

DRAFT ENVIRONMENTAL IMPACT STATEMENT:

West Valley Liquid High-level Waste Immobilization Project (WVLHWIP)

Dr. Irwin D.J..Bross  
February 2, 1980

Dr. Bross is Director of Biostatistics at Roswell Park Memorial Institute in Buffalo, New York. He is testifying as a private citizen and his views do not necessarily represent those at Roswell Park Memorial Institute or the New York State Health Department. Dr. Bross is a leading expert on the health hazards of low-level ionizing radiation, the kinds of hazards that represent the principle environmental impact from the WVLHWIP. His curriculum vitae and bibliography are attached.

## 1. A CAUTIONARY NOTE ON DEIS ISSUES

The purpose of this initial cautionary note is to emphasize the unique problems and difficulties in producing a scientifically reliable and meaningful Draft Environmental Impact Statement under the very special circumstances that currently exist for WVLHWIP.

The original purpose of environmental impact statements was to force promoters of new developments or uses of deployments or technology to consider the consequences that their actions might have on the environment and on the health and safety of other human beings. As so often happens in Washington, form degrades substance. Many EIS's are legalistic rituals with the kind of calculations that are called "Mickey Mouse Arithmetic" in the trade. While in many projects the DEIS may be nothing but a formality, it is extremely important that the DEIS for WVLHWIP be a frank and scientifically valid document. The potential for environmental disaster for WVLHWIP is so great and the currently available information and technology for WVLHWIP so inadequate, that there should be realistic DEIS in the record even though it is ignored in the official Department of Energy (DOE) statement.

The purpose of this document is to provide a valid DEIS and to cite some of the scientific back-up for the points that will be made. This DEIS can be relatively brief and informal because, unfortunately, there are relatively few specific estimates of the environmental impact of WVLHWIP which can be made with very much accuracy and precision (or even as educated guesses) because of the lack of essential information.

The crux of the problem is that whereas ordinary projects would present detailed operational plans and specifications for the work to be done and the methods to be used, there is nothing remotely resembling such a specific plan for the WVLHWIP. The prime contractor here, DOE, has had more than two years and more than \$1,000,000 to produce such a plan but has failed to do so.

The Notice of Intent for the DEIS received December 19, 1979 lists essentially the same "option" set offered two years ago. Apart from an indication of preference ordering, a little elaboration of the "preferred option", and the addition of two "no action" options, there has been no advance toward a detailed operational plan. Nor has there been any effort to develop the information on the physical state, composition, and distribution of the sludge in the carbon steel tank information essential for the development of any operational plan on DEIS.

As a result at present there is no adequate factual basis for the calculation of radiation exposures for the workers or for the public. Hence there can be no accurate and precise estimate of the consequences of these exposures or for the other environmental impacts that should be estimated in a meaningful DEIS. This point has been made orally and in written form at the DOE hearings. (See Attachment 1 to this DEIS) The subcontractors responsible for the DOE exposure estimates actually acknowledge in their reports that, because there is nothing like a specific work plan available, they have been forced to resort to meaningless Microw Mouse arithmetic. Unfortunately this is still the situation for DEIS for the proposed WVLHWIP.

Therefore any honest environmental impact statement for this particular project should start by frankly acknowledging that the informational basis for a DEIS for West Valley is inadequate for the purpose and that WVLHWIP represents an entirely different situation from any ordinary project, one that is probably unique in the nation for a DEIS.

What makes the WVLHWIP unique are the following:

(1) The lack of any adequate information on planning and/or procedures for this project,

(2) The necessity for developing both the information and the technologies on-the-job since both are beyond the present "state of the art",

(3) The greatly increased chance of making major mistakes in dealing with new technologies for which there is little or no operating experience,

(4) The potential here for a serious mistake to produce a major environmental disaster.

In this extremely difficult and dangerous technological situation, the DEIS should mandate special controls, precautions, and environmental monitoring as a precondition for approval of the statement.

In the Draft Environmental Impact Statement which follows these points will be reconsidered in more detail. The next section will present the general statements that can be made about the possible impacts of WVLHWIP on the basis of general scientific knowledge. Following that is a section concerning the specific information (or lack of information) on the processing of the high level wastes at West Valley. At the end, there is a short summary statement.

