6/4

September 5, 1986

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before Administrative Judge Helen F. Hoyt

In the Matter of	)	
TOLEDO EDISON COMPANY, et. al.	)	Docket No. 50-346-ML
(Davis-Besse Nuclear Power Station, Unit No.1) Waste Disposal Permit	)	

PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW OF INTERVENORS SAVE OUR STATE FROM RADIOACTIVE WASTE, TOLEDO COALITION FOR SAFE ENERGY, SUSAN A. CARTER, ARNOLD GLEISSER, GENEVIEVE S. COOK, AND CONSUMERS LEAGUE OF OHIO

Terry Jonathan Lodge

Counsel for Intervenors

DS03

INTERVENORS' PROPOSED FINDINGS
OF FACT AND CONCLUSION OF LAW

Pursuant to 10 CFR §2.754(a)(1), Intervenors Save Our State from Radioactive Waste, Toledo Coalition for Safe Energy, Susan A. Carter, Arnold Gleisser, Genevieve S. Cook and Consumers League of Ohio(hereinafter "Citizen Intervenors") submit their proposed findings of fact and conclusions of law in this license modification proceeding.

I. Summary

These proposed findings and conclusions derive from a hearing convened on the application of Toledo Edison Company (hereinafter "Applicant") for approval by the Nuclear Regulatory Commission (hereinafter "NRC") of a procedure for the disposal at the Davis-Besse Nuclear Power Station (hereinafter "Davis-Besse") of low-level radioactive waste. This decision concerns the adequacy of the proposed procedures for the disposal of the material in a manner consonant with environmental, geological and topographical concerns.

Central to the decision are Applicant's provisions for the burial of certain somewhat radioactive dredgings of sludge from onsite settling basins in subsurface structures at the Davis-Besse complex. The purpose of this informal hearing has been to adduce evidence of the structual scope of the burial plans, and the potential impacts upon the local and regional environment, including affected flora and fauna, prospective intrusions of irradiated materials into Lake Erie basin and tributaries, effects upon subsurface geology and underground water sources, and possibly adverse consequences to the regional human population. In particular, the designated Administrative Law Judge was interested in 20 specific issues identified in an NRC order dated May 30,1986.

The Administrative Law Judge has concluded that Applicant's proposed radioactive waste dumping and burial procedure is fundamentally and inherently unsound; that the dump, if approved, would be high by subject to flooding and prone to sub-

surface radiation leaching and contaminating of water supplies; would likely and with high probability contribute to an undesirable elevation of radiation levels in the Lake Erie basin; and as such poses an intolerable threat to plant, animal and human life in the Great Lakes region.

The Judge's conclusion is based upon facts such as the extremely close proximity of the burial structure (25 feet at one point) to the recognized wetlands; the marginal elevation of the structures above even average water levels of nearby Lake Erie, much less high wave surges and flooding caused by storm turbulence on the lake; the existing probable accumulations of radiation in Lake Erie; and the disturbingly naive and superficial hydrological analysis of subsurface topography and geological formations at Davis-Besse which was presented by the Applicant. The evidence shows that Toledo Edison moved conceptually from proposing dumping of raw dredgings into unimproved holes, to the burial of semisolidified slurry into more sophisticated clay-lined burial cells. Yet and still, the Edison proposal is highly chancy and questionable because the burial ground would be geologically quite vulnerable and subject to severe and recurring flooding.

Accordingly, the Administrative Law Judge finds that Applicant has not satisfactorily addressed most of the 20 issues of material fact raised in the May 30 prehearing order.

II. Overview of the Sludge Burial Proposal

A. Sequence Leading to Issues of Material Fact

Toledo Edison Company filed its request for low-level waste burial approval on July 14, 1983 with the NRC. Supplementary information was provided by the licensee by letters dated July 30, 1984 and January 29,1985. On October 9, 1985, the NRC published an "Environmental Assessment and Findings of No Significent Impact".[1]

---

1 50 Fed. Reg.41265 (10/9/85)

In it, the Commission proposed to approve Edison's proposed waste burial plan, specifically determining that no significant environmental impact would befall the environment of the burial site. The Commission's staff based its conclusions solely on information provided by Toledo Edison, and consulted no other agencies or persons.[2]

Although no legal opportunity for a hearing was mentioned in the Commission's notice, a sizeable number of individual citizens, Ohio local governments, citizen groups, and even the Govenor of Ohio complained in opposition to the dump proposal.

