicity, culture, income or educational level with respect to the development, implementation and enforcement of environmental laws, regulations and policies.

Principles of Environmental Justice Implementation:

The goal of the NRC's Environmental Justice Implementation Strategy is to integrate environmental justice into the conduct of all pertinent activities at the agency primarily in the NRC's fulfillment of its NEPA responsibilities. The Strategy contains five principles of implementation. The first three principles are institutional in nature and serve as the foundation for the last two principles which are operational in nature, i.e., they address specific activities. The principles emulate the "Principles of Good Regulation" which have been part of NRC policy for several years.

**Integration of Environmental Justice into NRC's NEPA Activities**

NRC is committed to integrating environmental justice into NRC's NEPA activities. Greater emphasis will be placed in discussing impacts on minority and low-income populations when preparing agency NEPA documents such as Environmental Impact Statements (EIS), supplemental EISs, and where appropriate, Environmental Assessments.

Continue senior management involvement

The NRC Environmental Justice Group, whose members are senior agency officials, will continue to provide guidance in this area. An Environmental Justice Coordinator has been appointed to ensure appropriate policy information flow among the different entities within the NRC, as well as with outside interested members of the public.

Openness and Clarity

Nuclear regulation is the public's business, and must be transacted publicly and candidly. Agency positions should be readily understood and easily applied.[2] This is of particular import when dealing with environmental justice issues.

Seeking and Welcoming Public Participation

The NRC maintains regular communication with a broad spectrum of entities, such as the States, Indian Tribes, members of the public and other Federal agencies. Outreach programs such as the Enhanced Participatory Rulemaking, open meeting policy, and scheduled meetings with Agreement States are being implemented. The NRC management is committed to improving our outreach efforts with stakeholders, including minority and low-income communities, and welcoming their input.

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[2] From the agency's "Principles of Good Regulations" issued in January 17, 1991, announcement #6.

**Continue Review and Monitoring of Title VI Activities**

The NRC's financial assistance programs under Title VI of the Civil Rights Act of 1964 are limited to funding training and travel under Section 274 of the Atomic Energy Act of 1954 as amended, in connection with States assuming certain regulatory authority over specified nuclear materials, and the award of grants for the support of basic and applied scientific research and for the exchange of scientific information. 10 CFR Part 4 calls for nondiscrimination with respect to race, color, national origin and sex in any program or activity receiving Federal financial assistance from the NRC. NRC is committed to monitoring this activity.

Implementation:

The NRC's statutory offices---the Office of Nuclear Reactor Regulation which regulates nuclear power plants and research reactors; the Office of Nuclear Material Safety and Safeguards which regulates materials uses, fuel cycle facilities and waste disposal facilities; and the Office of Nuclear Regulatory Research responsible for rulemakings and confirmatory research---will assess their existing environmental activities and integrate environmental justice into these activities, as appropriate.

## SPECIFIC PROJECTS WHERE NRC IS ADDRESSING ENVIRONMENTAL JUSTICE

- The staff of the Office of Nuclear Reactor Regulation (NRR) recently performed an evaluation of environmental justice in preparing its draft supplement to the Final Environmental Statement Related to the Operation of Watts Bar Nuclear Plant Units 1 and 2. The environmental justice review was performed in two phases. In the first phase, the staff reviewed recent economic, racial, and ethnic information for the Watts Bar Nuclear (WBN) Plant region and concluded that the WBN Plant is located in a predominately non-minority, low-income area. Input to the staff's evaluation was solicited from the public during the public comment period. No comments were received on environmental justice. The staff then considered in the second phase whether the low-income community near the WBN Plant is expected to experience disproportionately high and adverse human health or environmental effects and concluded the community would not experience such impacts. The Environmental Protection Agency did not comment on environmental justice during its review of the draft supplement. The WBN site review is providing the NRC with a means to begin assessing the effectiveness of its NEPA process in addressing environmental justice issues in its licensing activities. Additionally, the "Environmental Standard Review Plan for the Environmental Review of Construction Permit Applications for Nuclear Power Plants," ESRP (NUREG-0550), will include staff review guidance on evaluation of environmental justice. NRR intends to utilize workshops and media announcements to solicit input from affected minority communities. NRR anticipates gaining considerable information in this project relative to demonstrating the feasibility of addressing environmental justice issues.

- NRR conducts an extensive public scoping process (i.e., workshops, local town meetings, etc.) in the preparation of environmental impact statements for major licensing actions in order to solicit input from the public on the issues to be reviewed. This scoping process will, to the maximum extent possible, include specific solicitations from minority and low-income communities on environmental justice issues. Additionally, environmental impact statements are published in draft in order to solicit public comments prior to the proposed actions being taken. Public comment and opportunity for hearing are solicited via Federal Register notice.

- Louisiana Energy Services (LES) applied to the NRC in January 1991, for a license to build a uranium enrichment plant in Claiborne Parish, Louisiana. Northern Louisiana, including Claiborne Parish, is an economically depressed area, and the proposed site is near two small communities populated almost entirely by African Americans. The Office of Nuclear Material Safety and Safeguards (NMSS) issued the Draft Environmental Impact Statement in November 1993. Since the Executive

Order had not been issued as of that date, there was no discussion of environmental justice in the Draft EIS, although there was a discussion of the socio-economic impacts of the proposed action. The Final Environmental Impact Statement was issued in August 1994. It contains a discussion of environmental justice, including a description of the surrounding neighborhoods, the site selection process and a consideration of whether there was possible discrimination in the process, and possible disproportionate impact. The statement concludes that there is no evidence of discrimination, and that there will be no significant disproportionate impacts on minorities or economically disadvantaged persons.

- The Office of Nuclear Regulatory Research (RES) is using an enhanced participatory process for developing radiological criteria for decommissioning. As part of this process, the NRC conducted a series of seven workshops from January through May 1993. Workshop participants represented a broad spectrum of interests including interests related to environmental justice.

Enclosure 4

# STATEMENT REGARDING OPERATION OF THE TVA WATTS BAR NUCLEAR POWER PLANT

Myer (Mike) Bender

September 5, 1995

The Watts Bar Nuclear Plant has been in the "construction license" phase for more than 20 years. When operational, it will provide environmental enhancements of great importance to the health and safety of Tennessee Valley residents. It is well past the time when the Watts Bar Nuclear Plant should have been granted its Operating License and brought to full power.

As former Chairman of the *TVA Watts Bar Senior Review Panel for Employee Concerns* (1986 to 1988) and in prior years a long-time Member of the NRC's *Advisory Committee on Reactor Safeguards* (1972 to 1982), I have been intimately associated with national and Watts Bar site-specific nuclear safety Issues during the critical period when the issues were evauated. Many of them were of serious safety concern and needed attention. The period since the SRP completed its work has been devoted to corrective actions for the Watts Bar installation.

The TVA has saddled its customers with a huge financial obligation to pay off the bonded debt incurred by its nuclear plant construction program. The reasons for its high cost are numerous. The increment, attributable to Watts Bar, is primarily the cost of

correcting deficiencies identified in response the "employee concerns" raised some 10 years ago, At that time theTVA Board hired Admiral Steven White (USN Ret.) to oversee a corrective action program for the nuclear plants. Admiral White assigned a "Senior Review Panel (SRP)", which I chaired, to examine the *concerns* and establish that a corrective action effort was identified and could be implemented. The SRP completed its review in 1988. TheTVA Nuclear Plant Managers committed to implementing the *corrective action plan* developed by its "employee concerns" evaluation staff.

The major areas of *concern* were:

1. Questionable structural attachment welds of importance for seismic resistance.
2. Cable damage during electrical conduit wire pulling.
3. Quality adequacy including quality assurance recordkeeping for quality verification purposes.
4. Fire protection adequacy.
5. A variety of employee complaints about the attitude of the management toward its employees discouraged responsible attention to public safety provisions.

The NRC has presumably established that these matters have been corrected adequately to resolve the *concerns*. My remarks are founded on this presumption.

## ENVIRONMENTAL CONSIDERATIONS

TVA now provides the bulk of its electrical power supply from coal fired generating plants. These are all older installations, operating long beyond their intended life time, though still efficient. Their adequacy is a tribute to the engineering skill of TVA engineers during their design and construction. Nevertheless, they are technologically old and environmentally deleterious. Each kilowatt hour they produce uses about a pound of coal containing 3-5% sulfur. Other undesirable constituents associated with coal combustion are also being dumped to the environment. Although these are controlled, they continue to be a damaging environmental threat. Furthermore, the mining of raw coal scars the land and opens paths for acid drainage to the ground water system. Minimizing the use of coal by replacing its use with nuclear fuel will greatly enhance the Tennessee Valley as a human habitat.

Each nuclear unit at the Watt Bar plant, under full capacity base-load operation, would reduce coal usage by about 450 tons per hour (more than 10 thousand tons per day), eliminating the daily release of 3-500 tons of sulfur . Furthermore, carbon monoxide, nitrogen compounds and fly ash associated with coal burning would be totally eliminated. These environmental contributions

would offset the environmental effects of more than a million automobiles operating under today's environmental standards.

ECONOMIC FACTORS

There are important economic values from operating the nuclear installations. TVA can never recover the total cost of the Watts Bar Plant, nor its sister nuclear installations, through profitable sale of their energy product. The Tennessee Valley's using residents will shoulder most of the costs as a financial assessment, added to the nominal rate base, regardless of whether the nuclear units produce electrical energy. Now, however, the fuel costs of the system are dominated by the cost of coal for the older fossil plants. The fuel costs of the nuclear plants are roughly half those of the fossil units. The difference in operating costs could offset a considerable part of the financial burden. It could be used to shorten the time when the bonded debt will be settled.

PUBLIC SAFETY

The U. S. public safety record for commercial nuclear power plants is remarkable. No nuclear-caused deaths or even serious injuries have occurred in the more-than 30 years since the first commercial unit was operated. True, there have been serious operational incidents including the Three Mile Island fuel

showed that a fuel meltdown was not, of itself, catastrophic to health and safety. Neither event caused direct human injury. They proved the robustness of the U. S. safety provisions required by Nuclear Regulatory Commission for public safety protection. Even the Nuclear Navy program, though praiseworthy for its accomplishments, could not boast of such an outstanding record.

The safety concerns for Watts Bar and other nuclear units throughout the world are related to probabilistic safety assessment. The NRC expects to avoid human injury from nuclear accidents that might occur extremely infrequently (less than once in a million reactor years). It is an expectancy that can never be verified by direct experience but the combination of safety protection, high quality installations, and reliable operational programs can justify the claim.

The TVA "employee concerns" developed because many employees thought that TVA's then-in-charge management was not fostering the needed attention to construction quality nor operational integrity. Those involved in the "concerns" have mostly left the TVA organization because of personnel reductions, management discipline or lack of faith in the TVA future (their absence partially justifies their concern). **We assume the NRC has established that an adequately responsive and**

**responsible TVA management and operational team is in place to serve public safety needs. The basis for this assumption has virtually no public visibility. As energy consumers and part of the TVA System's public ow nership I, and millions of others like me, expect that the NRC will establish safety adequacy before granting an operational license.** If so, we would like to take advantage of the benefits from operating the Watts Bar Nuclear Units and others in the TVA Electrical Power System.

Enclosure 5

# AN OVERVIEW OF THE TVA EMPLOYEE CONCERNS SPECIAL PROGRAM

M. Bender, Querytech Associates
Member of the Senior Review Panel
August 31, 1987

When Hugh Parris, in his November 20, 1985 notarized letter to the NRC Executive Director for Operations, transmitted, in the name of the TVA board, the TVA Commitment to "completing" and "implementing" the Watts Bar and Sequoyah Employee Concerns Special Program (ECSP) he spoke for the previous and existing TVA Management. The transmittal laid out an approach to addressing the "concerns" which had previously appeared in a multitude of forms, as oral expressions of employees, as letters to congressmen, as public statements in newspapers, as letters and other forms of communication to the Nuclear Regulatory Commission. What this discussion intends to do is provide a overview of what has been seen from this observer's perspective while a member of the Employee Concerns Special Program Senior Review Panel as a reviewer and evaluator of the work performed to meet the "Employee Concern Commitment".

## MEANING OF THE EMPLOYEEE CONERNS COMMITMENT

The purpose of the Employee Concerns Special Program is to show that the TVA Management cares about what its employees think, concerning the management of its publicly owned nuclear installations and not just whether they are attending to their duties. Meeting the commitment is an act of faith by the TVA Management on behalf of its employees. Failure to meet the commitment could create so much unrest and related mistrust within the TVA organization that the Public, as respresented by the Congress and the Nuclear Regulatory Commission, may be unwilling to allow the TVA nuclear power program to proceed.

## THE IMPLEMENTATION EFFORT

The general approach to the effort is set forth in the Parris March 20, 1985 transmittal. As with any program without precedent, the ECTG has had some difficulty in complying rigorously with the orignally documented plan, but the substance remains.

The approach was conceptually simple:

(a) Examine the concerns and define the issues they expressed

1. The massive cut back in the TVA nuclear program which led to the cancellation of Hartsville, Phipps Bend and Yellow Creek caused a competition for job opportunities at all levels from the craftsman to the senior engineering and construction managers at the remaining nuclear sites. Many concerns were really complaints about the manner in which the work program cut back was handled. They show up in the more than 2000 concerns in the Management and Personnel Category.

2. Several management actions successively changed the manner in which the quality assurance function was organized and managed within TVA. This led to conflicts about quality judgements between QA personnel, inspection personnel, construction engineers, design engineers and craft supervision. Expressions of concerns about management competence probably arose mainly from the QA managerial problems.

3. The decision to bring in Quality Technology Assocates (QTC) to investigate concerns without a well established procedure for documenting and interpreting the concerns created an environment of suspicion about management purposes that introduced more of the very problems that the effort was expected to resolve.

4. The poorly understood role of the Nuclear Safety Review Staff as the "safety conscience" of the TVA resulted in the raising of issues in the name of safety that were largely matters pertaining to quality control and belonged in the province of the line organization. This is not to say, however, that the issues raised were invalid, only that it should not have been necessary to make them a matter of public safety concern to get them attention.

5. The work constraints put on the engineering organization by financial controls were probably intended to limit electrical power cost effects, but those ultimately led to a loss of conscientious interest in engineering quality by some parts of the TVA Office of Engineering

6. A combination of unsatisfactory reports from the NRC and Institute of Nuclear Power Operations (INPO) were never properly interpreted by the TVA management and thus, were never properly handled.

When the sources of the concerns are examined collectively they appear to be repetitious and have overlapping content. Most come from the QTC survey but the really substantive ones appear to predate the QTC participation.

This observer has asked members of the ECTG repeatedly whether the NPP covers matters needing corrective action. The responses have been less than satisfactory. What they show is that, no matter whether the plan does or does not intend to address a perceived root cause, it is difficult for those who are evaluating the TVA Employee Concerns Commitment to understand how the plan addresses identified problems. The need to educate all levels of TVA personnel about the NPP is self evident.

What may not be self evident is that the NPP is, except for explicit matters that represent commitments to the regulatory authorities, very general in its stated actions. Consequently, in many cases, the way in which the plan is effected must be judged from TVA's functional activities. For this purpose the Employee Concerns Special Program is an excellent test bed.