2. DRAFT ENVIRONMENTAL IMPACT STATEMENT (GENERAL)

The West Valley Liquid High-Level Waste Immobilization Project has the potential to produce an environmental disaster which could affect almost a quarter of the North American continent for a period of thousands of years. Probably no other single project has such a deadly potential.

Consequently there is need for extreme care and caution every step of the way on WVLHWIP. For instance, the "no action" options have as much potential for disaster as the "action" options. Hence, despite the risks, it is essential to proceed on WVLHWIP without delay.

The following general statements of environmental impact can be made on the basis of existing scientific information. Back-up for the statements can be found in the cited references and other publications, (numbers in parentheses refer to entries in the list of references at the end of this document). The main points are:

(1) At present, the high-level liquid wastes stored in the carbon steel tank at West Valley are probably the worst potential public health hazard in New York State, possibly in the nation. This point is developed in detail in Attachment 2, an article scheduled for 1980 publication in a New York State medical journal (1).

(2) The difference between a "potential" and an "actual" health hazard can be given in one word--"containment". As long as the radioactivity stays in the tank the hazard is potential, as soon as



there is a loss of containment the hazard is actual. The containment must be almost perfect, even 99.44% "pure" is not good enough here (see Attachment 2).

(3) The myth that low-level ionizing radiation is "harmless" (which is, unfortunately, widely believed in DOE) has been responsible for creating the problems at West Valley and could create even worse problems in the clean-up. Recent scientific evidence indicates that these low-level health hazards are probably 30 times worse than was believed a few years ago (2, 3). All calculations of health hazards should use the 1980 estimates and not the outdated 1970 estimates in the official reports (including recent ones such as the Interagency Report or BEIP-III report that was withdrawn). The health and safety of the workers and of the public will be endangered by WVLHWIP if DEIS calculations underestimate the hazards by orders of magnitude.

(4) The WVLHWIP operations pose a relatively high risk of accidental (or even deliberate) loss of containment. For instance, the "preferred options" involve removal of the liquid and sludge from the carbon steel tanks. The removal of the sludge from the tanks would be a very difficult task with the present "state of the art" and might even be impossible. The danger is that any removal system (e.g., washing with acid, mechanical) that would be powerful enough to remove the sludge could also be powerful enough to breach the containment of the carbon steel tank.

(5) The lack of any specific operational plans makes it infeasible to estimate the potential losses of containment for the "preferred" or other options and the consequent health effects. All that can be done

is to give a range from a minimum environmental impact under the most favorable assumptions to a maximum environmental impact under the least favorable assumptions.

MINIMUM IMPACT: Assuming that the exposures to workers and the public can be kept within the average limits reported in the NRC ALARA reporting system (and the NRC or EPA permissible levels), the additional radiation-induced reproductive wastage or cancer or other diseases would probably be of "borderline" significance or undetectable in routinely-collected state health statistics. Since WVLHWIP poses far more difficult problems than the routinely-operating, fully-developed technologies at most ALARA installations it is unlikely that this minimum effect could actually be achieved. Moreover a better monitoring system could probably detect some of the genetic degradation that would be inevitable even for the minimum impact.

MAXIMUM IMPACT: If there is a serious loss of containment due to damage to the carbon steel tanks or in the reprocessing operations, the worst case scenario would result in levels of radioactivity in the local water systems and Lake Erie which would immediately jeopardize the health and safety of citizens of Erie County and other Western New York areas. It could ultimately jeopardize the major populated regions of Canada. The Strontium-90 and other radioactive components of the high-level waste would be dangerous for hundreds of years and might force permanent evacuation of large areas. Hopefully, if adequate precautions are taken and natural events such as earthquakes do not intervene, the maximum effect will also be unlikely (see Attachment 2).

(6) The lesson of the report of the Three Mile Island Commission is this: In these complex technological operations the performance of top-level management (e.g., utility executives, NRC) is critical in avoiding major accidents. The initial TMI emphasis on the operator error that left a valve closed was subsequently shifted to the management failure that let the error go undetected for two weeks. Similarly the initial emphasis on instrument malfunction was later shifted to the design failures in instrumentation that NRC had permitted for years. Since WVLHWIP is a far more difficult and complex operation than routine operation of a power plant, the capability of top-level management is a critical factor in EIS estimates.