By order dated February 20, 1986, the NRC instituted an informal hearing on the matter, appointing Administrative Judge Helen F. Hoyt presiding officer. By "Memorandum and Order" dated March 10, 1986, the Judge specified a format by which aggrieved parties might seek leave to intervene in the hearing. Numerous individuals, groups, and the State of Ohio sought this permission. By order dated May 30, 1986, the Judge made initial determinations concerning party status, described 20 issues for hearing, and set a timetable for submission of prefiled testimony and hearings. The 20 issues because the outline for litigation.

B. Prefiled Testimony and Evidentuary Hearing

Pursuant to the May 30, 1986 order, direct testimony was prefiled in written fashion by all parties on July 18, 1986.[3]

---

2 50 Fed. Reg. 41267 (10/9/85)

3 Intervenors Save Our State from Radioactive Waste, Arnold Gleisser, Genevieve S. Cook, and Consumers League of Ohio prefiled on June 19,1986, adhering to the original deadline ordered. Prefiling was delayed at Applicant's request due to a strike by Toledo Edison workers.

At the hearing, Toledo Edison Company presented a panel of thirteen (13) witnesses, including a biochemist, a geotechnical engineer, health physicists, a zoologist, a biologist, a physician, a civil engineer, an environmental engineer, limnologists and a biochemical engineer.

The State of Ohio produced four (4) witnesses, two geologists, a hydrologist, and a botomist/zoologist.

The Citizen Intervenors presented two (2) witnesses, a research chemist and a physician.

An evidentiary hearing was convened on August 5,6 and 7, 1986. Limited appearance statements by individuals were received into the record on August 6 and 7, 1986. The Administrative Law Judge had undertaken a tour of the proposed sludge burial area at Davis-Besse on August 4, 1986.

In preparing this decision, the Administrative Law Judge considered the entire record and the proposed findings of fact and conclusions of law submitted by the parties. Those proposed findings and conclusions not incorporated directly or referentially herein are rejected as being unsupported by the record of this case or as being unnecessary to the rendering of this decision.

C. Governing Standards

Toledo Edison's burial proposal is governed by the requirements of 10 CFR§20.302 of the NRC's regulations. Moreover, the Administrative Law Judge has reviewed the record in light of whether the burial plan constitutes a real or potential, significant environmental impact. Further the Commission is required by models

used to estimate radiation doses from NRC Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," Revision 1, October, 1977. Further, 10 CFR Part 50, Appendix I counsels the use of techniques or technologies to reduce radiation exposure levels "as low as reasonably achievable" at commercial nuclear facilities. As there is no other known regulatory guidance on an unprecedented issue of this sort, viz., onsite low-level radiation burial, the Commission must adopt a "reasonableness" test, to determine whether the dumping plan is a reasonably prudent approach to the particular disposal problem posed by radioactive resins. In the discussion that follows, it will be clear that the proposal is not reasonable.

III. Weaknesses in the Dumping Scheme

A. The Burial Cells

As previously mentioned, Toledo Edison originally had conceived of dumping raw, untreated radioactive sludge into unimproved pits at the Davis-Besse site, covering the filled holes with a few inches of topsoil.[4] By the time of the informal hearing, however, Applicant's vision had evolved to the construction of up to six (6) clay-lined cells, 4-foot linings interspersed with other layered materials, and a membrane of indeterminate composition.[5] The material proposed for burial would be predominately condensate demineralizer resins used to clean

---

4 50 Fed. Reg. 41266 (10/9/85).