In this observer's view the educational problem is relatively straightforward. Each action taken to correct a problem should be correlateable with the NPP. The implementation action should show consistancy with the plan. In other words, the "givens" of the problems to be solved should have direct tie-in to the Nuclear Performance Plan and the tie-in should be referenced when the corrective action is proposed. In this manner those involved in corrective actions will become familiar with policies and practices on which the plan is based, learning to understand it by actual usage.

## TESTING THE NUCLEAR PERFORMANCE PLAN

The NPP has no meaning unless the TVA employees believe in it, so the TVA Employee Concerns Commitment must be satisfied to make the plan believable. An important point that seems to be missing is that the commitment is satisfied by coupling the working level line functions to the upper and mid level management staff decisions . For example, rewriting procedures could be visible evidence if explanations are presented of the expected managment improvements that would be derived. Adding managerial staff may also be of value, if there is clear evidence that the additions fill gaps that could not be filled from the incumbent TVA ranks.

There is a surprising tendency within the TVA Managerial Staff at all levels to forget that the TVA Employee Concerns Commitment is, itself, a part of the NPP. All eyes are directed to restoring nuclear operations at Sequoyah and Brown's Ferry and Licensing Watts Bar and Bellefonte. The Plan in its five parts is directed to that purpose. Each part includes a commitment to address "employee concerns". However, the direct evidence of meeting the commitment is not visible except in the Employee Concerns Special Program (ECSP) and that program is not visibly coupled to the remaining parts of the plan.

policies are being properly and fairly administered with the appropriate emphasis on minor and major policy details. TVA's policy administration appears to be highly procedural and its administration highly impersonal. The resolution of many concerns hinges on showing that personnel policy administration is reasonable, rational and supportable by all levels of management by direct discussion at all levels of the organization.

Communications channels intended to implement engineering, construction and operating programs are a different matter. Here, the intermix of management and technical matters is complicated and often needs explanation, but if everything being done were open to challenge at every level the decision process would be chaotic. The managerial staff needs to give thought to when explanation needs to be provided about technical subject matter.

Methods and practices evolve with time and the TVA organization has built its approach on a record of experience starting with Norris Dam and continuing to the present. It can't be suddenly restructured in total. Fortunately, the TVA system was built on sound principles and because of it most of the engineering and construction work, as well as the operating results are excellent. Even though there is a new Nuclear Performance Plan in place, it is not aimed at redoing every thing that has been done before. But, when the methods are changed or decisions are altered, some explanation of the reason is needed.

The purpose of the NPP is to reestablish responsive adjustment to new conditions and new circumstances. What has been called "organizational dynamics" in some of the ECTG discussions is the matter needing attention. When something new arises that perturbs the system, the corrective response in the recent past has been lethargic and sometimes totally passive. The ECTG corrective action effort displays that characteristic. Communicating information about the need to work out problems quickly by aggressive interactive organizational actions is the secret of attaining the desired dynamic response.

## COMMUNICATIONS CHANNELS FOR SAFETY ISSUES

The Nuclear Regulatory Commission would not be involved in the TVA Employee Concerns problem if there was not a public safety issue. The users of TVA produced electrical energy might. A concern that stands out is that some persons inside and outside the TVA organization believe that the TVA management has been so concerned about keeping the users of electrical energy content that it has set aside the interests of public safety.

Whether the accusations are well founded cannot be totally judged from the Employee Concerns Special Program, but if the channels for voicing such concerns are shown to be ineffective, it will be

A ship captain traversing unknown waters, even with well qualified maps, usually relies on a pilot to guide his course. The TVA communications path for employees who want to raise "safety concerns" is lacking the needed pilot. For the "concerned employee" to want to use the "employee concerns" channel its functional effectiveness must be demonstrated--but how?

For complex safety issues the need may not be to open a channel but to provide a forum where the safety issues can be discussed openly. It doesn't exist at TVA, although the Agency is large enough to support that type of approach. A forum would take away the apparent stigma that accompanies the raising of unpalatable issues and could give opportunity for creating an understanding of the <u>really important safety issues and how they are being faced.</u>

For less complex matters where the safety isssue is mostly a matter of compliance with prior TVA plans and commitments (e.g. recordkeeping errors, local quality problems, inspector qualifications, etc.) the management system should be displaying how the use of normal supervisory channels will result in effective response.

## RESULTS BY CATEGORY UP TO NOW

The ECTG Category Group Heads have presented their assessment of the results to date. Their assessments incorporate comments provided by SRP members, but they are not necessarily consonant with SRP views nor should they be required to be. Each SRP member has his own concept of what has been learned. The following is an individualistic view of the status as judged by Issue Definition, Investigative Effectiveness, Evaluation Substance and Corrective Action.

## INDUSTRIAL SAFETY

The issues put in this category are the routine matters covered by traditional industrial safety programs. The investigation was exhaustive and the result from the work exposed little of concern except a poor attitude by the managerial staffs. The evaluation indicated that a change in attitude could be developed by instituting a program similar to that of E. I. Du Pont. Nothing else is needed. The evidence of success will take several years, but the DuPont system, built on a century of successful work with explosives, chemicals and nuclear weapons materials, has the credibility to make it deserving of respect.

trol procedures are introduced without accompanying training and monitoring of the new program.

Procurement practices are clearly involved in the "materials control" problem. Documentation has sometimes been separated from the materials to which it applied, causing difficulties with identification at the time of use. Knowledgeable review of documents is normally provided by Engineering but the avalanche of documentation associated with nuclear installations could have overwhelmed the normal engineering functions.

Problems with the use of unqualified electrical cable materials appear to be mostly a lack of understanding among TVA crafts and inspectors about the differing requirements set out for the various TVA sites, since specifications changed in the later stages of plant design.

## OPERATIONS

Operational concerns seem to be mainly expressions of discomfort about whether operating personnel are conforming to established procedures. The instances cited did not appear to represent a high violation frequency, nor was there evidence of deliberate infraction. Shortcutting of procedures as a matter of expediency seemed to be the dominant problem.

Maintenance and modification work is included in the operations category however, the concerns displayed are mainly to do with engineering and construction practices which appeared to be less well controlled in the operating plants than in those still under construction. The problem within operations probably stems from a long standing TVA operating tradition that operational actions are "beholden" to no regulatory constraints if the Technical Specifications are not violated. There was a misunderstanding in this management style because the Technical Specifications were based on the assumption that the entire installation was designed and built to prescribed principles and standards.

## WELDING

The issues examined by ECTG are well understood and the evaluation indicates that hardly any represented serious breakdowns, although a few places were found where faulty welds occurred.

The "weld project" was intended to sort out the "weld quality issues". Unfortunately, the statistical quality analysis it is applying is not well understood or really credible because of the developmental problems in using a methodology which has never before been applied to this type of weld quality evaluation.

The issues, raised about management of Construction and Engineering, challenge decision making in the work planning, quality control and engineering methodology areas. In some cases they raise questions about the professional competence of the managerial staff. These management issues should be examined as a part of the Engineering and Construction Categories; their validity has not really been evaluated as a part of this report; they have been assumed in the reports to be at least partially valid and correctable by training or a more effective managerial selection program.

Personnel management issues are the matters deserving most serious consideration in this category. The concerns display an disturbing picture of the manner in which TVA handled performance appraisals and career growth. No working system was evident and the salary evaluation program was not systematically followed, although the framework for such a program existed.

Concerns about "authoritarianism", that were given wide attention in some public media, does not appear to represent a broadbased problem. More than likely "authoritarianism" existed in some TVA operations and may still exist, perhaps in worse form. The style of management that permits it is one wherein decisions are made without providing a reasoned explanation. There is little evidence that decision reasoning is now being provided. How much is appropriate is a matter of judgment, but there is nothing to show that managers are being encouraged to explain the logic of their approaches to their subordinates.

There were and are legitimate concerns about TVA's implementation of the Fair Employment regulations, as they apply to women, minorities and disadvantaged individuals. The TVA record is poor but the reasons may be partially attributable to the retrenchment activity when the nuclear program was cut back.

The proposed corrective actions are focused on improving personnel policy implementation through management training and modifications of some job evaluation techniques. That appears to be a rational approach and eventually, should pay dividends in building employee respect for management competence.

## INTIMIDATION AND HARRASSMENT

The intimidation and harrassment concerns appear to be perceptions that many supervisory and managerial personnel attempted to use threatening tactics to bring about desired actions from employees. In any organization as large as that of the TVA some of this type of behavior should be expected, but the evidence does not indicate that it is widespread. In fact, the frequency of the reports during the total time spread is low. Whether the

ments about the significance of quality deficiencies when records are missing, workmanship is in question, and engineering work is not in accord with preestablished commitments. It has the freedom and should accept responsibility for seeking (not implementing) corrective actions.

The NPP has to provide a management approach to making the organizational units collectively responsive to quality problems. Whether the NPP measures up adequately will not be known until all of the corrective actions are defined for the Employee Concerns Special Program, but the NPP appears to be on the right track. The final result must be judged after its implementation over a period of years.

ROOT CAUSE ANALYSIS, LEARNING THE ART

The term "root cause analysis" is a "buzz word" constantly misused and misinterpreted in the ECSP reports. As its interpretation is currently understood by managerial experts in the nuclear industry, it applies to analysis of problems to identify causes that should be eliminated to avoid and to prevent recurrance of unacceptable conditions.

Deciding what needs "root cause analysis" is the first step. The ECSP has shown that few if any really know how it should be done. TVA has to learn how such analysis should be performed and when to perform it. The number of observed problems is not a measure of the need to find and correct a "root cause". Its potential seriousness in a safety sense, its effect on organizational effectiveness, its effect on methodology of engineering, construction and operations are considerations in the need to search for a root cause. Obviously, a matter which repeatedly causes problems is a candidate.

An illustration from the ECSP can suggest an approach. Many of the Employee Concerns were first exposed during TVA's QA audits. Often, they were exposed at a time when the observed deficiency had existed for a long period of time, perhaps predating the audit function. The obvious conclusion is that the audits should have been performed when the program started. It is clearly too late to correct those older deficiencies by the audit process, but they do point to the fact that audits should be performed at the beginning of work initiation to be effective. A root cause of TVA's current problems is that auditing is not being used as a management tool to find and eliminate problems at an early stage of the work.

In many of the ECSP reports the "root cause" is expressed as "inadequate training". Nowhere in any of the reports is there a question about the adequacy of the overall TVA training program. Has it been analyzed to determine whether it covers the right

ment practices on nuclear safety protection, prudent handling of the TVA investment as a public resource, economic impact on the Tennessee Valley and the ultimate reliability of the installations in question.

The program has not come to grips with this question as yet. It may be beyond the capabilities of those assigned to the Employee Concerns Special Program. In some manner the TVA management must show that it has either properly performed its obligations to represent the whole public interest or that the new NPP will correct any known deficiencies.

Foremost among the management actions needed is to establish a meaning to the term "quality". To the front line manager, the meaning has to be established in terms of the results to be attained by the activities being managed. To the upper levels of management it has to be interpreted in terms of the total end results to be provided--safe, cost effective, reliable operational power plants meeting the legal requirements under which they were authorized. To the TVA organization, and especially its employees, it means providing resources to attain the expected results, applying them knowledgeably by effective planning and execution, and establishing the needed checks and balances to protect against inadvertant mistakes, mismanagement or oversights.

What seems clear is that in most of the concerns there was more "sound and fury" than serious substance. Some serious problems did need to be addressed, but virtually all were known before the Employee Concerns Special Program was initiated. The Program's main impact has been to put emphasis on the need to be fully responsive to employee concerns when they arise and not allow them to fester until actions by external forces are required to draw management attention. Inability to establish confidence of the work force in its management is an intolerable deficiency in any public agency, and especially one entrusted with the sensitive safety problems of nuclear power plants.

Needless to say, the Employee Concerns Issues do not disappear with the issuance of the ECSP reports. The reports display the facts and suggest some causes and corrective actions to eliminate identified problems and deficiencies. Their major contribution has been to examine the whole TVA nuclear organization from the standpoint of the real world problems that existed in the past and partially exist today. No other nuclear organization and perhaps, no other industrial organization has been subjected to this type of scrutiny. The information, if properly used, will provide a data base which future management can use to make the organization more effective.

The TVA Management decision to implement this type of program took courage and a willingness to expose and face up to its pro-

Enclosure 6

**TVERC**

Tennessee Valley Energy Reform COALITION

**MEMBER GROUPS**

*Alabama Environmental Council*

*Appalachia-Science in the Public Interest*

*Bring Urban Recycling to Nashville Today (BURNT)*

*Campaign For a Prosperous Georgia*

*Citizen Action, Alabama*

*Coalition for Jobs and the Environment*

*CommonSense, Inc.*

*Cumberland Center for Justice and Peace*

*Foundation for Global Sustainability*

*Friends of the Clinch and Powell Rivers*

*Kentucky Resources Council*

*Northwest Conservation Act Coalition*

*Southern Environmental Law Center*

*Student Environmental Action Coalition, Tennessee*

*Tennessee Citizens for Wilderness Planning*

*Tennessee Environmental Council*

*Western North Carolina Alliance*

A Member of COMMUNITY SHARES A Fund for Change

# IRP FACT SHEET

## WHAT IS THE 'IRP'?

IRP stands for Integrated Resource Plan. The IRP is the 25 year energy plan for the Tennessee Valley Authority (TVA). TVA supplies electricity to almost 8 million people in a 7 state region. This plan outlines how electricity will be supplied to Tennessee Valley ratepayers for the next 25 years. and demand-side options Power can be provided by one of two options: supply-side (building more power plants) and demand-side (energy efficiency and conservation so that the utility doesn't need to make as much electricity in the first place). The IRP is supposed to put supply-side and demand-side options on a level playing field.

## WHY DID TVA DRAFT THE IRP?

Two national laws are at the heart of this planning process. TVA is required to complete a comprehensive energy plan by the 1992 Energy Policy Act. TVA is supposed to use the strategy of 'least cost planning', creating a plan that provides electricity to the valley at the lowest cost. Because it is a federal agency, TVA is required to allow public participation in this planning process by the National Environmental Policy Act.

## WHAT HAS HAPPENED THUS FAR BECAUSE OF THE IRP?

**Although the IRP planning process is not yet finished, it has already resulted in several changes:**

- TVA announced last December that it would not complete by itself four of its six remaining nuclear plants.
- TVA's debt limit was set by Congress at $30 billion. TVA recently announced that it will limit it's debt to about $2 billion below the limit set by Congress.
- As a result of public participation in the IRP, TVA is now more open to the public than it has ever been before.