(7) The impact of the same accident or hazard factor on the environment will depend on whether there is careful and foresighted management or not. For instance, a major spill from the carbon steel tank could produce an environmental disaster if there is no secondary containment in place. Again, genetic damage from the inevitable low-level exposure of workers will be limited to these workers if there are appropriate employment policies but will seriously degrade the gene pool in Western New York if the use of young transient workers continues to be sanctioned by NRC-DOE. (4) The seriousness of genetic degradation is discussed in a recent paper (5). These are just two examples of the critical role of top-level management in WVLHWIP.

(8) Accordingly, two separate estimates of the environmental impact are needed depending on whether there is good management and good luck or DOE management and bad luck. In the first case the environmental



impact would probably be toward the minimum end of the range noted in item 5 above. The number of radiation-induced deaths and serious disabilities (e.g, malformed babies) could hopefully be held to undetectable levels. On the other hand, with DOE's past general record of incompetence as a federal agency (and with DOE's miserable record on West Valley in particular), the WVLHWIP under DOE management could well have an environmental impact toward the maximum of the range. Hence safeguards against mismanagement are essential in the DEIS if the health and safety of tens of thousands of Western New Yorkers and Canadians are to be protected.

At the very least a Citizen's Committee and a technological Watchdog Committee are needed for oversight of WVLHWIP. It would be better if DOE could serve as a conduit for funds but not have any role in technological management. It is probably necessary to go outside of the federal agencies and outside of the nuclear establishment to get competent management.

3. DRAFT ENVIRONMENTAL IMPACT STATEMENT (SPECIFIC)

Some specific problems in drafting a DEIS for WVLHWIP will now be considered in more detail:

(1) There is at present a near total lack of pertinent information on what can or will be done at West Valley in WVLHWIP or on how the job is to be done. In particular:

(a) Little is known about the physical state, composition, or distribution of the radioactive components of the sludge in the carbon steel tank,

(b) No one knows whether the sludge can be physically removed from the tank without compromising the tank itself or how this job can be done without a serious risk of loss of containment,

(c) No one knows what the composition or physical state of the sludge would be if it were successfully removed from the tank,

(d) No one knows what processing of the sludge is feasible or what the final processed form would be,

(e) No one knows how the processed material could safely be transported or stored,

(f) There is no warning in the Notice of Intent on the DEIS of this informational lack in WVLHWIP planning. Hence this notice can be construed as creating a false and misleading impression of the DEIS problem here.

(2) The WVLHWIP situation is almost unique for a DEIS in that every option, including the "no action" options, has in it the seeds of

an environmental disaster. Indeed the "no action" options are certain to be dangerous ones. We do know that the carbon steel tank will fail and containment will be lost while the materials are still highly radioactive. The only uncertainty is when this will happen not if this will happen.

(3) Even action to obtain information will be dangerous in the WVLHWIP situation. A non-negligible risk of loss of containment and of exposure of workers to radioactivity would be involved in taking an adequate sample of the sludge (an essential first step toward planning the operations). These will be especially dangerous when core are taken near the carbon steel or internal supports.

(4) The WVLHWIP planners must be able to view the immobilization process as a coordinated, complex system rather than a series of isolated technical problems. There is no sign that DOE has this capability. For example, it is absurd to delay the program in order to make studies on whether to make glass or salt cake or anything else. At this point there is no technology to process the sludge in any shape or form. First the questions noted in item 1 above would have to be answered. The inability of most physical scientists and engineers to comprehend the broad problems of these complex systems is discussed further in The Sciences (Attachment 3). Dangerous failures will occur in WVLHWIP unless the planners are willing to talk about the important aspects (where information and know-how is lacking) instead of the trivial aspects (which technologists like to discuss).

(5) In planning for the immobilization process it is vitally important to distinguish between (a) producing a degree of immobilization

producing the degree of immobilization required for permanent storage. For a WVLHWIP (a) would suffice. The glass vs. salt cake issue involves (b). However for all that we know (we know so little about the sludge) it is perfectly possible that the type (a) immobilization has already occurred spontaneously in the carbon steel tank. In this event, WVLHWIP could, in effect, be a mining operation only. After the liquid is pumped out and processed (the simplest part of the job), it might only be necessary to make "bricks" out of the sludge and to coat the "bricks" with some sealant.