5 App. Pref. Test Fig 1-1; Pref. Test 18 (Swim).

up the secondary-side (nonradioactive) pipes in the Davis-Besse reactor. These resins have become radiocative from a 1981 steam generator tube leak and "minor" leaks or weeps in the steam generator caused by thermal expansion and contractions in the system.[6]

The Commission must doubt Toledo Edison's arguments that the radiation levels of the resins will prospectively remain de minimis. As established upon cross-examination, steam tube leaks in an aging reactor are a "probability".[7] There is thus no guarantee that irradiated material in excess of Applicant's current projections will not be buried in the cells, increasing potential exposures to life. Also, the sampling techniques for radiation levels in the sludge prior to dredging and dumping does not reflect the common sense conclusion that there will be "hot spots" and thus widespread sampling will be needed.[8]

B. Situs Problems

Problems abound with the proposed locations of the six burial cells. Applicant's witness admitted that at least one cell is only 25 feet from designated wetland area.[9] The cells are only a few hundred feet from designated State-managed marsh-land.[10]

---

6 App. Pref. Test 14 (Briden).

7 Tr. 155 (Briden), 8/5/86.

8 Tr. 162 (Briden), 8/5/86.

9 Tr. 170-1 (Wasilk), 8/5/86.

10 Tr. 175 (Wasilk), 8/5/86.

Edison's own witness testified in some detail concerning an old dewatering pond very near the cell locations which was originally constructed in the 1970's to drain and evaporate groundwater so that foundations for plant-related structures could be built. The witness described this pond as possessing constant stability of water level, and certainly gave the lie to Applicant's contention that significant groundwater sources are 15 or more feet below the surface.[11] The State's witness demonstrated the severely limited hydrologic information base on which Edison is operating in his observation that Applicant grounded its conclusions about geology of the site on core drillings done during Davis-Besse's construction in the early 1970's, which were for construction purposes and not part of a hydrogeologic investigation.[12] This expert testified quite authoritatively that groundwater levels all around the cell sites fluctuate constantly and significantly, and that rear-surface aquifers may be 15 to 30 feet thick.[13] As the witness observed, even Edison's own 15-year-old core drillings tend to prove the existence of large subsurface water supplies within a couple feet of the surface, because of the presence of fine sandy soil there.[14] Testimony also showed conclusively that deep groundwater flow (10 to 20 feet below the surface) almost certainly moves toward Lake Erie most of the year.[15]

---

11 Tr. 182-3 (Hendron), 8/5/86; compare App. Pref. Test 46 (Hendron)

12 State Pref. Test 5 (Voytek).

13 Id. at 5-6.

14 Id. at 7; Id. at Attachment B.

15 Id. at 10.

Finally, this witness went a long way toward exploding the myth of impermeable clay such as is contemplated for the cell liners.[16]

An additional State expert dismissed as "oversimplified" the Applicant's description of the soil sediments at the Davis-Besse site.[17] This expert, who has mapped in intensive detail the southern shore of Lake Erie around Davis-Besse, seriously undermined the usefulness of the 15-year-old core borings of Toledo Edison, convincing the Judge of their uselessness in resolving the issue of groundwater location.[18]

C. Site Flooding

Applicant adopted nonchalance about the flood potential of the buried sites, which would beartificially raised to a point about 6.5 to 7 feet above average water levels for Lake Erie. A principal utility company witness calculated only the potential for Lake Erie flooding, and did not seriously consider flood problems from the Toussaint River, a broad, marshy tributary only 355 feet from the proposed burial cell site.[19] That witness acknowledged that the burial site was clearly within a zone which would be flooded at least every 50 years; that parts of the site could be expected to flood at least every 10 years; and that this site has flooded 25 times in 50 years, and 23 times in the last 15 years.[20]

---

16 Id. at 11-12, 14-15.

17 State Pref. Test. 2 (Pavey).

18 Id. at 5-6.

19 Tr. 217 (Herndorf), 8/5/86.

20 Id. at 221-3.

Incredibly, the Applicant's witness refused to acknowledge that the experience of that 15 years represented a trend, even though his own data revealed 8 floods of 6 to 7 feet from 1948 through 1971, and 14 floods of 7 feet, including 3 of more than 8 feet, from 1972 through 1986.[21]

The State demonstrated, moreover, that the proposed burial site is located in a "geologically hazardous area, and that a 500-year flooding event would exceed the worst flood in recent memory (1972) by a foot.[22]