## WHAT IS WRONG WITH THE DRAFT IRP?

**Consider these points when commenting on the IRP:**

- The efforts to bring on more demand side management (DSM) are very weak. DSM includes energy efficiency, conservation, and other methods of managing energy demand. Although TVA plans to offer some efficiency programs to new, all electric homes, the majority of homes and businesses in the valley will not receive energy efficiency incentives. Efficiency programs that TVA rejected include solar hot water heaters, direct installation of energy efficient lighting for homes, and efficient central air conditioners. When TVA was developing the plan, 39 potential energy efficiency programs were suggested. If implemented, this could have saved 5,500 megawatts of electricity - the equivalent of what the Watts Bar Nuclear Power Plant could produce four times over. However, of the 39 proposed DSM programs, TVA will only implement 7 as a part of the IRP's short-term action plan. Why wouldn't TVA encourage energy efficiency? The agency has a $25 billion debt with an annual debt service of $1.9 billion per year. TVA wants to sell power to service its debt. This is the crux of the conservation issue - TVA wants revenue and therefore doesn't want ratepayers to conserve power.

- Watts Bar Unit 1 and Browns Ferry 3, the last two TVA nuclear power plants still under construction, were not included in the IRP. By being left out of the planning process these two

**PO** *Box* **8290** *Knoxville, TN* **37996** *Phone* **615 637 6055** *E-Mail* **tverc@igc.apc.org** *Fax* **615 524 4479**

# TVA'S LATEST TELEVISION COMMERCIAL CLAIMS TVA DOESN'T WANT TO KEEP YOU IN THE DARK!

# NOW IT IS YOUR TURN!

## ATTEND ENERGY VISION 2020

*Muscle Shoals, Alabama: August 28*

*TVA Environmental Research Center, Hwy. 43 (in the TVA Reservation)*

## PUBLIC MEETINGS

*Huntsville, Alabama: August 29*

*Huntsville-Madison County Public Library, 915 Monroe Street*

## AND COMMENT

*Knoxville, Tennessee: September 11*

*TVA West Tower, 400 Summit Hill Drive*

## ON TVA'S

*Bristol, Tennessee: September 12*

*location to be announced*

## 25-YEAR ENERGY PLAN

*Paducah, Kentucky: September 18*

*Information Age Park*

## ALL MEETINGS ARE

*Nashville, Tennessee: September 19*

*(tentative) Scarritt-Bennett Center, 1008 19th Ave. South*

## FROM 5:00PM-9:00PM

*Starkville, Mississippi: September 25*

*Memorial Hall, Mississippi State University*

## FOR MORE INFORMATION

*Memphis, Tennessee: September 26*

*Fogleman Executive Center, University of Memphis*

## CALL TVERC AT 637-6055

*Chattanooga, Tennessee: October 2*

*TVA Solar Energy Institute, Martin Luther King Blvd.*

# DON'T LEAVE TVA IN THE DARK!

# THIS MAY BE YOUR LAST CHANCE TO COMMENT ON TVA ENERGY ISSUES FOR 25 YEARS!

# BE READY...BE INFORMED...

## ARE YOU CONCERNED ABOUT:
## ACID RAIN?
## NUCLEAR POWER?
## SMOG?
## TVA'S $26 BILLION DOLLAR DEBT?

## THEN YOU MUST ATTEND A TVERC TEACH-IN

*Pleasant Hill, Tennessee: August 24, 10:00 a.m.*
*Community House, Church Drive*

## AND LEARN ABOUT TVA'S

*Kingsport, Tennessee: August 30, 6:00 p.m.*
*(tentative) St. Dominic's Church*

## 25 YEAR ENERGY PLAN.

*Knoxville, Tennessee: September 5, 7:00 p.m.*
*Center for Global Sustainability, 2743 Wimpole Avenue*

## BE PREPARED TO COMMENT

*Nashville, Tennessee: September 7, 7:00 p.m.*
*Nashville Peace and Justice Center, 716 Georgetown Drive*

## AT THE PUBLIC DRAFT HEARING

*Chattanooga, Tennessee: TBA*

## IN YOUR AREA!

## FOR MORE INFORMATION CALL TVERC AT 637-6055

# MAKE YOUR VOICE HEARD!

# PUBLIC MEETING ON WATTS BAR

## 6:30PM - Tuesday September 5
## Quality Inn in Sweetwater
## (at the I-75 and Highway 68 junction)

After decades of construction, billions of dollars and years of safety violations the Nuclear Regulatory Commission, the NRC, is holding a public meeting to allow the people of Tennessee to express their thoughts, concerns and ask questions about Watts Bar Unit One. The NRC is about to grant the TVA permission to load nuclear fuel into this power plant and grant an operating license after that. There are many questions and issues left unanswered including:

*Have all of the thousands of safety violations that were brought to the NRC by current and former Watts Bar workers been looked at and fixed?

*What is the real economic impact of loading Watts Bar with nuclear fuel and how many jobs will be lost if that happens?

*Since Tennessee has a breast cancer mortality rate that is rising 16% faster than the rest of the country and scientists have already confirmed the link between exposure to radiation and breast cancer, how can we be sure that nuclear power plants aren't to blame. If they are, how can we let another new source of radiation come on-line?

*How big is the earthquake fault line that lies under Watts Bar and can the plant withstand the impact of an earthquake of that size?

This meeting is scheduled just two days before an NRC meeting in Washington, DC where it is expected that the permission to load nuclear fuel will be granted. Come let your voice be heard. Speak you mind to save your family and the beautiful hills of East Tennessee from financial and environmental ruin.

For information please call Greenpeace (404)876-6477, Katuah Earth First! (615)624-3939

# WATTS BAR HAS COST ENOUGH - STOP WATTS BAR!

A message from the people of the Tennessee Valley to Congress, The Tennessee Valley Authority and the TVA Board of Directors.

We, the undersigned ratepayers and residents of the Tennessee Valley, do hereby demand that the TVA Board of Directors immediately halt plans for loading nuclear fuel into the Watts Bar Unit 1 power plant near Spring City, Tennessee until:

*Watts Bar's real ability to generate income as a nuclear power plant is thoroughly examined by experts outside of TVA - particularly in light of the added $500,000 million+ that loading that power plant with nuclear fuel would add to its already enormous $8 billion price tag;

*the link between increased mortality rates from breast cancer and other radiation related diseases and TVA's nuclear facilities in the region is examined and addressed;

*congressional hearings are held to investigate the findings of the General Accounting Office report on TVA's $26 billion debt and financial health; and ,

*other, more job intensive and economic energy sources for the region are explored like conservation, efficiency and renewable energy.

| Name | Address | Phone Number | Want to Help? |
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Please return completed petitions to: Beth Zilbert, Greenpeace 20 13th St,NE Atlanta, GA 30309. For more information call (404)876-6477 or in Chattanooga call (615)624-3939.

Enclosure 7

**Mansour Guity**
**Engineer**
P.O. Box 50893
Knoxville, TN 37950-0893
(615) 531-3837

Certified # Z 785 465 116
Return Receipt Requested

September 5, 1995

Mr. Al Ignatonis
United States Nuclear Regulatory Commission
101 Marietta Street, N.W. Suite 2900
Atlanta, Georgia 30323-0199

Subject: Watts Bar Nuclear Plant Unit 1 Readiness for Fuel Loading

Dear Mr. Ignatonis:

Thank you for this opportunity to respond to your letter of May 17, 1995. As you will recall, I telephoned you on August 18, 1995 and informed you that I was in the process of preparing a report responsive to your request.

I hereby am advising you that I have numerous significant major nuclear safety concerns about the Tennessee Valley Authority's Watts Bar Nuclear Plant Unit 1.

The nature, scope, extent, significance of these concerns are of such a wide magnitude and detailed substance that they cannot readily be precisely, accurately and completely described by myself in writing at this time. However, I can adequately and concisely communicate them verbally with supporting and corroborating documents prepared by TVA, NRC, DOL and other governmental agencies.

I am therefore willing to thoroughly disclose these concerns to you or other NRC members as expeditiously as possible if conditions similar to the following can be arranged.

1. That a court reporter shall be made available to take the complete transcription of my presentation at no cost to me.
2. That I shall be provided with a copy of such transcription(s) including all exhibits at no cost to me and without any deletions and or omissions.
3. That I shall be permitted to have at least two observers of my choice present during the presentation(s). These observers will not participate in the presentation(s).

4. That a member of the Nuclear Regulatory Commission, Office of Inspector General, and Office of Investigations be present during these presentation(s). Preferably individuals that would be mutually agreeable to you and me.
5. That the environment under which such presentation(s) is conducted must remain non-hostile and non-confrontational at all times. Otherwise I shall excuse myself from continuation of such presentation(s). Therefore it is of utmost importance that no past or present TVA employee(s), contractor(s), or others be present during such presentation(s).

Attachment A to this letter lists the names, titles and addresses of those individuals that are recipients of copies of this letter.

Attachment B to this letter is a report that briefly describes some of my nuclear safety concerns at Watts Bar Nuclear Plant Unit 1 (WBNB-1).

Should you have any questions or comments please do not hesitate to contact me at your earliest convenience. I shall make myself available for the subject presentation(s) upon a short notice.

I look forward to hearing from you at your earliest convenience.

Respectfully yours,

Mansour Guity 9/5/95

MANSOUR GUITY
FORMER TVA EMPLOYEE (1972-1989)

# "ATTACHMENT A"

Copies of my letter of Sept. 5, 1995 to Mr. Al Ignatonis and attachment B of subject letter were mailed to the following individuals via U.S. Postal Service on Sept.5, 1995.

Rep. Bob Clement
1230 Longworth House Office Bldg.
Washington DC 20515

Rep. Bud Cramer
1318 Longworth House Office Bldg.
Washington DC 20515

Rep. John Duncan
115 Cannon House Office Bldg.
Washington DC 20515

Rep. Harold Ford
2211 Rayburn House Office Bldg.
Washington DC 20515

Sen. Bill Frist
825 Hart Senate Office Bldg.
Washington DC 20510-2203

Rep. Bart Gordon
103 Cannon House Office Bldg.
Washington DC 20515

Rep. Van Hilleary
114 Cannon House Office Bldg.
Washington DC 20515

Sen. Howard Heflin
728 Hart Senate Office Bldg.
Washington DC 20510

Rep. John Kasich
1131 Longworth House Office Bldg.
Washington DC 20515

Rep. Scott Klug
1113 Longworth House Office Bldg.
Washington DC 20515

Sen. Trent Lott
487 Russell Senate Office Bldg.
Washington DC 20510

Rep. James Quillen
102 Cannon House Office Bldg.
Washington DC 20515

Rep. Bud Shuster
2188 Rayburn House Office Bldg.
Washington DC 20515

Rep. John Tanner
1427 Longworth House Office Bldg.
Washington DC 20515

Sen. Fred Thompson
508 Dirksen Senate Office Bldg.
Washington DC 20510-2203

Rep. Zach Wamp
114 Cannon House Office Bldg.
Washington DC 20515

Robert Pollard
Union of Concerned Scientists
1616 P Street NW, Rm 310
Washington DC 20036

Stephen A. Smith, DVM
Executive Director
TN Valley Energy Reform Coalition
P.O. Box 8290
Knoxville, TN 37996

Craven Crowell, TVA Chairman
ET 12A-K, 400 W. Summit Hill Dr.
Knoxville, TN 37902

George Prosser
TVA Inspector General
ET 4C-K, 400 W. Summit Hill Dr.
Knoxville, TN 37902

Oliver D. Kingsley, Jr.
President, TVA Chief Nuclear Officer
LA6A Lookout Place, 1101 Market St.
Chattanooga TN 37402-2801

Shirley Jackson, Chairman
US Nuclear Regulatory Commission
Washington DC 20555

William Russell, Director
Office of Nuclear Reactor Regulation
US Nuclear Regulatory Commission
Washington DC 20555

James Taylor
Executive Director for Operations
US Nuclear Regulatory Commission
Washington DC 20555

Leo J. Norton, Acting Inspector General, US Nuclear Regulatory Commission, Washington D.C. 20555

"ATTACHMENT B"

# *SYNOPSIS OF WATTS BAR NUCLEAR PLANT UNIT 1*

# *NUCLEAR SAFETY PROBLEMS AND NON-COMPLIANCES WITH TITLE 10 CFR 50 APPENDIX B*

*PREPARED AND REPORTED BY*
*MANSOUR GUITY**
*MEMBER OF THE DEFUNCT*
*NUCLEAR SAFETY REVIEW STAFF*
*OF*
*TENNESSEE VALLEY AUTHORITY*
**PRESENTLY NOT A TVA EMPLOYEE*

*SEPTEMBER 5, 1995*

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- Presentment and Dedication.

A. The Authorized Nuclear Inspector(ANI)- Responsible For Performing The Third Party Independent Inspection And Certification Of Compliance Of Watts Bar Nuclear Plant Unit 1(WBNP-1) With American Society Of Mechanical Engineers(ASME) Code Requirements Per Final Safety Analysis Report(FSAR), Which Is Required For All Nuclear Plants Prior To Granting Operating License.

B. Inadequate Or Lack Of Tracking Program For Environmental Qualification Of Class IE Electrical Equipment.

C. Electrical Cable Problems And Inadequacies In The Associated Corrective Action Plans(CAP), Root Cause Analysis, Preventive Measures And/Or Improper Implementation Of The CAP. (10 year old problems continue to be repetitively identified as late as 1994).

D. Failure Of TVA To Establish An Adequate Quality Assurance(QA) Program And Independent QA Organizations That Meets Title 10 CFR 50 APPENDIX B Requirements For WBNP-1.

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F. Five Material False Statements Made To Nuclear Regulatory Commission(NRC), Four Of Which Are Directly Related To WBNP-1 For Fuel Loading And Its Compliance With Title 10 CFR 50 APPENDIX B.

G. TVA's "Whistleblowers" Dilemma-Intimidation, Retribution, Harassment, Discrimination And Reprisal(H & I) By TVA Management, Persistent Repetition And Continuation Of TVA's H & I Activities, The Chilling Effects And Absence Of Protection By NRC.

H. Cause And Effect Of Revisions To The Design, Construction And Testing Procedures And Failure To Retrofit The Design, Construction And Testing Activities Per The Latest Procedural Requirements.

I. NRC's Inadequate Inspection Processes.

J. WBNP Has Never Met Title 10 CFR 50 APPENDIX B Requirements.

K. I Told You So Nine Years Ago.

L. Conclusions.

## ***PRESENTMENT & DEDICATION***

This brief report has been prepared with much personal mental anguish, struggle, and distress in anticipation of informing the general public of the nuclear safety hazards of Watts Bar Nuclear Plant Unit 1 if it is to receive operating license.

I am dedicating this report to all the "Whistleblowers" of America, in particular those of us that at one time or other have been or may still be employed by The Tennessee Valley Authority. As Admiral Rickover admonished--"if you are going to sin, sin against God, but not against the bureaucracy--God will forgive you, the bureaucracy never will."

"Whistleblowers" have suffered needlessly and can easily identify with each others misery brought upon us by TVA which is an excellent example of a bureaucratic agency. To those of us who as "whistleblowers" have suffered as a result of our expression of nuclear safety problems and exercise of our First Amendment and because we have placed public health and safety ahead of our own personal needs and securities resulting in committing career suicide, I would like to quote you the following as a way of encouragement.

"I expect to pass through this world but once. Any good, therefore that I can do or any kindness that I can show to my fellow creatures, let me not defer nor neglect it for I shall not pass this way again.", and

"If you have tried to do something and failed, you are vastly better off than if you had tried to do nothing and succeeded."