(6) At this point we are almost completely in the dark on what specific operations will be required in the WVLHWIP and therefore the DEIS can only say that the environmental impact will lie somewhere between the minimum and maximum impacts of the previous section. For instance, if no elaborate reprocessing is required to make "bricks" suitable for transport (as suggested in item 5 above), then for practical purposes the material could stay in the carbon steel tank until it was ready to be, say, packaged and airlifted out. This would probably result in minimal on-site processing and minimal impacts. On the other hand if the sludge must really be removed and elaborately processed on-site this could be a very costly operation both in dollars and in health effects. The impacts would probably be in the middle of the range or toward the maximum end. However until we know more about the sludge and what can be done with it, the DEIS can only be written in this "iffy" and unsatisfactory way.

(7) Locating a reprocessing plant at West Valley in a well-watered area, close to a major water system and to heavily populated areas was an incredibly stupid decision in the first place. Hence, processing of the waste at Hanford or in other arid areas with existing facilities makes much better sense than trying to process the materials at West Valley.



4. SUMMARY OF DEIS

The West Valley-Liquid High-Level Waste Immobilization Project may well be the most dangerous project ever undertaken in the U.S. It has the potential to jeopardize the health and safety of citizens of the Northeast sector of North America for a period of hundreds of years. Despite the current lack of essential information and lack of proven technology and consequently lack of any specific operational plans, it is necessary to get the project underway because the "no action" options are also very hazardous. Since it will be necessary to develop the information, technology, and operating experience on-the-job, a critical factor in the calculation of the environmental impacts is the quality of the top-management in this extremely demanding project. With the past record of mismanagement and ineffectiveness of the Department of Energy, there would be a high risk of a major environmental disaster if DOE has direct managerial responsibility for this project and if there is no provision for watchdog or advisory groups with veto power over DOE plans.

ATTACHMENTS

1. Bross, I.D.J., How to Lie with Mathematics, 1979
2. Bross, I.D.J., The Worst Potential Public Health Hazard. New York State Journal of Medicine, 1979, (in press)
3. Bross, I.D.J., Nuclear Discord. The New York Academy of Sciences, September issue., 1979.
4. Curriculum Vitae and Bibliography Irwin Bross

## REFERENCES

1. Bross, I.D.J., The Worst Potential Public Health Hazard. New York State Journal of Medicine. 1979 ( in press)
2. Bross, I.D.J., A Dosage Response Curve for the One Rad Range: Adult Risks for Diagnostic Radiation. (Co-authors: M. Ball. S. Falen) American Journal Public Health 69(2)130-136, 1979.
3. Bross, I.D.J., A 1980 Reassessment of the Health Hazards of Low-level Ionizing Radiation. (Invited lecture given at the University of Heidelberg, Germany on October 30, 1979.)
4. Dispute over A-Plant Sponges. Newsday, November 25, 1979.
5. Bross, I.D.J, Natarajan, N., Cumulative Genetic Damage in Children Exposed to Preconception and Intrauterine Radiation. Investigative Radiology, February 1980 issue.

Irwin D.J. Bross, Ph.D.  
Director of Biostatistics  
Roswell Park Memorial Institute  
666 Elm Street  
Buffalo, N.Y. 14263

No opinions here expressed should be construed as reflecting official positions of the administration of  
Roswell Park Memorial Institute or of the N.Y. State Health Department.

June 20, 1980

THE NEED FOR A PUBLIC HEALTH ASSESSMENT OF THE HEALTH EFFECTS  
OF THE VENTING OF THREE MILE ISLAND, NUMBER 2 (TMI-2)

The basic question in the venting of the radioactivity in the containment at Three Mile Island, Number 2 (TMI-2) is: Will this deliberate release of radioactivity at TMI-2 cause deaths, diseases, and disabilities in the population that is exposed?

This is a public health question. However, no genuine "public health assessment" of the health hazards of the venting has ever been made. Instead the decisions were based on something that is completely different (although it may sound similar), a "radiological assessment". A public health assessment involves different factual evidence, different types of expertise, and an entirely different approach and review process.