D. Radiation Accumulations in Lake Erie

During the hearing, the Citizen Intervenors cross-examined one of Applicant's health physicists closely concerning his testimony that even if all of the proposed radioactive waste were to be discharged into Lake Erie at once, it would not raise radiation levels in excess on NRC guidelines.[23] The witness admitted that he projected the total radiation levels in the Lake Erie water were from this theoretical dump, and that his calculations did not factor in other radiation discharges from Davis-Besse.[24] At that point, the witness was asked if his computations included any factor representing radiation discharges into Lake Erie from the Fermi II reactor near Detroit, Michigan.[25] Then the Citizen Intervenors' counsel asked if the witness

---

21 Id. at 224,235.

22 State Pref. Test 5 (Guy).

23 Tr. 88 (Till), 8/6/86, examination concerning Till's Statement.

24 Tr. 88 (Till), 8/6/86.

25 Id. at 89.

accounted for radiation from the Chernobyl, U.S.S.R. nuclear accident or from bomb testing.[26] These latter two lines of questioning were objected to by the Applicant on the ground that they involved a radiation source other than Davis-Besse. At the time of the hearing theAdministrative Judge sustained Applicant.[27] Upon reflection, the Administrative Judge now believes those rulings were in error, since the Citizen Intervenors were attempting to undermine the veracity of the expert's conclusion by proving that he did not account for accumulative amounts of radiation which do, in fact, permeate Lake Erie water. Davis-Besse and Fermi are, in one sense, licensed to pollute radioactivity, a fact which may be officially noticed by the Judge. The Chernobyl disaster, it is well known, sent radioactive debris quite literally around the globe and certainly into the air and waters of the State of Ohio. There is indeed a strong argument for cumulative radiation being present in Lake Erie even before the prospect of a massive dump of radiation from the propose cells, and it is inescapable that Applicant's cursory conclusion that a sudden release into the Lake would be harmless is highly superficial and unscientific, and can therefore be given no weight.

E. Radiation Effects on Human Health

Similarly, Applicant's physician witness was undermined. He stated on direct that below 10 rem exposure, it is difficult to spot ill side effects on human or animal populations.[28] However, he acknowledged the existence of conflicts in

---

27 Id. at 90, 92.

28 App. Pref. Test. 86 (Linneman).

medical literature over the number of people who die as a result of disease brought on by background radiation.[29] Moreover, he would not scientifically deny the possibility that deaths could, in fact, occur from this unnoticed source.[30] The Administrative Judge must conclude that the virtual certainty of effects on the human population from this proposed low-level radiation source cannot be disregarded, especially in light of the testimony of Citizen Intervenors' physician witness on the harmfulness of low levels.[31] And since the Commission is bound to apply the "as low as is reasonably achieveble" standard to the installation of controls on radiation emissions,[32] the Judge finds that the untested and experimental waste storage proposal does not pass regulatory muster.

F. Dangers in the Resins Themselves

A fact which was completely ignored by the Applicant was the cancer-inducing aspect of the resins which would comprise a very large proportion of the burial sludge. In some of the most beguiling and misleading testimony of the trial, an Applicant chemist from the company supplying the resins to Toledo Edison testified that the resins are so harmlessly inert that two appear on the market as prescription drugs for human consumption.[33] On cross examination, the witness acknowledged that a passage from the Physician's Desk Reference detailing one of the drugs, Questran, did outline Questran's significant cancer-causing tendencies in people.[34]

---

29 Tr. 101 (Linneman), 8/6/86.

30 Id. at 102.

31 Tr. 180-9 (Gitlin), 8/6/86.

32 10 CFR Part 50, App. I.

33 App. Pref. Test. 102 (Hetherington).

34 Tr. 114 (Hetherington), 8/6/86; S.O.S. Exh. 1.

The same witness also acknowledged that under certain conditions that the resins, which due to the ionization characteristics attract and hold radioactive molecules in a seemingly magnetic fashion, could nevertheless be caused on occasion to release radioactive particules.[35] Far from being a stabilizing quality in the buried material, then, the resins, radioactive or not, pose at least two hazards to flora and fauna.