The following is for NUCLEAR REGULATORY COMMISSION members.

"The past can not be changed but the future is what ever you want it to be."

Let us not forget about the Three Mile Island nuclear plant disaster, Browns Ferry nuclear plant fire and not to mention Browns Ferry nuclear plant units 1 and 3 shut down since 1985.

**A**.The Authorized Nuclear Inspector(ANI)- Responsible For Performing The Third Party Independent Inspection And Certification Of Compliance Of Watts Bar Nuclear Plant Unit 1(WBNP-1) With American Society Of Mechanical Engineers(ASME) Code Requirements Per Final Safety Analysis Report(FSAR), Which Is Required For All Nuclear Plants Prior To Granting Operating License.

1. 1985- I, as the lead NSRS investigator identified exertion of improper pressure by TVA management upon ANIs. This was substantiated by NRC Investigation Reports Nos 2-85-034 and 2-85-034s dated September 9, 1988. NRC Report of Investigation Alleged coercion of ANIs by ANI management through TVA management, case No. 2-85-034.
2. 1985- I, as the lead NSRS investigator identified that some voids in the containment penetrations at WBNP-1 had not received examination as required by ASME Code. In addition, a particular ANI was told by his supervisor to accept the welds which he did per his supervisors instructions.
3. 1985 to present NRC and TVA's failure to review the adequacy and appropriateness of ANI's inspection activities prior to 1985 supports my conclusion of indeterminate status of all ANI inspections prior to 1985. In particular since four out of nine ANI's that had worked at WBNP at one time or another had confided to NRC about such pressure. See aforementioned NRC Inspection Reports.
4. TVA's Office of Inspector General and the NRC have failed to investigate the allegation of conspiracy by TVA management that caused the NSRS lead investigator, Mansour Guity, to abort the investigation of the effect of such collusion and its nuclear safety implications. Refer to the testimony of the lead investigator, Mansour Guity, in the U.S. House of Representatives Subcommittee on Oversight and Investigations of the Committee on Energy and Commerce on June 11, 1986.
5. How can the NRC have any level of confidence in the ANIs certification as a third party independent inspectors for WBNP Unit 1? In particular when all ASME Code activities were allegedly completed as early as February 20, 1985 when for the first time the TVA Manager of Nuclear Power declared WBNP-1 readiness for fuel loading.

**B**. Inadequate Or Lack Of Tracking Program For Environmental Qualification Of Class IE Electrical Equipment.

Definitions:

1. Design life is defined as "The time during which satisfactory performance can be expected for a specific set of conditions."
2. Installed life is defined as "The interval from installation to removal, during which the equipment or component thereof may be subjected to design service conditions and system demands."

3. Qualified life is defined as " The period of time for which satisfactory performance can be demonstrated for a specific set of service conditions."

Some equipment may have a qualified life less than the required design life of the plant, and some equipment may have a qualified life that is less than the installed life.

WBNP-1 does not have a system of tracking the design life, installed life and qualified life for its electrical equipment and or components such as resistors, capacitors, wires, connectors, transistors, switches, etc.

**C**. Electrical Cable Problems And Inadequacies In The Associated Corrective Action Plans(CAP), Root Cause Analysis, Preventive Measures And/Or Improper Implementation Of The CAP. (10 year old problems continue to be repetitively identified as late as 1994).

Such as:

1. Cable installations-sidewall pressure, pulling forces, jamming effect, minimum bend and training radius, vertical supports of cables in cable trays and conduit, adequacy of sizing of pull boxes, etc.
2. Cable sizing - Short circuit calculations, voltage drop calculations both for as constructed lengths derating of cables due to fire proof coating material and solid cable tray covers and lengths (based on scientific research and or engineering studies and analysis and not in an informal, undocumented survey of other utilities and A and E firms as stated by TVA.)
3. Cable splices - utilization of 600 volt splice kit for 6900 volt cables - identified as late as 1995 where in a letter from Oliver D. Kingsley Jr. to US-NRC dated December 16, 1988, item 4.1. TVA had allegedly identified the root cause problem and taken appropriate corrective action. While NRC Report No. 50-390/94-72, 50-391/94-72, dated 10/10/94 identifies the same problem again, over six years later.

NSRS Report No. I-85-06-WBN, prepared by Mansour Guity, several employee concerns and numerous revisions to TVA's Corrective Action Plan for cable problems, numerous NRC Inspection Reports such as 50-390/94-53, 50-391/94 53, dated 9/20/94, Franklin Research Center, Technical Evaluation Report of Cable Problems TER-C5506 649,dated January 30, 1987.

TVA once again has proven that it does not perform nor is it capable of performing adequate root cause analysis, and can not take proper action to prevent recurrence nor can it adequately inspect other similar activities and work products for the potential identification of same problems elsewhere in the plant.

This follows the old pattern and attitude of "if you don't look for deficiencies, you don't have to worry about documenting them, if deficiencies are not documented, you don't have to worry about fixing them. If you can limit its applicability so much the better, if you can word engineer your way out of rework, repair or retrofit , this is the best."

NRC's repetitive failure to recognize these inadequacies in the TVA's corrective action programs reoccurrence prevention, inspection of similar cases and inadequate root cause analysis has compounded these problems. Furthermore there are instances where the CAPs have not been properly implemented and continues to be identified by NRC as a persistent recurring problem and yet NRC fails to be aggressive enough in its enforcement authorities and responsibilities by not fining TVA for such issues.

**D.** Failure Of TVA To Establish An Adequate Quality Assurance(QA) Program And Independent QA Organizations That Meets Title 10 CFR 50 APPENDIX B Requirements For WBNP-1.

1. Frequent QA Organizational changes(not an all inclusive listing.)

   - Prior to 1982 - Design QA, Construction QA staff, Construction QA at each plant site, Office of Engineering and Design QA staff, Office of Nuclear Power QA staff (Chattanooga), Office of Power QA at each plant site.
   - 1982 - Abolishment of QA organizations as listed above
   - 1982 - Establishment of Office of QA
   - 1984 - Abolishment of Office of QA
   - 1986- Establishment of Nuclear QA and its sub-set, EngineeringAssurance
   - 1989 - Abolishment of Engineering Assurance
     QA organization continues to go through frequent changes requiring new inter/intra office procedures, establishing new reporting processes, taking away some authorities and responsibilities and distributing it among others while holding no one responsible. Revising FSAR, meeting within NRC to sell the new organization, its authority, independence and almost in all cases for exactly the same reasons that brought about the previous changes. While all these activities are going on its effect on the quality of design, construction and testing has been minuscule as noted by NRC and others.

2. Lack of independence of QA members (not an all inclusive listing.)
   - Prior to 1980 - There was no independence.
     NRC-RII Inspection and Exit notes - Team Leader Virgil Brownlee - None of the TVA QA organizations in the offices of Engineering Design and Construction had sufficient authority and organizational freedom to identify

Nuclear Quality problems

- 1982-1984- during OQA existence- there was slight independence. OQA spent the entire period establishing internal policies and procedures, drastically cut back on Appendix B type Audits and performed surveillances that amounted to nothing more than fixing small problems - The record speaks for itself.
- 1986 and on- during Nuclear QA period- there has not been any independence.
  Nuclear QA managers reported to the Nuclear Power Manager. Engineering Assurance manager reported to the Nuclear Engineering Manager neither of which have had sufficient authority and organizational freedom to identify Nuclear Quality Problems.

TVA announced its decision to build WBNP-1 August 1970, applied for a construction permit in May 1971, received construction permit in January 1973 with a probable conservative estimate date of November 1985 for Commercial Operation. Construction progress was reported to be 99% complete on September 1984.

In view of these major organizational changes and lack of independence of QA members throughout the life of WBNP, so far we do not have to wonder long to recognize as to why WBNP-1 did not meet title 10 CFR 50 APPENDIX B requirements in 1986 when it was certified and declared to be ready for fuel loading (meaning that all of the design, engineering, construction and testing activities had been completed successfully). Almost ten years later how could a plant that was complete and ready for fuel loading be declared and certified as complete once again.

So far WBNP-1is at least 16 years behind TVA's critical path for fuel loading, which at one time was set for 1979.

As one of my colleagues used to say and an NRC senior manager had echoed the same concern which is " quality has to be designed in, constructed in, you can not study it in after the fact." Is TVA suggesting that they have built quality into WBNP for the last 10 years? Is the NRC staff once again going to allow TVA to "SNOOKER" them?

E. Significant Events Related To And Effecting WBNP-1.(not an all inclusive listing)

- 1979-NRC-RII conducts its first inspection of TVA Design, Engineering and QA staff in Knoxville(I was interviewed by NRC.)

- 1979- TVA establishes Nuclear Safety Review Board. It gives it significant autonomy and has it report to the General Manager and Staff of Directors. NSRS performs superbly in identifying Significant Nuclear Safety Problems.
- 1981-McDonald Motivational Research Center performs a review called Diagnostic Evaluation of Morale and productivity at WBNP (Report dated 10/4/81) and identifies employees lack of trust in management.
- 1981- TVA studies the FSAR representation of Design Changes included by ECN's at WBNP, report dated April 21, 1981 identifies significant safety problems.
- 1982- US-NRC Advisory Committee on the Reactor Safe Guards Notes " A serious QA break down was identified late in the construction of WBPN."
- 1983,1984- Black and Veatch(B&V)- IDVP at WBNP-1 identifies significant problems in Auxiliary Feed Water System and recommends generic applicability of their findings for other systems. TVA force feeds problems in to groups and categories in such a manner to minimize their impact on that system and others.
- 1984- Management Analysis Company Project No. MAC-84-F139 identifies inadequate QA program, QA organization and week management.
- 1985- NRC meets with TVA about B&V Report on 1/12/85.
- 1985- Quality Technology Corporation (QTC) is hired by TVA to confidentially interview all WBNP employees and others who have concerns and collects over 5000 concerns of which about 1800 were determined to have Nuclear Safety implications.
- 1985- EG&G report substantiates overall welding problems at WBNP.
- 1985- TVA Office of General Council substantiates allegations of reprisal at least by four individuals, OGC85-037, OGC85-418, OGC85-131, OGC85-277.
- 1985- Three NSRS members assigned to WBNP brief then commissioner James Asseltine on their perception of WBNP meeting 10 CFR 50 Appendix B requirements. These NSRS members are stripped of their supervisory roles and three separate complaints are filed with the Department of Labor which rules in their favor. Department of Labor(DOL) report prepared as the result of Mansour Guity's allegations contained a full description of the inception of TVA's nuclear QA program effort as "unsuccessful" and one of the root cause problems underlying the nuclear power program."
- 1985- TVA establishes Office of Inspector General (not independent from the Board of Directors).
- 1986- QCT contract is canceled - NRC collects all the data and individuals confidentiality is breached.
- 1986- TVA creates its own Employee Concern Program
- 1986- TVA abolishes NSRS in Knoxville.(I was a member of this staff)
- 1986- TVA establishes the so called"Blue Ribbon" panel called Nuclear Manager Review Group(NMRG) reporting to the manager of Nuclear Power (not independent) in Chattanooga.(I was a member of this group)

- 1986- Five NSRS Nuclear Engineers, including Mansour Guity, testify in the U.S. House of Representatives about nuclear safety problems at WBNP-1 and serious problematic QA program and construction deficiencies at WBNP, as well as, intimidation and harassment, retaliation and discrimination they have suffered as a result of their pursuit and reporting nuclear safety problems at WBNP.
- DOL and NRC substantiate these allegations
- 1986- US-NRC Advisory Committee on Reactor Safeguards drills TVA about Intimidation and Harassment, meeting dated June 12 and 13, 1986.
- 1986- An NRC executive manager threatens TVA executive managers to correct Intimidation and Harassment problems or else.(see memorandum from Carl Crawford to S.A. White, dated June 20, 1986 TVA no. 86062602417)
- 1986- NMRG Maintenance Report No. R-86-02-NPS dated September 30, 1986 identifies problems at WBNP. (I was a member of the group that performed this review)
- 1986-TVA names four nationally recognized safety and engineering experts to a top level panel to review Watts Bar Special Program involving resolution of employee concerns.
- 1986- TVA-OIG and NRC enter into a Memorandum of Understanding leading to TVA's awareness of the identification of names of TVA employees who have voiced concerns to the NRC (NRC has not yet conducted its own investigations of these concerns.)
- 1987- A TVA Employee Task Concerns Group releases a report concluding that "the quality of TVA's nuclear plants was highly criticized.
- 1988- Inside NRC reported that a draft report prepared by NRC details TVA's Watts Bar nuclear quality assurance program failure at WBNP and throughout TVA dating back to 1981.
- 1990- Complete "Stop Work" order was issued for WBNP-1 construction activities, due to faulty construction activities.
- 1991- NRC, in a letter to Oliver Kingsley, TVA's President of Generating Group notes that the primary factors in the TVA decision to shut down the entire nuclear program in 1985 were still occuring-that is six years later.
- 1991- NRC, in a letter to Oliver Kingsley notes that NRC continues to have serious concerns with TVA's overall QA program.
- 1993- NRC, in a letter to TVA notes that it continues to have concern over TVA QA program for assuring that construction, maintenance and test activities are properly accomplished.
- 1993- Nuclear Utility Services (NUS) prepares a report for TVA on The Assessment of WBNP Management and the QA program and concludes that WBNP-1 could not achieve a level of quality that would support April 1994 completion of the plant.
- 1993- WBNP receives a low mark (category 3) for overall nuclear safety assessment and quality verification per NRC's Systematic Assessment for Licensee Performance (SALP) and that TVA'sQA program did not provide

consistent that the activities were being performed in accordance with QA requirements.

- 1994- NRC continues to find repetition of previously identified problems.
- 1995- An NRC executive manager publicly expresses his lack of confidence about WBNP management.
- 1986-1993- Employee Concern Program Survey, Office of Nuclear Power, 1986 report, Employee Opinion Survey results of 1991 at WBNP report, Employee Opinion Survey of 1991 Nuclear Generation- Compliance Assurance report, Employee Opinion Survey- TVA wide, 1992 report, and Organizational Effectiveness Consultants, 1993 report, all echoed "eye opening" and significant revelations of TVA's top level management's continuous failures in all major areas within nuclear program.

**F.** Five Material False Statements Made To Nuclear Regulatory Commission(NRC), Four Of Which Are Directly Related To WBNP-1 For Fuel Loading And Its Compliance With Title 10 CFR 50 APPENDIX B.

1. Hugh Parris, Manager of Nuclear Power, certification of WBNP Unit 1 readiness for fuel loading, February 20, 1985. NRC Disposition Report of Investigation Report OI-2-86-002 dated April 19, 1990 accompanied by Report of Investigation WBNP, possible material false statement regarding certification for fuel load, case no. 2-86-002.
2. Steven White, Manager of Nuclear Power, statements of March 20, 1986 and June 5, 1986 pertaining to WBNP QA overall compliance with 10 CFR 50 APPENDIX B. NRC case No. 2-87-002 dated September 28, 1987, that the Manager of Nuclear Power "knowingly and willfully" made a material false statement on two occasions to US-NRC.
3. Herb Sanger, General Counsel for TVA, "knowingly and intentionally misled the US-NRC Commissioners about TVA's handling and investigation of the charges of Intimidation and Harassment, retaliation and discrimination by four Nuclear Engineers from NSRS. I was one of these nuclear engineers. NRC Investigation report No. 86-015 dated February 15, 1990.
4. Four of these substantiated Material False Statements had to do with WBNP Unit 1 readiness for fuel loading and compliance with 10 CFR 50 Appendix B.