The procedure in a radiological assessment focuses on theoretical calculations of the radiation exposures. Here, for instance, the focus was on Krypton-85, and other radionuclides were simply ignored. This gives estimates of exposures which have little relationship to the actual exposures. Further computations using the same obsolete procedures which have been used in radiological assessments for many years are then used to estimate "cancers" and "genetic damage".

In contrast to the focus on physical theory and abstract calculations in a radiological assessment, a public health assessment focuses on what actually happens to human beings who are exposed to low levels of ionizing radiation. This focus on what is actually happening to people instead of hypothetical diffusion of radioactivity leads to marked differences in the conclusions drawn from the two kinds of assessments. In the venting of TMI-2 which the U.S. Nuclear Regulatory Commission was anxious to carry out, the NRC reached the conclusion that the potential health impact of the venting would be "negligible". This is usually the conclusion that is reached from radiological assessments.

The reliability of this method of drawing conclusions about the public health and safety can be judged from the historical results of the radiological assessments. In 1955 and thereafter the Atomic Energy Commission used this method to assess the potential health impact on the servicemen exposed to fallout from the nuclear weapons test. The troops were told the exposures were "harmless". The AEC assessed the dangers to civilians in Utah and elsewhere downwind from the nuclear tests. They again concluded this would be a negligible effect. Down through the years the methods were used to evaluate the health hazards for nuclear workers at the Hanford reprocessing plant and other installations. A radiological assessment was made of the health effects for workers at the Portsmouth Naval Shipyard and other military installations involving nuclear submarines or other weapons. In all cases the conclusion from the radiological assessment was that there would be no adverse health effects (or negligible ones).



In all of these examples, a public health assessment was also carried out. This was not done by nuclear engineers, health physicists, radiologists, or other persons who do the radiological assessments. The public health evaluations were carried out by biostatisticians, epidemiologists, and persons with experience in public health research.

In all of the above cases, doubled risks of leukemia and/or other diseases were clearly shown in the public health assessments of what actually happened to the human beings exposed to these low doses of ionizing radiation that the radiological assessments concluded were "safe".

What the historical and scientific evidence shows is that radiological assessments provide no adequate protection of the public health and safety.

The decision to proceed with the venting at TMI-2 was made solely on the basis of radiological assessments. The official report (NUREG-0662, Vol. 2) shows that no public health assessments of the risks to the public was made or even attempted.

The report stresses that all of the radiological assessments agree. Whether it was the U.S. Nuclear Regulatory Commission or the Metropolitan Edison Company which have supported nuclear power or the Union of Concerned Scientists or the National Resources Defense Council which have not, the results of the radiological assessments are taken as showing negligible risks. However, a more recent radiological assessment from Heidelberg reached a somewhat different conclusion. After a bill of particulars on the serious theoretic defects in the estimates used in

the radiological assessments, the report concludes that in view of the wide range of uncertainty, "considerable health damage could be caused by venting".

While there is a clear need for a public health assessment of the venting of TMI-2, there might be a question of whether it is feasible to carry this out. One way to assess the effects of deliberate venting of the radioactive gases at TMI-2 is to assess the effects of the accidental venting of these gases in the original accident in 1979. There has, however, been no open hearing where the findings on infant mortality and thyroid cancer could be presented and discussed in an unbiased judicial atmosphere.

There is some indication that infant mortality was increased by this earlier accidental venting. Some preliminary estimates based on health department data show a significant 86% increase in infant mortality in the area within 10 miles of TMI-2 for the six month period immediately following the accident. This moot question should be dealt with in public hearings.

While there has been no public review of the evidence, a committee including qualified public health scientists did carry out a brief "peer review". The committee supported the findings of the health department. However, the peer reviewers must have had some qualms about these findings. When they were specifically asked to endorse the venting at TMI-2, the panel refused to do so. This fact was suppressed in the NRC Report NUREG-0662.

From a public health standpoint, the circumstances in the purging of TMI-2 are unique. In contrast to the usual NRC passive intervention this is active intervention to deliberately subject a human population to substantial radiation exposures. Those exposed can be harmed but they cannot be benefited. The action is irreversible, once the radioactivity is released from the "bottle", it can never be put back. There are major scientific uncertainties here and it is essential that these be resolved in a way that is fail-safe for the public. Neither the NRC or anyone else really knows what will happen when this genie is let out of the "bottle" and to claim otherwise is bad science.