G. Radioactive Dosage Calculations

One of the Citizen Intervenors' witnesses differed greatly with Toledo Edison's radiation dose calculations. He stated that the annual radiation dose figures were significantly underestimated by assuming only 100 hours' exposure per year, instead of the total number of hours in a year, 8,766.[36] The research chemist also maintained that it was fallacious to compute gamma radiation emmissions from only to top 10 centimeters of the waste, since the material would,in fact, be some 8 1/4 feet thick.[37] His calculations suggested that the gamma radiation from the top 100 centimeters of waste might exceed Applicant's dose calculations by a factor of 877.[38] The chemist also criticized the Applicant's recalculated dose figures, based upon the clay cell disposal technique, as being too low since 5 gamma radiation-emitting elements would be buried in the sludge.[39]

H. Mobilization of Radioactivity

The same Citizen Intervenor witness cogently noted that the use of cement kiln dust to solidify the sludge might actually mobilize the radioactivity because

---

35 Id. at 118.

36 Cit. Int. Pref. Test. RMB-2, (Bimber).

37 Id.; Tr. 227 (Bimber), 8/6/86.

38 Id. at RMB-3, (Bimber).

39 Tr. 227-8 (Bimber), 8/6/86.

the dust could be presumed to have many soluble alkaline materials in it.[40] It would appear that the seeds of undoing of this sophisticated cell structure are going to be buried with the waste.

IV. CONCLUSION

The foregoing was not intended to serve as an exhaustive recounting of all of the facts which militate against allowing the proposed disposal plans to proceed to implementation. Nevertheless, the evidence is quite convincing that Toledo Edison wishes to develop a simplistic short-term (i.e., 30 years or less) solution to a problem the scope of which the utility obviously does not even thoroughly know. Perhaps the record is most disturbing for what it does not, rather than what it does, contain. The utility does not have a firm grasp on the probability of certain types of radioisotopes being present in future waste dredgings. This might stem in part from the bizarre and unpredictable operation of Davis-Besse. The utility does not have adequate, current or task-oriented core drilling data which reveal anything but generalizations about subsurface materials at the site.

The utility does not have an adequate of comprehensive understanding of the flooding potential of the site. Applicant does not have a meaningful hold on the leaching possibilities, the permeability of its clay liners, the presence/absence of groundwater sources.

In effect, Toledo Edison proposes to launch an experiment. After much negative publicity, the utility finally evolved from the idea of a raw ditch type burial to a sophisticated clay-lined cell. The Applicant has conducted no studies nor put on any evidence of the track record of storage of radioactive wastes in clay-liners, yet it blithely assumes that the concept will work.

---

40 TR. 233 (Bimber), 8/6/86.

Worst of all, the proposed burial site is in an obvious floodplain, and would be constructed in soil incapable of providing any additional protection to the environment in the event of a breach of the cell's integrity. The result would mean yet another radioactive encroachment on the fragile earth, water and plant and animal life along Lake Erie. The proposal is not reasonable and is therefore denied.

Pursuant to the Commission's order of February 21,1986, this determination constitutes final agency action.

Helen F. Hoyt
Administrative Law Judge

CERTIFICATION

I hereby certify that a copy of the foregoing "Proposed Findings of Fact and Conclusions of Law" was sent by me this 5th day of September, 1986, via regular U.S. Mail to each of the parties on the attached Service List (guaranteed mail or Federal Express to Administrative Law Judge).

Terry J. Lodge
Counsel for Save Our State, Toledo Coalition for Safe Energy, Consumers League of Ohio, Susan Carter, Genevieve Cook, Arnold Gleisser

SERVICE LIST

Docketing & Service Section
Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Jay E. Silberg, Esq.
Shaw, Pittman, Etc.
1800 M Street, N.W.
Washington, D.C. 20036

Helen F. Hoyt, Esq.
Administrative Judge
Atomic Safety and Licensing Board
Panel, EW-439
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Arnold Gleisser
5005 S. Barton
Lyndhurst, Ohio 44145

Jack A. Van Kley, Esq.
Sharon Sigler
Assistant Attorneys General
Environmental Enforcement Section
State 9 Ohio
30 East Broad St.
Columbus, Ohio 43215

Genevieve S. Cook
25296 Hall Drive
Cleveland, Ohio 44145