**G.** TVA's "Whistleblowers" Dilemma-Intimidation, Retribution, Harassment, Discrimination And Reprisal(H & I) By TVA Management, Persistent Repetition And Continuation Of TVA's H & I Activities, The Chilling Effects And Absence Of Protection By NRC.

1. TVA has had the highest and overwhelming percentage of "Whistleblowers" in the nation, Why?
2. NRC's role in the protection of these people has been non-existent.

3. TVA's attitude toward such people has been to intimidate, harass, retaliate and discriminate and put them through costly legal battles. NRC's role, lets watch. Why?
4. The message of TVA is to keep quite if you want to keep your job. Cause and effect, those that are in positions to know the problems will be reluctant (chilling effect) based on their observations of what they happened to these "whistleblowers."
5. Therefore not all problems are identified and yet they can not be corrected. Has the NRC looked at and followed up on these whistleblowers? Are they still employed at TVA? How many has TVA settled out-of-court and brought their silence? How many have been rewarded for their courage? The list can go on.

**H**. Cause And Effect Of Revisions To The Design, Construction And Testing Procedures And Failure To Retrofit The Design, Construction And Testing Activities Per The Latest Procedural Requirements.

Revisions to the deficient design, engineering, construction, testing procedures and drawings continues with very little retrofitting thereby rendering the activities performed under those deficient procedures unacceptable and not in compliance with new revisions. Those design, construction and testing activities performed and not reworked or redone per revised procedures fail to establish that WBNP-1 was designed, built and tested per a QA program that meets Title 10 CFR 50 APPENDIX B and FSAR commitments.

**I**. NRC's Inadequate Inspection Processes.

NRC's inspection and review of QA Program for Design,Engineering, Construction, Pre-Operational, start up and Hot Functional Testings at WBNP for the last 22 years has been totally segmented and performed in a piece meal approach. Inspecting few chain loops here and there while missing all the links and neglecting to look at the dynamics of the plant design, construction, and testing due to the fourth dimension, namely time.

The question NRC should ask and be concerned about is does the design, construction, and testing activities at WBNP-1 meet TVA's present QA program, procedures, FSAR, design and construction specifications as of the date of TVA's certification or not? Obviously WBNP-1 with 22 years of constant and frequent organizational, QA program, design, construction, and testing procedure changes does not meet the 10 CFR 50 Appendix B requirements. It did not meet that 10 years ago and it does not meet it today. It is not sufficient for TVA to have a QA program that meets Appendix B at the time of certification. What is significant, is whether the plant meets today's QA program?

**J**. WBNP-1 Has Never Met 10 CFR 50 APPENDIX B Requirements.

In conclusion, I am of the opinion that WBNP has never ever met 10 CFR 50 Appendix B during its design, engineering, construction and testing. This opinion is based on my engineering education, skills, nuclear expertise, qualifications and technical knowledge about WBNP-1 and research and analysis of related information compiled over the last 16 years.

**K**. I Told You So Nine Years Ago.

1. In my letter of September 24, 1986 to Chairman Charles H. Dean, Jr. TVA board of director and Board Member, John H. Waters (Exhibit I), I, at that time believed that "our nuclear problems as of today are manageable and have the potential of being resolved."

2. After nine years and twelve billion dollars nothing has changed about TVA's management style, attitude and abilities to fix nuclear safety problems at TVA nuclear plants. Although TVA has supposedly hired nuclear "experts" , these so called "experts" and "nuclear czar" have failed to resolve these problems and such problems continue to remain unresolved and out of control just as bad, if not worse, than they were nine years ago. At least TVA was in much better financial shape then than it is today.

3. Browns Ferry nuclear plant units 1 and 3 remain shut down since 1985, WBNP-2 has been deferred, Bellefonte nuclear plant units 1 and 2 have been canceled. Browns Ferry nuclear plant unit 2 and Sequoyha nuclear plant units 1 and 2 continue to suffer from assorted operational problems.

4. Watts Bar Nuclear Plant unit 1 at an approximate cost of three billion dollars as of 1986 could not have paid for itself during the plant's life expectancy.How about now at a cost of six to seven billion dollars? Where is TVA's cost vs. benefit analysis? Why was Watts Bar Nuclear Plant unit 1 excluded from TVA's Integrated Resource Planning(IRP)?

5. Chairman Charles, H. Dean, Jr. in his response of October 14, 1986(exhibit II) to my letter indicated that "they were on the right track.", and that "history will have to record as to what kind of leadership we have provided." I believe the history now speaks for the kind of leadership TVA had then and much the same will be recorded for those in charge of the agency's leadership since then.

In conclusion, I am of the opinion that WBNP-1 has never ever met 10 CFR 50 APPENDIX B during its design, engineering, construction and testing. This opinion is based on my engineering education, skills, expertise, qualifications, technical knowledge, research and analysis of WBNP-1 information compiled during the last 16 years as an Electrical Engineer, QA Evaluator, QA Engineer, QA Analyst, Nuclear Engineer and Nuclear Evaluator about WBNP-1.

L. Conclusion

Therefore US-NRC should seriously consider **DENYING** TVA's application for fuel loading to avoid a point of no return -once the fuel is loaded then we shall have a plant worse than Browns Ferry Nuclear Plant Unit 1 and 3.

Watts Bar Nuclear Plant unit 1 is the safest nuclear plant in the world just as it is- without loading fuel.

Very truly yours,

Mansour Guity 9/5/95

Mansour Guity
Former TVA employee till 1989
Member of The Defunct Nuclear Safety Review Staff

# EXHIBIT 1

September 24, 1986

TO: The Honorable Chairman, Charles H. Dean, Jr., TVA Board of Directors
The Honorable Board Member, John B. Waters, TVA Board of Directors

I believe you gentlemen have the best interest of the agency and the rate payers in mind and at heart. Furthermore, I am sure that both of you are doing the best that you would possibly do to have our nuclear problems resolved and get our nuclear plants back on line. I am also convinced that TVA's nuclear dilema has been a continuous nightmare for both of you gentlemen for the last 18 months, if not longer. I am just as equally sure and convinced that there are situations where ones best intentions and hard, long hours of work falls too short of expectations as well as obligations.

Gentlemen, I believe that your records of persistent, continuous failures as well as ineffective management style speak for itself and need not be repeated here. Regardless of what your intentions are and how hard you are working at getting our nuclear plants back on line safely, you have without a doubt proven that either this task is too complex for you to resolve it or that it is an impossible one. I believe our nuclear problems as of today are manageable and have the potential of being resolved. The time is running out and so is the money. How much longer and how many more billions of dollars are you willing to waste? I, as a very concerned Tennessee Valley resident and ratepayer, therefore, request that you gentlemen remove yourselves from the leadership positions you have been holding within this agency immediately in the best interest of the agency and the ratepayers.

I am convinced that most if not all the people of the valley would remember your action to remove yourself as the most courageous and unselfish decision you have ever made. They will remember you as the ones who put the agency's survival and the ratepayers pleas ahead of your own personal needs and interests. We all need to do what we can to help expedite our nuclear recovery program and I am convinced you gentlemen will agree with me on this point. Therefore, let us help save the agency. Let a new team take over the leadership and future direction of the agency as it is the leadership at your level that is a key factor in the success of the recovery program.

Respectfully yours,

Mansour Guity
Tennessee Valley Ratepayer for
the Last 25 Years

# EXHIBIT 2

TENNESSEE VALLEY AUTHORITY

Office of the Chairman

400 Summit Hill Drive
Knoxville, Tn 37902
Telephone 615/632-2921

OCT 14 1986

Mr. Mansour Guity
11512 Packard Lane
Knoxville, Tennessee 37922

Dear Mr. Guity:

Your letter of September 24 was very interesting. We think we are on the right track to solve our nuclear problems, even though we agree with you that they are very complex. The rest of your remarks concern whether we should stay in the jobs we have, and history will have to record as to what kind of leadership we have provided.

Best regards,

C. H. Dean, Jr.
Chairman

cc: John B. Waters

Enclosure 8

September, 1995

From: Ruth and Bob Peeples

To: TVA Vision Program

Re: Energy in the Tennessee area.

We are very concerned that TVA is not encouraging conservation of energy. We would like to see TVA encouraging us, the rate payers, to conserve electricity in a variety of ways - energy saving light bulbs, energy saving appliances, etc.

We would also like to see TVA doing research into solar and wind energy possibilities. Some money should be put into this kind of research every year.

We would like to see a plan for the waste products from all of the nuclear energy plants. As it stands now the waste is a major problem that has not been addressed.

We would like to have TVA not start up the Watts Bar nuclear energy plant. If the above things were done we would not need more electric power than is now produced. We are worried that the Watts Bar plant is now so old that even if it is brought up to standards set it won't be long until there will be major problems and that means more money - rate payers money spent on it. We realize that much too much money has been spent on getting this plant into shape. We urge you not to spend any more money on this plant. What has been spent cannot be recovered but that does not mean that more should be spent. Just stop it now!!!

Thank you.

Ruth + Bob Peeples

Enclosure 9

To the Editor:

Mr. Mangano states that the population of Anderson County is an "apparently low-risk population." Mr. Mangano contends that, since the opening of Oak Ridge in 1943, Anderson County has always had a better-educated, higher-income population than the U.S. population. If this were previously true, it certainly is not true now. As illustrated by the 1990 Census data contained in Table 1 below, Mr. Mangano's statement is incorrect. If education or income levels affect death rates, then it is obvious that current death rates in Anderson County should be similar to or slightly worse than the U.S. rates, once adjustments for demographic differences have been made.

Table 1

| | Anderson | U.S. |
|---|---|---|
| Percent of Population in 1990 25+ Yrs of Age With 12+ Yrs. School | 72.4% | 75.2% |
| Percent of Population in 1990 25+ Yrs of Age With 16+ Yrs. School | 18.6% | 20.3% |
| Median Household Income in '89 | $26,496 | $30,056 |
| Households Earning $100,000 + in '89 | 1.9% | 4.4% |
| Percent of Persons Below Poverty in '89 | 14.3% | 13.1% |

Mr. Mangano stated that the incidence rate for new cancer cases in Anderson County from 1988-90 was higher than the U.S. rate. This is also clearly not true. Researchers have now published the first direct evidence that people accumulate cancer-causing mutations of genes as they grow older. As stated by Gino A. Cortopassi, assistant professor of molecular pharmacology and toxicology at the University of Southern California School of Pharmacy, "'age

from the expected deaths taking into account the dramatic demographic changes in Anderson County? Mr. Mangano illustrated the cancer deaths from 1980-89 using the total deaths versus his previous illustrations based only on the white deaths. The white cancer deaths are illustrated below in Table 3 compared to the expected cancer deaths calculated by applying the U.S. age, race and sex death rates to the relevant demographic segments of the Anderson County population. This data has been displayed through 1992 even though Mr. Mangano continuously fails to recognize the existence of death data beyond 1989.

Table 3

Anderson County
White Cancer Deaths

| | Actual | Expected | Deviates from Exp |
|---|---|---|---|
| 1980 | 110 | 120 | -0.89 |
| 1981 | 116 | 123 | -0.57 |
| 1982 | 123 | 127 | -0.31 |
| 1983 | 118 | 130 | -1.06 |
| 1984 | 132 | 134 | -0.16 |
| 1985 | 136 | 138 | -0.12 |
| 1986 | 149 | 141 | 0.69 |
| 1987 | 163 | 144 | 1.55 |
| 1988 | 154 | 147 | 0.56 |
| 1989 | 152 | 152 | 0.05 |
| 1990 | 162 | 155 | 0.58 |
| 1991 | 146 | 157 | -0.88 |
| 1992 | 153 | 159 | -0.46 |

As illustrated, the increase in cancer deaths is a reflection of the demographic changes occurring in Anderson County; changes that Mr. Mangano is apparently unwilling to recognize. However, a failure to recognize and understand these demographic changes is a blatant misrepresentation of the true facts.

Mr. Mangano's calculations of the effect of reclassifying the unknown or

deaths would have been ill-defined and 7,932 deaths would have been reclassified as cause-specific. Since the white cancer deaths during this period equalled 32,358 in Tennessee, the white cancer death rate would have been increased by 25% if these ill-defined deaths had been reclassified as cancer deaths. The impact of underreporting cause-specific deaths is dramatic and this example cogently illustrates the unreliability of the historical cause-specific death data in Tennessee. Is it really reasonable to think that the white cancer death rate in Tennessee was 14.0% below expected from 1950-59 while the white death rate for all causes during this period was just 2.6% below expected? Undoubtedly, the answer is "no". Clearly the high proportion of ill-defined deaths in Tennessee impacts the cause-specific death rates.

In addition, as previously noted, the pre-1970 U.S. deaths included nonresidents. This inflates the U.S. death rates during that time. Mr. Mangano states that only 0.2% of the deaths in 1989 were to non-residents. However, the fact remains, Mr. Mangano does not know the impact of nonresidents on his U.S. data from the early 1950s. Just because the nonresident percentage equalled 0.2% in 1989 does not mean that it equalled 0.2% in the early 1950s. Compounding this problem is the fact that there is no way to know whether a disproportionate share of these deaths were cancer deaths during the early 1950s. Combined with the dramatic impacts that the underreporting of cause-specific deaths in Tennessee creates, it is clear that comparisons using cause-specific data from the early 1950s are not reliable.

Mr. Mangano's presumption that I had no objection to his other hypotheses is totally in error. Since Mr. Mangano's basic methodology is flawed

Enclosure 10

9-5-95 Ann Harris
What is Criteria used to determine evaluation of these issues + what is basis for Criteria

NRC ORAT ISSUES

As discussed in R. Purcell's memo of August 7, 1995, the following issues require completion, to the extent possible, prior to the NRC ORAT's return (August 14, 1995). Draft, typed responses are due for each issue (including issues in 8/7/95 memo) Wednesday at 4:30 p.m., August 9, 1995 in the Plant Assembly Room, and finalized responses provided to Site Licensing by close of business, Thursday, August 10, 1995. Contacts: Masoud Bajestani (ext. 7965, P-70357) or Charlie Touchstone (ext. 3820, P-90848).

