Files

50-263

JUN 17 1969

Honorable Walter F. Mondale
United States Senate

Dear Senator Mondale:

In response to your referral of March 21, 1969, I am pleased to provide the enclosed comments on a report concerning the Monticello Nuclear Generating Plant which was prepared and circulated at the DFL City Convention in Minneapolis by Mr. Russell Hatling.

For your convenient reference, we have numbered on the enclosed copy of Mr. Hatling's report the respective passages to which our comments pertain.

Sincerely,

Original Signed by C. K. Beck

Harold L. Price
Director of Regulation

Enclosures:
1. Comments on Mr. Hatling's Statements
2. Ltr fm Mr. Hatling
3. Radiological Effects of Operating The Monticello Nuclear Plant

RETYPED TO BE CONSISTENT IN USAGE OF ENCLOSED & ATTACHED.
SEE ATTACHED YELLOW FOR PREVIOUS CONCURRENCES
SEE PAGE 2 FOR COPY DISTRIBUTION & NOTE

OFFICE ▶	DR (WP)	DIR:RPS	OGC	DIR:DR	OCR	
SURNAME ▶	WGDooly:jdw:ps	FWestern	Hadlock:Schur Shapar	CKB/vv HLPrice		
DATE ▶	5/23/69	5/8/69	4/21/69	6/16/69	6/17/69	

Form AEC-318 (Rev. 9-53) AECM 0240

U.S. GOVERNMENT PRINTING OFFICE : 1968 O—296-617

Distribution:

H. L. Price
C. K. Beck
M. M. Mann
C. L. Henderson
R. L. Doan
Forrest Western, RPS
P. A. Morris, DRL
L. D. Low, CO
Lester Kornblith, CO
A. A. Schoen, DOS
F. J. Shon, DOS
H. F. Soule, DOS
A. Pressesky, RDT
W. P. Gammill, RDT
H. K. Shapar, OGC
B. Schur, OGC
G. Hadlock, OGS
Congressional (2)
W. G. Dooly
G. Ertter (DR-2057)
Public Document Room (50-263) – Rdd 6/23/69

NOTE: AEC comments on Russell Hatling's "Questions and Answers" have been reviewed in draft by, and reflect comments of, C. K. Beck, M. M. Mann, Forrest Western, P. A. Morris, Lester Kornblith, H. K. Shapar; A. A. Schoen, F. J. Shon, H. F. Soule, DOS; A. Pressesky & W. P. Gammill, RDT.

OFFICE ▶						
SURNAME ▶						
DATE ▶						

Honorable Walter F. Mondale
United States Senate

Dear Senator Mondale:

In response to your referral of March 21, 1969, I am pleased to provide the attached comments on a report concerning the Monticello Nuclear Generating Plant which was prepared and circulated at the DFL City Convention in Minneapolis by Mr. Russell Hatling.

For your convenient reference, we have numbered on the enclosed copy of Mr. Hatling's report the respective passages to which our comments pertain.

Sincerely,

Harold L. Price
Director of Regulation

Enclosures:
1. Comments on Mr. Hatling's statements
2. Ltr fm Mr. Hatling

NOTE: AEC comments on Russell Hatling's "Questions and Answers" have been reviewed in draft by, and reflect comments of: CKBeck, MMMann, FWestern, PAMorris, LKornblith, HKShapar, DOS (Schon, Schoen, Soule), RDT (Pressesky, Gammill)

DISTRIBUTION:
HLPrice
CKBeck
MMMann
RLDoan
CLHenderson
FWestern
PAMorris
HKShapar
WGDooly
PDR (50-263)
GErtter (DR-2082)
DR Reading
OCR
Kornblith
Schon
SCHOEN
Soule
Pressesky
Gammill

CO	DOS	RDT				
Kornblith						
4/ /69	4/ /69	4/ /69				

OFFICE ▶	W&Rx DR	FWestern	OGC	DR	OCR	DRL
SURNAME ▶	WGDooly/jdw			HLPrice		PAMorris
DATE ▶	4/ /69	4/8/69	4/21/69	4/ /69	4/ /69	4/ /69