1) ADEQUACY OF CORRECTIVE ACTION/ROOT CAUSE ANALYSIS PROCESS TO THOROUGHLY DIAGNOSE PROBLEMS - IRA, S. Casteel/D. Davis

2) LCO TRACKING PROCESS IS CUMBERSOME - Operations, L. Newman/J. Guyer

3) EVALUATE NEED FOR MORE STRUCTURE/DOCUMENTATION FOR 50.72 DETERMINATIONS Operations, L. Newman/J. Guyer

4) CONCERN WITH SYSTEM STATUS AND CONTROL RELATED TO SFPCS CCS MANIPULATIONS Operations, L. Newman/J. Guyer

5) DIESEL GENERATOR OPERABILITY - Deleted a D/G fuel oil graph from an SOI that converted level to gallons. Operations, L. Newman/J. Guyer

6) MAIN CONTROL ROOM COMMUNICATIONS - Operations, L. Newman/J. Guyer

7) RESOLUTION PLAN FOR ICE CONDENSER ISSUES - Technical Support, D.Koehl

8) VITAL INSTRUMENT BREAKER TRIP (WBPER950440) - INVESTIGATION and CORRECTIVE ACTIONS - Technical Support, D. Koehl/T. Walker

9) SURVEILLANCE INSTRUCTION ISSUES (Compliance Instruments, SI-901 backpressure and venting, schedule issues) - Technical Support, Koehl

10) ERCW STRAINER 2B-B ISOLATION VALVE WORK ORDER CLOSED WITHOUT DETERMINING CAUSE OF TRIPPING - Maintenance, Desouza

11) CLA # 4 OPERABILITY - PROBLEM WITH LEVEL DIFFERENCES BETWEEN ROSEMOUNT AND FCI TRANSMITTERS - Maintenance, Desouza

12) MANIPULATION OF INSTRUMENT VALVES VS ROOT VALVES BY INSTRUMENT TECHNICIANS, Maintenance, Desouza

13) RADCON/CHEMISTRY OBSERVATIONS (BRIEFINGS, PASS PIG, LEAD SHAVINGS ON BOLTS, TRAINING LESSONS LEARNED, SELF-CONTAINED BREATHING APPARATUS) RadCon/Chemistry, Hughes

14) USQD PROCESS - OBSERVATION THAT THERE IS ROOM FOR IMPROVEMENT - Nuclear Engineering - F. Koontz

15) TIMELINESS OF PROCESSING PROCEDURE CHANGES AND MAKING THEM AVAILABLE IN THE TICS - Document Control, R. Byrd

4. DEAD LEG FLUSH CONNECTIONS HAVE NEVER BEEN INSTALLED AT WATTS BAR--WHICH IS IN DIRECT CONFLICT WITH A COMMITMENT MADE TO THE NRC IN JAN. 1991. THE SYSTEM TO HAVE THE CONNECTORS INSTALLED IS THE EMERGENCY RAW COOLING WATER (ERCW). AS YOU KNOW ALL THE WATER DOES NOT GET TREATED. THIS CAUSES PIPE THINNING AND DETERIORATION AND THE EROSION/CORROSION CAN GROW BACK WITHIN 48 HOURS AND GROWS EXTENSIVELY. THIS IS COMMONLY REFERRED TO AS "MIC". THIS AFFECTS THE FIRE PROTECTION PORTION OF THE PLANT ALSO.

A. WHAT WAS THE CRITERIA FOR THE NRC WAIVING TVA'S COMMITMENT.

B. SINCE THIS AFFECTS THE FIRE DETECTION SYSTEM AND IN LIGHT OF THE PROBLEMS WITH RUPTURED PIPES AT SEQUOYAH WHAT IS THE BASIS FOR THIS DECISION?

Ann Harris

14. JOHN WATERS REQUESTED OLIVER KINGSLEY TO REPORT TO HIM ANY WEAKNESSES IN SEQUOYAH CHEMISTRY TECHNICIANS TRAINING PROGRAM AND ANY DEFICIENCIES WITH REFERENCES TO CHEMISTRY PROCESS INSTRUMENTATION AND OR CALIBRATION. MR. KINGSLEY MISREPRESENTED THE CONDITION BACK TO WATERS REGARDING THOSE 2 CONDITIONS AND THAT HAS BEEN CONFIRMED BY THE NRC'S OFFICE OF INVESTIGATION. IF MR. KINGSLEY MISREPRESENTED INFORMATION TO THE CHAIR OF TVA--- WHY WOULD THE NRC TAKE HIS WORD FOR OTHER ITEMS. PAST CONVERSATIONS WITH HIGHLY PLACED NRC MANAGEMENT HAS STATED THAT THE NRC KNOWS THAT TVA LIES, EXPECTS TVA TO LIE AND TO LIE UNDER OATH THEREFORE HOW DOES THE NRC PLAN TO REGULATE AND OVERSEE THEIR ACTIVITIES? -------OR IS IT JUST PURE COLLUSION WITHIN THESE TWO FEDERAL AGENCIES?

Ann Harris

1.
DURING THE HOT FUNCTIONAL TESTING AT WATTS BAR, THE NRC MADE ORAL CORRECTIONS TO THE OPERATORS. THIS IS A LAUNDRY LIST OF PROBLEMS. WHAT WAS THE TRACKING PROCEDURE USED TO CAPTURE ALL ORAL CORRECTIONS? WHO HAS ANALYZED THAT INFORMATION TO DETERMINE IF PROBLEMS ARE PROCEDURAL OR TRAINING BASED PROBLEMS?

3. MY UNDERSTANDING IS THAT A POLICY DECISION IS BEING MADE AT THE COMMISSION LEVEL CONCERNING THE CRITERIA FOR REASONABLE ASSURANCE CAN YOU UPDATE ME ON THAT? FRED HEBDON---IS THIS YOUR VERSION OR IS IT JIM TAYLORS VERSION? WHOSE DECISION WILL TAKE OVER?

7. IN A TAPED INTERVIEW WITH THE TVA'S INSPECTOR GENERAL THE CORPORATE MANAGER OF SECURITY STATED THAT HIS PEOPLE WERE SCARED TO RAISE ISSUES OF SAFETY FOR FEAR OF LOSING THEIR JOBS!!! HOW DO YOU EXPLAIN THIS? IN YOUR PRESENTATION TO THE COMMISSION RECENTLY YOU STATED THAT EMPLOYEE CONCERNS ARE NOT A PROBLEM AND THEREFORE EMPLOYEES ARE NOT RAISING ISSUES---- WHY SHOULD THEY PUT THEIR LIVES, CAREERS, FAMILIES AND FUTURES ON THE LINE FOR AN INDUSTRY AND REGULATOR THAT HAS BETRAYED THOSE VERY WORKERS?

Ann Harris

Enclosure 1

MYLES JAKUBOWSKI
5213 HILLROSE
BAXTER TN. 38544

QUESTIONS -

1) HOW CAN YOU INSURE MATERIAL BOUGHT IS MATERIAL RECIEVED ?
2) HOW CAN YOU CREATE THE RECORDS REQUIRED ?
3) HOW CAN PAPER REPLACE DEFECTIVE MATERIAL OR EVEN DETECT A DEFECTIVE MATERIAL ?
4) WERE ALL WELDS INSPECTED AFTER 1985 ? THOSE WITHOUT A SINGULARITY IDENTIFIER INSPECTED AFTER INSTALATION. IF SO, HOW ?
5) WERE LINES DRAINED & DRIED DURING THE EXTENSIVE LAY DOWN ?
6) HAS THE WIRE REMAINING AFTER 1985 EXTENDED PAST ITS SHELF LIFE FOR ELASTISITY ?
7) WAS FLAMASTIC USED ? IF SO, HAS IT BEEN REMOVED & WIRE REPLACED ?
8) ARE THERE WAREHOUSE RECIEPTS FOR INDIVIDUAL COMPONANTS.

THANK YOU FOR YOUR CONSIDERATION

Enclosure 12

RALPH M. GALT
P. O. Box 561,
Pleasant Hill,
TN 38578

Open letter to:

September 4, 1995

The Board of Directors
The Tennessee Valley Authority
Knoxville, Tennessee

Honorable Gentlemen,

We sympathize with you as you face the great problems of the Tennessee Valley Authority today. These problems include:(1) We understant the TVA now has a debt of nearly 27 billion dollars, and that about 30% of all the funds that the TVA ratepayers pay to TVA goes to pay its interest on this huge debt. (2) We have heard or seen that recently there were nearly 8000 outstanding safety violations alleged against Watts Bar Unit I by current and former plant workers. (3) Watts Bar Unit I is still in need of costly repairs costing between 1 million and 2 million dollars a day, before it can be granted an operating license. (4) The incidence of cancer in persons living near to nuclear plants is several times as high as the average in the USA.

So therefore we urge you (1) to postpone the starting up of the Watts Bar nuclear plant until all problems of the leakage of radioactivity are fully solved. (2) We also urge you to develop more safe non-nuclear methods of producing electricity including wind power, water power, and solar power. Very probably such methods are far more efficient than nuclear power is. (3) We urge that TVA again help the people to conserve energy and use power more efficiently. (4) Do preventive medicine or otherwise get the rate of incidence of disease down to or below the national average. (5) Urge Congress to hold hearings on TVA's debt, and make sure that the fate of Watts Bar is openly and completely discussed and resolved by all persons concerned.

May God guide you in solving all these herd problems about the TVA!

Respectfully submitted,

Ralph M. Galt

Ralph M. Galt.

Enclosure 13

**QUESTIONS SUBMITTED TO NRC**
**SEPTEMBER 5, 1995**
**SWEETWATER, TN**
**6:30 P.M. MEETING**

Beth Ziliott
Greenpeace
20 13th St. NE
Atlanta, GA 30309
(404) 876-6477

THE PUBLIC MEETING NOTICE SAYS THIS MEETING WILL BE TRANSCRIBED AND COMMENTS AND CONCERNS WILL BE ADDRESSED AS PART OF THE LICENSING PROCESS, "IF APPROPRIATE".

Q: IN SIMPLE ENGLISH, WHAT DOES THIS MEAN?

Q: HOW WILL YOU DETERMINE WHAT IS OR IS NOT "APPROPRIATE"?

---

THE NOTICE FOR THIS MEETING INDICATES YOU WILL ADDRESS PUBLIC COMMENTS AND QUESTIONS IF "PRACTICAL" AND "APPROPRIATE". I HAVE 3 QUESTIONS:

Q: WHAT DO YOU MEAN BY THIS?

Q: ARE THERE GUIDELINES YOU FOLLOW IN DETERMINING WHAT IS "PRACTICAL" AND "APPROPRIATE", OR DO YOU MAKE THIS UP AS YOU GO?

Q: HOW DO YOU DEFINE "PRACTICAL" AND "APPROPRIATE"?

---

I HAVE TWO QUESTIONS, BOTH OF WHICH ARE PRACTICAL AND APPROPRIATE:

Q: HOW WILL YOU INCORPORATE QUESTIONS YOU GET TODAY INTO THE DECISION TO LOAD OR NOT LOAD FUEL AT WATTS BAR?

Q: WHEN DO YOU INTEND TO MAKE AND ANNOUNCE YOUR DECISION ON WHETHER OR NOT TO LOAD FUEL AT WATTS BAR?

---

Q: WHAT IS THE PURPOSE OF THE MEETINGS YOU INTEND TO HOLD ON SEPTEMBER 7TH AND 11TH?

Q: IS IT TRUE THAT YOU INTEND TO GIVE WATTS BAR PERMISSION TO LAD FUEL AT THESE MEETINGS? (THIS IS A YES OR NO QUESTION, OF COURSE. AND I WOULD LIKE AN EXPLANATION FOLLOWING YOUR YES OR NO.)

---

Q: WHAT HAPPENS IF WATTS BAR HAS AN ACCIDENT SERIOUS ENOUGH TO COST OVER THE AMOUNT OF MONEY THEY ARE INSURED FOR? WHO PICKS UP THE TAB?

Q: HOW WILL BUSINESSES AND RESIDENTS BE PAID FOR PROPERTY AND LOSSES SHOULD THEY AMOUNT TO MORE THAN THE INSURANCE COVERS?

Q: WHAT HAPPENS IF THE INSURANCE COMPANY REFUSES TO PAY AND NO ONE ELSE CAN? OR IF AN ACCIDENT IS LITIGATED FOR YEARS AND YEARS? WILL RESIDENTS WHO SUFFER PROPERTY DAMAGE AND LOSSES BE REIMBURSED THROUGH SOMETHING LIKE FEMA?

Q: WHAT IS THE NRC'S WORST CASE SCENARIO REGARDING THESE KINDS OF QUESTIONS? WHAT CAN WE EXPECT?

---

REGARDING EVACUATION AND MEDICAL PLANS:

Q: WHAT HAPPENS IF AN ACCIDENT REQUIRING EVACUATION OCCURS DURING SCHOOL HOURS? HOW WILL PARENTS BE UNITED WITH THEIR CHILDREN? HOW WILL THEY KNOW WHERE TO GO? WHAT IF CHILDREN ARE INJURED, OR SUFFER SERIOUS RADIATION EXPOSURE? WHERE WILL THEY GO?

Q: ARE LOCAL HOSPITALS SET UP TO BE ABLE TO DEAL WITH AN ACCIDENT THAT HAS SERIOUSLY CONTAMINATED A NUMBER OF RESIDENTS? DO THEY HAVE ISOLATION CHAMBERS? DO THEY HAVE ALL THE EQUIPMENT THEY NEED TO PROTECT CAREGIVERS FROM RADIATED PATIENTS?

Q: WHAT EXACTLY ARE LOCAL HOSPITALS EQUIPPED WITH, AND WHICH HOSPITALS ARE EQUIPPED WITH WHAT? WHO PAID FOR IT, IF THEY DO HAVE EQUIPMENT?

---

IN REGARD TO EVACUATION:

Q: WILL EVERYONE IN THE SURROUNDING COMMUNITY HAVE CURRENT AND PROPER EVACUATION PLANS IN THE EVENT WHEN SOMETHING GOES WRONG? HOW DO YOU GUARANTEE THAT? WHAT ABOUT PEOPLE WHO MOVE IN?

Q: HOW MANY MILES AROUND WATTS BAR IS THE CRITICAL EVACUATION ZONE, TEN MILES?

Q: ISN'T NRC NOW LOOKING AT SHRINKING THAT CRITICAL EVACUATION ZONE TO SOMETHING LESS THAN TEN MILES? WHAT DO YOU PROJECT IT WILL BE IN THE FUTURE?

---

Q: IF THERE IS AN IRRADIATED FUEL TRANSPORTATION ACCIDENT ON LOCAL ROADWAYS, WHAT IS THE WORST CASE SCENARIO FOR THE COSTS AND TIME NEEDED FOR CLEAN UP? ISN'T IT OVER A YEAR?

Q: WHAT DO PEOPLE IN THE COMMUNITY DO? WHERE DO THEY GO? HOW DO THEY MAKE A LIVING? WHO PAYS FOR THE COSTS?

---

Enclosure 14

Gentlemen

Please research and answer these questions. The answers given were vague and incomplete

Please forward these answers to ....

Gene Kelly / Greenpeace
# 20 13th Street NE
Atlanta, GA 30309

The questions are on the other side of this card.

Q: WHAT HAPPENS IF WATTS BAR HAS AN ACCIDENT, SERIOUS ENOUGH TO COST OVER THE AMOUNT OF MONEY THEY ARE INSURED FOR? WHO PICKS UP THE TAB?

Q: HOW WILL BUSINESSES AND RESIDENTS, BE PAID FOR PROPERTY AND LOSSES, SHOULD THEY AMOUNT TO MORE THAN THE INSURANCE COVERS?

Q: WHAT HAPPENS IF THE INSURANCE COMPANY REFUSES TO PAY AND NO ONE ELSE CAN? OR IF AN ACCIDENT IS LITIGATED FOR YEARS AND YEARS? WILL RESIDENTS WHO SUFFER PROPERTY DAMAGE AND LOSSES, BE REIMBURSED THROUGH SOMETHING LIKE FEMA?

Q: WHAT IS THE NRC'S WORST CASE SCENARIO REGARDING THESE KINDS OF QUESTIONS? WHAT CAN WE EXPECT?

Enclosure 15

September 5, 1995

TO: NRC
RE: Questions for the NRC

For the record, I am asking that you respond in full to every question asked at this meeting. Further, I ask that if you reference NRC studies, that you include the name of the study, the date completed, and who the study is available through.

Thank you,

Sherry Meddick

Additional Questions

Q: WHAT ARE THE PLANS FOR DISPOSING OF -- OR EVEN STORING -- GREATER THAN CLASS C (GTCC) "LOW-LEVEL" RADIOACTIVE WASTES PRODUCED AT WATTS BAR, OR ANY OTHER TVA NUCLEAR FACILITY?

Q: ARE THESE WASTES ALLOWED TO BE "AVERAGED" INTO CLASS A-C "LOW-LEVEL" RADIOACTIVE WASTES, THEREBY BECOMING A RESPONSIBILITY OF THE STATES WHERE THE WASTES ARE PRODUCED UNDER THE LOW-LEVEL RADIOACTIVE WASTE POLICY ACT OF 1980, AND 1985 AS AMENDED?

---

Q: TVA BOARD CHAIRMAN CROWELL LAST WEEK ANNOUNCED THAT HE SEES NO REASON WHY WATTS BAR CANNOT OPERATE AT 100% CAPACITY WHEN IN OPERATION. DO YOU AGREE WITH THIS ASSESSMENT? WHY OR WHY NOT?

Q: HAS ANY NUCLEAR POWER PLANT OPERATED, AVERAGED OVER ITS LIFE, AT 100% CAPACITY? WHICH PLANT AND WHERE IS IT LOCATED?

---

Q: IS NRC WORKING ON A BRC RULE, WHICH WOULD EFFECT WASTE VOLUMES AND CURIES THAT TVA WOULD OTHERWISE BE RESPONSIBLE FOR? WILL THIS EFFECT THE VOLUME/COSTS OF DISPOSAL FROM WATTS BAR OR OTHER TVA NUCLEAR PLANTS? WHAT IS THE POTENTIAL OVERALL EFFECT OF THE RULE ON FUTURE TVA WASTE COSTS?

Q: IF YES, PLEASE NOTE THE RESPONSIBLE NRC STAFF MEMBER FOR THE NEW BRC RULE.

---

Q: IT IS OUR UNDERSTANDING THAT IRRADIATED FUEL FROM WATTS BAR WILL BE SHIPPED WESTWARD BY RAIL. IS THIS THE CASE? HOW MANY SHIPMENTS? WHAT IS THE ROUTE? DO TRAINS HAVE A HIGHER ACCIDENT RATE PER MILE THAN TRUCKS?

Q: IS IT TRUE THAT LEGISLATION BEFORE CONGRESS (THE UPTON BILL) WOULD INCREASE RISK OF FATAL CANCERS TO 1 IN 285 OF THE EXPOSED POPULATION?

Q: ARE THE PEOPLE ALONG THE RAIL OR ROAD TRANSPORTATION ROUTES FROM WATTS BAR CONSIDERED TO BE POTENTIALLY EXPOSED POPULATIONS? DOES THIS MEAN THAT THEIR AVERAGE ANNUAL EXPOSURE WILL BE HIGHER THAN THE AVERAGE POPULATION'S EXPOSURE? HAVE THESE PEOPLE BEEN INFORMED OF THIS BY TVA OR NRC?

---

Sherry Medlock

Q: DOE is considering use of commercial reactors for production of tritium, a necessary component of nuclear weapons. Is NRC in any way involved in theis process?

Q: To your knowledge, is Watts Bar -- or could Watts Bar -- be considered for such use?

Q: Given that the Yucca Mountain proposal for the permanent disposition of irradiated fuel can only accommodate 30% or so of the metric tons of commercially generated fuel that will need disposition in the U.S., what is the TVA proposal for their remaining irradiated fuel that clearly has absolutely no place to go?

---

Q: Has NRC finalized their environmental justice policy to implement President Clinton's 1994 Executive Order on Environmental and Economic Justice?

Q: If you have, please send me a copy: Sherry Meddick
P.O. Box 771
Silverado, CA 92676

Q: If you have, please inform me of any reviews pertaining to Watts Bar that have been undertaken by NRC in relation to environmental and economic justice.

---

To: NRC

Please send me a copy of the unedited transcript of the 9/5/95 as soon as it is available.

Also, please send me a copy of all responses to

Concerns / questions raised in the hearing:

To: Sherry Meddick
PO Box 771
Silverado, CA 92676

Q: What are requirements of TVA by NRC relative to decommissioning?

I want the NRC decom. requirements and TVA plan: Send to:
Sherry Meddick
PO Box 771
Silverado, CA 92676

Q: You stated the NRC does have limits for routine releases?

The question is: How many times in the history of Nuclear power have Plants exceeded their limits? How many violations have been regarded? How many times have fines been levied? Reduced? Dismissed altogether?

You stated that we should give you the name of new documents on v-rad. exposure & you would review them. Here's a new one:

Breast Cancer, Radiation and Nuclear Power
by Dr. Ernest Sternglass and Dr. Jay Gould

Q: What does the last EIR report conclude about low-level radiation?

You seem to be stating that there is a "safe" dose under which disease & genetic damage does not occur.

Please explain

Q: When was thermolag installation done? Before or after it was discovered that the material's testing was fraudulent.

Enclosure 16

THE INTERNATIONAL JOURNAL OF
# Health Services

Editor-In-Chief: Vicente Navarro

Volume 25, Number 2—1995

## Comments on "Cancer Mortality near Oak Ridge, Tennessee"

*Charles McRae Sharpe*

**Baywood Publishing Company, Inc.**
26 Austin Avenue, Box 337, Amityville, NY 11701

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*Debate on Environmental Health*

# COMMENTS ON "CANCER MORTALITY NEAR OAK RIDGE, TENNESSEE"

Charles McRae Sharpe

A recent article by Joseph Mangano concluded that changes in cancer mortality near Oak Ridge (Anderson County) in Tennessee over a 40-year period (1950–1989) suggest an increase in cancer deaths linked to radiation contamination. These conclusions are not supported by available, representative data. In his analysis, Mangano selected for comparison two three-year periods (1950–1952 and 1987–1989) that are not representative of the entire 40 years. An analysis by decade of the 42-year period from 1950 to 1991, using U.S. mortality rates from the National Center for Health Statistics and Tennessee mortality rates from the NCHS and the Tennessee Health Department, shows that the relation between expected and actual cancer deaths for the white population of Anderson County does not differ from that for the State of Tennessee. In addition, changes in methods of reporting death statistics during the 40-year period invalidate any attempt to compare current cause-specific mortality data (such as cancer deaths) with data from the 1950s. Relevant comparisons that can be made for the period 1970–1991 again show that cancer deaths for whites in Anderson County have been statistically equivalent to the expected rates.

Joseph J. Mangano recently wrote an article entitled "Cancer Mortality near Oak Ridge, Tennessee," published in this Journal (1). Contrary to Mangano's report, mortality patterns near Oak Ridge do not suggest "that the possibility of adverse health effects from the nuclear operations exists." Contrary to Mangano's report, changes in cancer mortality near Oak Ridge do not suggest "a link between radiation contamination and increased cancer risks to populations living near nuclear sites." In his article, Mangano attempts to analyze a 40-year period by showing the changes in age-adjusted death rates from two three-year periods (1987–1989 versus 1950–1952). As might be suspected, these two three-year periods are not characteristic of the entire 40 years. In addition, as discussed below, certain concerns exist with the historical cause-specific mortality data in

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Tennessee. As a result, Mangano's article presents a distorted view of Anderson County. His illustrations are not reflective of the true facts, and his conclusions are flawed and incorrect.

## METHODS AND SOURCES OF DATA

For comparability with Mangano's report, our comments are confined to the white population. All expected malignant neoplasm (cancer) deaths are calculated using the U.S. age- and sex-specific rates for the white population for each year from 1950 to 1991. These rates were obtained from the National Center for Health Statistics (NCHS) (2–4). For the calculation of the expected cancer deaths, 38 age- and sex-specific rates for the white population from the NCHS were multiplied by the relevant local population subgroups. (Population data were obtained from the Bureau of the Census (5, 6).) The resulting summation from these subgroups represents the expected total cancer deaths. These calculations were performed for each individual year between 1950 and 1991. For Tennessee, mortality data from both the NCHS and the Tennessee Department of Health (TDH) were utilized. While 1991 data are the most recent available final mortality data from the NCHS, mortality data through 1992 are available from the TDH (7–9). (Population data for Tennessee were also obtained from the Bureau of the Census (10).) The consistency of these data with those reported by Mangano is evident in the comparison of the absolute number of deaths shown in Table 1. The "< 40 miles" category specified by Mangano includes the counties of Blount, Campbell, Knox, Loudon, McMinn, Meigs, Monroe, Morgan, Rhea, Roane, Scott, and Union Counties. All of these counties, along with Anderson, are in Tennessee.

Table 1

Comparison of cancer deaths among whites

| | NCHS and TDH data | Data presented by Mangano (1) | Percent difference |
|---|---|---|---|
| United States | | | |
| 1950–52 | 596,892 | 596,567 | 0.1% |
| 1987–89 | 1,277,769 | 1,285,149 | –0.6% |
| Anderson County | | | |
| 1950–52 | 111 | 111 | 0.0% |
| 1987–89 | 469 | 473 | –0.8% |
| <40 miles | | | |
| 1950–52 | 1,340 | 1,351 | –0.8% |
| 1987–89 | 4,204 | 4,183 | 0.5% |

## THE 1987–1989 DATA

Mangano compared the differences in the age-adjusted death rates between 1987–1989 and 1950–1952 to demonstrate an absolute difference in rate change during this period. If either of these three-year periods is not representative of the entire period, then any conclusions postulated will be incorrect. As illustrated in the following analysis, these chosen three-year periods could have—and did—produce an apparent desired conclusion.

Mangano presented figures indicating that the age-adjusted death rate in Anderson County was above the U.S. average from 1987 to 1989. While this difference was not statistically significant, the age-adjusted death rate for Anderson County for 1987–1989 was used as the numerator in the calculation of an absolute difference compared with the Anderson County age-adjusted death rate for 1950–1952. Mangano chose the three-year period in the 1980s during which the cancer deaths in the white population in Anderson County exceeded the expected rates by the greatest percentages. During the remainder of the 1980s, the cancer death rate in the white population in Anderson County was below the expected rate. In addition, the cancer death rate in this population was less than the expected rate in 1990 and 1991. Mangano chose a three-year period in the 1980s that was not representative of either the years preceding or the years following his selected three years, regarding the rates as absolute values. Mangano correctly concluded that the differences in the local 1987–1989 rates and the national rate were not statistically significant. He errs, however, in then claiming that "the difference between the two groups is substantial."

As noted by the NCHS, mortality data are not subject to sampling error, although deaths may be affected by random variation. It is further noted in NCHS publications that, when mortality data are used for analytical purposes, such as the comparison of rates over a period of time, the number of deaths that actually occurred may be considered as but one of a large series of possible results that could have arisen under the same circumstances. This illustrates why it is inconsistent for Mangano to state that the differences in local and national rates were not statistically significant but were, nonetheless, substantial. By definition, the local rates were equivalent to the national rates if the differences in these rates were not statistically significant. Table 2 illustrates the random variation described by the NCHS and illustrates the problem in using the 1987–1989 Anderson County rate as an absolute value and then considering the rate reflective of the past decade. While the actual deaths and the expected deaths are statistically equivalent in each of these illustrations, it is clear that the actual death rate of the 1987–1989 period will produce a different result from the death rate for the remainder of the decade if that rate is used as an absolute value in the numerator of a comparison with a prior period of time.

We prefer to examine mortality data in the context of comparing the actual deaths with the expected deaths, because this produces data in current "real" time.

Mangano has presented data in terms of age adjustments to the 1950 population. We can convert our data into this format and in doing so, illustrate the identical problem outlined by comparing the actual deaths with the expected. Mangano calculated the Anderson County age-adjusted cancer death rate for whites as 159.0 per 100,000 for the period 1987–1989. Our results are similar in that we calculated the Anderson County age-adjusted rate as 158.7 per 100,000 population for 1987–1989. However, the Anderson County rate was 141.8 for the remainder of the 1980s and 142.9 for 1990 and 1991. Again, this illustrates exactly the same problem highlighted by comparing actual deaths with expected deaths. Mangano chose a three-year period that was not representative (in absolute value) of the years either preceding or following the three years he selected. The Anderson County cancer death rate is compared with the U.S. rate in Table 3. Again, the differences in the U.S. and the Anderson County rates are not statistically significant. Nonetheless, it should be noted that whether the U.S. age-specific rates are used to calculate expected deaths in "current" time or current local age rates are converted to some predetermined distribution, the result is the same. Compared with U.S. data, the cancer mortality rate for whites in Anderson County was less than the U.S. average in the years preceding and the years following the three years Mangano chose to use. As stated above, the three years selected by

Table 2

Cancer deaths in the white population of Anderson County

| | Mangano's three years, 1987–89 | Remaining seven years of 1980s | Two years, 1990–91 |
|---|---|---|---|
| Actual | 469 | 884 | 308 |
| Expected | 441 | 907 | 312 |
| Actual vs expected, percent difference | 6.4% | –2.6% | –1.1% |

Table 3

Age-adjusted cancer death rate for whites per 100,000 population (adjusted to the 1950 U.S. population)

| | Mangano's three years, 1987–89 | Remaining seven years of 1980s | Two years, 1990–91 |
|---|---|---|---|
| Anderson County | 158.7 | 141.8 | 142.9 |
| United States | 147.6 | 146.1 | 148.4 |
| Anderson County vs U.S., percent difference | 7.5% | –2.9% | –3.7% |

Mangano are not representative of the recent history in Anderson County in the context of using the 1987–1989 rate as an absolute value.

Since Mangano uses the absolute value of his 1987–1989 age-adjusted rate as the numerator in his calculation of an absolute percentage change from the 1950–1952 period, his result is biased and skewed. This result is not representative of what has actually happened in Anderson County during the 40 years about which Mangano attempts to report. Any conclusions related to Anderson County are, therefore, incorrect.

## THE 1950–1952 DATA

It appears that Mangano selectively chose his three-year period in the 1950s just as he did in the 1980s. For his three-year period in the 1950s, he chose the three years in which the actual cancer deaths in Anderson County were the lowest of any consecutive three-year period during the decade. Again, since he uses the absolute value of his age-adjusted 1950–1952 rate as the beginning point of his calculation of an absolute rate increase, this further distorts the true picture of Anderson County. The actual cancer deaths for whites are compared with the expected deaths in Table 4.