Form AEC-318 (Rev. 9-53) AECM 0240 U.S. GOVERNMENT PRINTING OFFICE : 1968 O—296-617

AEC COMMENTS ON QUESTION AND ANSWER COMPILATION PREPARED BY MR. RUSSELL HATLING MINNEAPOLIS, MINNESOTA, CONCERNING RADIOACTIVITY RELEASES FROM THE MONTICELLO NUCLEAR GENERATING PLANT

1. Mr. Hatling calls the safety record of nuclear energy plants "dismal." To the contrary, the safety record of nuclear energy plants has been outstanding. The AEC has licensed the operation of 114 power, research, and testing reactors which have accumulated a total of about 780 reactor-years of operation without a radiation fatality or serious radiation exposure. Within this total, 17 reactors were constructed for the generation of electric power. These nuclear power plants, about which Mr. Hatling is primarily concerned, have compiled a record of about 90 reactor-years of operating experience. We know of no instance where the operation of these licensed plants has resulted in exposure of any member of the public to radiation levels exceeding annual limits specified in AEC regulations, which are designed for protection of the public.

2. We are not certain of the basis used by Mr. Hatling in referring to eight "of the original 12" nuclear power plants as having "failed." As noted above, 17 central station nuclear electric power plants have been licensed for operation to date. A number of the early power reactors were small prototypes built for research and development under cooperative programs between the AEC and electric utilities. They constituted an important step in the R&D process toward development of dependable and economical nuclear plants for the production of electricity, including exploration of the feasibility of different types of reactors. Operation of five of these plants has been terminated. They are: Hallam Nuclear Power Facility, Hallam, Nebr.; Carolinas-Virginia Tube Reactor, Parr, S.C.; the Pathfinder Atomic Power Plant, Sioux Falls, S. Dak.; Piqua Nuclear Power Facility, Piqua, Ohio; and the Boiling Nuclear Superheat Reactor, Punta Higuera, Puerto Rico. While there were operating difficulties with each of these reactors, no public health and safety problem ever arose from their operation, shutdown, or dismantling. Of the remaining 12 nuclear power plants now licensed to operate, nine are currently generating electricity, including the first five to be licensed by the AEC. Two are undergoing repairs: the Enrico Fermi Atomic Power Plant in Michigan and the Elk River Nuclear Plant in Minnesota. The twelfth plant, Oyster Creek Nuclear Power Plant in New Jersey, has only recently been authorized to commence operation at low power levels.

The Elk River plant, which Mr. Hatling reports as having failed, recently experienced an operating difficulty after nearly six years of operation. A small leak was detected in a 1 1/2-inch reactor water level monitoring line which is welded to the upper portion of the Elk River reactor pressure vessel. The licensee has conducted an extensive inspection of other piping connected to the vessel, and the results are being evaluated. Some

similar malfunctions have occurred in the operation of other nuclear power plants; none has resulted in a radiation injury to any employee or posed a threat to public health and safety.

From all the records available to us, the radioactivity in effluent releases from licensed power reactors, including those from the Pathfinder plant referred to in Mr. Hatling's remarks, has been below the limits that would be permissible under the AEC regulations in Part 20 of Title 10, Chapter 1, Code of Federal Regulations, "Standards for Protection Against Radiation." The release limits in AEC regulations are based on guides developed by the Federal Radiation Council and approved by the President for the guidance of Federal agencies. These guides are compatible with recommendations of the National Council on Radiation Protection and Measurements and the International Commission on Radiological Protection. The radioactivity that may be released in effluent water from a nuclear reactor consists of a mixture of radioisotopes of different maximum permissible concentrations. An analysis of this mixture was performed at the Pathfinder plant by the licensee during 1967, the last year of operation of this plant. It showed that average concentrations of radioactivity in the effluent water were less than one percent of the AEC Part 20 limit, based on the actual radioisotopic composition. Releases of radioactivity in gaseous effluents from the Pathfinder plant during 1967 were less than 10 percent of applicable limits specified in the operating license.

3. Any nuclear facility either built for the AEC or approved as a licensed facility must meet rigorous safety standards, and is kept under continued surveillance throughout its lifetime for purposes of safety.