Mangano calculated that the age-adjusted cancer rate in the white population of Anderson County was 17.8 percent below the U.S. average in the 1950–1952 period. As illustrated in Table 4, the actual deaths in Anderson County were 17.3 percent below the expected during this period. Both of these differences are statistically significant. However, the difference between the actual deaths and the expected was less during the remainder of the decade. Consequently, the absolute value of the death rate in the 1950–1952 period is not reflective of the entire decade. To display the effect of selective choice, Table 5 illustrates the actual increase in cancer deaths compared with the expected. The results presented by Mangano are evident in the comparisons between 1987–1989 and 1950–1952. However, dramatically different results can be obtained by using different periods of time, as illustrated in Tables 6 and 7.

**Table 4**

Cancer deaths in the white population of Anderson County

| | Mangano's three years, 1950–52 | Remaining seven years of 1950s |
|---|---|---|
| Actual | 111 | 317 |
| Expected | 134 | 363 |
| Actual vs expected, percent difference | −17.3% | −12.7% |

Table 5

Cancer deaths among whites

| | Mangano's three years, 1950–52 | Mangano's three years, 1987–89 | Percent increase |
|---|---|---|---|
| Anderson County | | | |
| Actual | 111 | 469 | 322.5% |
| Expected | 134 | 441 | 228.3% |
| Other 12 counties | | | |
| Actual | 1,340 | 4,204 | 213.7% |
| Expected | 1,573 | 3,979 | 152.9% |

Table 6

Cancer deaths among whites

| | 1954–55 | 1990–91 | Percent increase |
|---|---|---|---|
| Anderson County | | | |
| Actual | 96 | 308 | 220.8% |
| Expected | 100 | 312 | 212.4% |
| Other 12 counties | | | |
| Actual | 983 | 2,908 | 195.8% |
| Expected | 1,159 | 2,792 | 140.9% |

Table 7

Cancer deaths among whites

| | 1968–69 | 1990–91 | Percent increase |
|---|---|---|---|
| Anderson County | | | |
| Actual | 169 | 308 | 82.2% |
| Expected | 160 | 312 | 95.2% |
| Other 12 counties | | | |
| Actual | 1,503 | 2,908 | 93.5% |
| Expected | 1,620 | 2,792 | 72.3% |

Tables 5, 6, and 7 are all comprised of data from the past 42 years; all three show different results. Table 5 indicates that the increase in cancer deaths has been greater than expected for both Anderson County and the other 12 counties, with the increase in Anderson being greater than the increase in the 12-county area. Table 6 indicates that the increase in cancer deaths has been equivalent to the expected in Anderson County, while the increase has been greater than expected in the 12-county area. Table 7 indicates that the increase in cancer deaths has been less than expected in Anderson, while the increase has been greater than expected in the 12-county area.

Mangano chose the two extremes for his illustrations. He chose the three years in which Anderson County had the highest relative deaths in the 1980s, and he chose the three-year period in the 1950s that included the year with the fewest relative deaths. This produced the highest absolute differential of change in Anderson County. But, the three-year periods chosen by Mangano are not representative of the decades from which they were selected. Worse still, this is not representative of the past 42 years. In fact, *this is a misrepresentation of the last 42 years in Anderson County*. The results in Tables 5, 6, and 7 poignantly indicate the problem of selecting short periods of time and extrapolating the results to a much broader period of time. This is why the entire 42-year period should be examined.

## THE 42-YEAR PERIOD

A comparison of the actual cancer deaths with the expected cancer deaths by decade for the white population is presented in Table 8. The data for Anderson County are given along with the data for the other 12 counties characterized by Mangano as the remaining counties in the 40-mile radius. As noted earlier, these other counties include Blount, Campbell, Knox, Loudon, McMinn, Meigs, Monroe, Morgan, Rhea, Roane, Scott, and Union Counties. Since only two years of comparable U.S. data are available for the 1990s, data for 1990 and 1991 have been included with the 1980s data. The percentage differences between the actual and expected deaths are shown in Table 9.

When examining the past 42 years by decade, it is clear that the relationship of actual to expected cancer deaths in the white population of Anderson County has been identical to that in the State of Tennessee. The other 12 counties in the 40-mile radius have exhibited a similar trend. If we deal in absolute figures as Mangano has done, the 12-county area has actually exhibited a slightly wider variation than has Anderson County. This is in direct conflict with Mangano's entire contention. Again, he used two three-year periods of time that were not representative of the entire 42 years for which data are readily available. As a result, his conclusions are flawed. The actual data for the entire 42 years do not support his skewed contentions. In fact, the actual data are in direct conflict with

Table 8

Actual versus expected cancer deaths among whites

| | 1950–59 | 1960–69 | 1970–79 | 1980–91 |
|---|---|---|---|---|
| Anderson County | | | | |
| Actual | 428 | 626 | 943 | 1,661 |
| Expected | 498 | 689 | 992 | 1,660 |
| Tennessee | | | | |
| Actual | 32,358 | 41,863 | 56,685 | 94,299 |
| Expected | 37,661 | 47,160 | 60,731 | 94,819 |
| 12-County area | | | | |
| Actual | 4,845 | 6,572 | 9,123 | 15,446 |
| Expected | 5,776 | 7,353 | 9,602 | 15,164 |

Table 9

Percent difference between actual and expected cancer deaths among whites

| | 1950–59 | 1960–69 | 1970–79 | 1980–91 |
|---|---|---|---|---|
| Anderson County | −14.0%* | −9.2%* | −4.9% | 0.1% |
| Tennessee | −14.1%* | −11.2%* | −6.7%* | −0.5% |
| 12-County area | −16.1%* | −10.6%* | −5.0%* | 1.9%* |

*Difference statistically significant at the 95.0 percent level.

his unfounded contention that the rate of increase in Anderson County has been greater than that in the 12-county area.

## HISTORICAL DATA

Two additional factors must be considered in comparing current mortality patterns with historical mortality patterns. The following cautionary note appeared in the vital statistics publications from TDH during the 1950s and early 1960s (9):

> In certain sections of the state persons die without medical attendance and the causes of death are unknown. In these areas the number of deaths from unknown or ill-defined causes may be large and the number of deaths from specific causes small. The availability of medical facilities affects the quality of vital statistics data.

From 1950 to 1959, the percentage of deaths in the United States that were classified as unknown or ill-defined was 1.0 percent. However, during this same period of time, 4.4 percent of all Tennessee deaths were classified as unknown or ill-defined. Given that Tennessee, Anderson County, and the 12-county area consistently reported fewer deaths by cause than expected, it appears that this issue is critical when trying to compare current data with historical data. According to vital statistics published in 1962 (9), the 1961 Tennessee Legislature passed the Post-Mortem Examination Act which provided for county medical examiners. An examination of annual data shows that 1968 was the first year in which the Tennessee ill-defined deaths declined to the U.S. percentage. Since that point, the percentage of unknown or ill-defined deaths has been 1.2 percent in the United States and 1.9 percent in Tennessee.

To further illustrate this point, cancer deaths in the white population of Tennessee were 14.1 percent below expected during the 1950s and 11.2 percent below expected during the 1960s. However, total deaths from all causes among whites were only 2.8 percent below expected during the 1950s and 1.2 below expected during the 1960s. This highlights the problem of using cause-specific mortality from the 1950s and 1960s in Tennessee. During the 1950s, 14.6 percent of all defined deaths in the white population were related to cancer in Tennessee, and 14.8 percent in Anderson County. If 14.8 percent of the ill-defined deaths in Anderson County during the 1950s also related to cancer, then any rate changes involving rates from the 1950s as the denominator would have been drastically altered. These reporting problems invalidate any attempt at comparing cause-specific death data such as cancer deaths from the 1950s. *Any attempts to do so are not reliable.* It should also be noted that the problems related to cause-specific mortality data were greater in rural areas. In 1950, the percentage of ill-defined deaths in rural counties in Tennessee was 5.6 percent compared with only 3.7 percent in urban counties. This would have to be taken into account before Mangano could legitimately reach any conclusions involving rate change differentials between urban and rural counties.

In addition, mortality statistics for the United States prior to 1970 included all deaths occurring in the United States, with nonresidents assigned to the place of death. Since the resident population was used in calculating all of these rates, the occurrence-based deaths overstate any resulting mortality rates. Beginning in 1970, resident mortality data refer to deaths of U.S. residents only (11). Any "truly" relevant mortality comparisons with the United States can only begin with data from 1970 and thereafter.

## RELEVANT COMPARISONS

Because the U.S. system became resident-based in 1970 and because of the historical problems with cause-specific death data in Tennessee during the 1950s and 1960s, we recommend that all mortality comparisons begin with 1970 data.

Comparisons of actual cancer deaths with expected deaths are shown in Table 10 for the period 1970–1991. During this period, the actual cancer deaths in the white population of Anderson County were statistically equivalent to the expected, as were the deaths in the 12-county area. Mangano states in his article that "local rates are now greater than the national standard. . . . The difference between the two groups is substantial." This is clearly not the case if a representative period of time is studied. From 1970 to 1991, the actual deaths were less than expected in both Anderson County and the 12-county area. Table 11 again illustrates the comparisons for 1980–1991.

During the period 1980–1991, the actual cancer deaths among whites in Anderson County were statistically equivalent to the expected. It is also clear that one cancer death above the expected in the white population during this 11-year period is not mathematically substantial. And, the population most geographically proximate to Oak Ridge is the population of Oak Ridge itself. From 1970 to 1991, the actual cancer deaths in the white population of Oak Ridge were 6.5 percent below expected (significant at 95.0 percent). From 1980 to 1991, the actual cancer deaths in the white population of Oak Ridge were 6.0 percent below expected.

Table 10

Actual versus expected cancer deaths among whites, 1970–1991

| | Actual | Expected | Actual vs expected, percent difference |
|---|---|---|---|
| Anderson County | 2,604 | 2,651 | –1.8% |
| Tennessee | 150,984 | 155,550 | –2.9%* |
| 12-County area | 24,569 | 24,766 | –0.8% |

*Difference statistically significant at the 95.0 percent level.

Table 11

Actual versus expected cancer deaths among whites, 1980–1991

| | Actual | Expected | Actual vs expected, percent difference |
|---|---|---|---|
| Anderson County | 1,661 | 1,660 | 0.1% |
| Tennessee | 94,299 | 94,819 | –0.5% |
| 12-County area | 15,446 | 15,164 | 1.9%* |

*Difference statistically significant at the 95.0 percent level.

## SUMMARY

Mangano's conclusions are not supportable by available, representative data. It is clear that, in comparison with the expectations based on age-, race-, and sex-specific rates, there have been no excess cancer deaths in the white population of Anderson County during comparable years—either statistically or substantively.

## ADDITIONAL COMMENTS

Although the data presented in Mangano's article are flawed, as demonstrated above, additional comments on his methodology are also warranted. Since the areas most proximate to Oak Ridge did not exhibit the trends purported by Mangano, it was not necessary to address or consider the entire 94 counties. Most certainly, any effect of the Oak Ridge environment on the health of the population would be evident in the areas most proximate to Oak Ridge. In addition, Mangano's article does not present any correlating data on specific environmental contaminants. Because of the lack of documenting and correlating data, any attempt at conclusions linking the flawed mortality data to the environment is irrational and, at best, conjecture. No mention is made in Mangano's article of Tennessee Eastman in Kingsport. According to the 1991–1992 Green Index (12), the Tennessee Eastman plant in Kingsport is the nation's second largest single industrial source of air toxins. However, other issues must also be considered before linking mortality data to environmental contaminants. For example, when comparing the actual deaths from all causes on a state-by-state basis with the expected deaths (calculated using age-, race-, and sex-specific U.S. rates), the vast majority of the variance between the expected and actual rates can be explained by state-specific differences in age-adjusted smoking-attributable mortality. Correlating data exist to illustrate this.

Tennessee has the third highest age-adjusted smoking-attributable mortality of the 50 states. The rate in Tennessee exceeds the U.S. rate by 22.1 percent. A recent report from the Centers for Disease Control (13) indicates that the age-adjusted smoking-attributable mortality rate in Tennessee in 1990 (442.1 per 100,000 population aged 35+ years) was exceeded only by the rates in Nevada (478.1) and the District of Columbia (444.7). As a consequence, in addition to the flaws in the data, Mangano's article is severely defective in that specific correlating data on purported environmental contamination were not presented and additional factors such as age-adjusted smoking-attributable mortality were not considered.

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Enclosure 17

# PUBLIC MEETING ON WATTS BAR

## 6:30PM - Tuesday September 5
## Quality Inn in Sweetwater
## (at the I-75 and Highway 68 junction)

After decades of construction, billions of dollars and years of safety violations the Nuclear Regulatory Commission, the NRC, is holding a public meeting to allow the people of Tennessee to express their thoughts, concerns and ask questions about Watts Bar Unit One. The NRC is about to grant the TVA permission to load nuclear fuel into this power plant and grant an operating license after that. There are many questions and issues left unanswered including:

*Have all of the thousands of safety violations that were brought to the NRC by current and former Watts Bar workers been looked at and fixed?

*What is the real economic impact of loading Watts Bar with nuclear fuel and how many jobs will be lost if that happens?

*Since Tennessee has a breast cancer mortality rate that is rising 16% faster than the rest of the country and scientists have already confirmed the link between exposure to radiation and breast cancer, how can we be sure that nuclear power plants aren't to blame. If they are, how can we let another new source of radiation come on-line?

*How big is the earthquake fault line that lies under Watts Bar and can the plant withstand the impact of an earthquake of that size?

This meeting is scheduled just two days before an NRC meeting in Washington, DC where it is expected that the permission to load nuclear fuel will be granted. Come let your voice be heard. Speak you mind to save your family and the beautiful hills of East Tennessee from financial and environmental ruin.

For information please call Greenpeace (404)876-6477, Katuah Earth First! (615)624-3939

Enclosure 18

# WATTS BAR HAS COST ENOUGH - STOP WATTS BAR!

A message from the people of the Tennessee Valley to Congress, The Tennessee Valley Authority and the TVA Board of Directors.

We, the undersigned ratepayers and residents of the Tennessee Valley, do hereby demand that the TVA Board of Directors immediately halt plans for loading nuclear fuel into the Watts Bar Unit 1 power plant near Spring City, Tennessee until:

*Watts Bar's real ability to generate income as a nuclear power plant is thoroughly examined by experts outside of TVA - particularly in light of the added $500,000 million+ that loading that power plant with nuclear fuel would add to its already enormous $8 billion price tag;

*the link between increased mortality rates from breast cancer and other radiation related diseases and TVA's nuclear facilities in the region is examined and addressed;

*congressional hearings are held to investigate the findings of the General Accounting Office report on TVA's $26 billion debt and financial health; and ,

*other, more job intensive and economic energy sources for the region are explored like conservation, efficiency and renewable energy.

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Please return completed petitions to: Beth Zilbert, Greenpeace 20 13th St,NE Atlanta, GA 30309. For more information call (404)876-6477 or in Chattanooga call (615)624-3939.