The first production reactors at Hanford were a wartime effort built for military purposes by the former Manhattan Engineer District. After the Atomic Energy Commission was established in January 1947, the Commission continued and expanded operation of the Hanford facility for military purposes, but undertook an extensive program to reduce releases of radioactivity to the environment. Substantial reductions were made. Extensive environmental studies indicate that at no time since the production operations began at Hanford in 1944 have the concentrations of radioactivity in the Columbia River exceeded levels specified in the nationally established standards for controlling exposure to people.

4. The claims made in the article in the May-June 1965 issue of the Journal of Environmental Health were answered in an article in Public Health Reports, April 1966, by John C. Bailar III and John L. Young, Jr., of the National Cancer Institute. A copy of this article, "Oregon Malignancy Pattern and Radioisotope Storage - A Reappraisal," is enclosed. Reporting on an independent study of cancer statistics from 1934 to 1963, it concludes that "no evidence was found that persons living downstream from the Hanford Preserve or along the Pacific coast of Oregon have had an excess risk of death from cancer in general or from leukemia in particular."

5. The Atomic Energy Act of 1954 charged the Atomic Energy Commission with the role of encouraging an expanded civilian program of peaceful uses of atomic energy "to the maximum extent consistent with the common defense and security and with the health and safety of the public." Thus, the AEC regards the protection of public health and safety as an overriding consideration in the licensing and regulation of nuclear reactors.

The AEC regulatory function is carried out independently from the Commission's operational and developmental activities. Three organizational units below the Commission level participate in the licensing and regulation of nuclear power reactors. These are the AEC regulatory staff, which includes professional personnel in many technical disciplines; the Advisory Committee on Reactor Safeguards, a statutory body of highly qualified scientists and engineers; and atomic safety and licensing boards, drawn from a panel of technically qualified experts and persons experienced in administrative procedures to conduct public hearings and issue initial decisions on licensing applications. None of these units has any operating or promotional responsibilities, and each group is independent of the others. Their sole responsibility is in the field of nuclear safety and related regulatory matters. Details of the licensing and regulations process are contained in the enclosed booklet, "Licensing of Power Reactors."

6. Throughout history, man has been confronted with the problem of balancing risk against benefit in many walks of life. Many risks are so small that, while they cannot be reduced to absolute zero, the effort that would be required to further reduce them could not be justified. Independent committees of scientists have been continuously active in seeking to define safe practice in the use of man-made radiation, and the AEC has followed procedures to ensure that the best scientific advice available is utilized.

To place in perspective the use of man-made radiation, it should be noted that the human race has always been subject to exposure to radiation from natural sources -- radioactivity in the crust of the earth, cosmic rays from outer space, and naturally occurring radioactive materials in the body. At most locations on the earth's terrain, the total exposure from such sources exceeds 125 millirems* per year. Additional exposures that would result from proposed releases of radioactivity to the Mississippi River from the operation of the Monticello reactor would be very small fractions of this level.

7. This statement seems to imply that an X-ray exposure of an unborn child would be small compared to the exposure an unborn child might receive over a period of several months as a result of the proposed releases from the Monticello reactor to the Mississippi River. Such an implication is not correct. The evidence for a possible increase in the incidence of leukemia resulting from X-ray examination of the obstetrical abdomen of the mother

---

* Rem stands for "roentgen equivalent man" -- a measure of the dose of ionizing radiation to body tissues, roughly equal to a dose of one roentgen of high voltage X-rays. A millirem is one-thousandth of a rem.

relates to exposures of the unborn child ranging from 50 to 5,000 millirems. As noted in 6, above, exposures to people (including unborn children) that could be expected from radioactive material in the river would be much less than such levels. Further, the fact that X-ray exposures occur in a period less than a second is believed to make them more hazardous than if distributed over longer periods of time.

8. Under recommendations of the Federal Radiation Council (FRC), maximum exposures of a population group that could occur from radioactivity in water would be less than one-third of the level quoted by Mr. Hatling. The FRC further recommends that, within such limits, exposures be kept as low as practicable. Thus, there is no "FRC standard dose."

As indicated in connection with several of Mr. Hatling's statements, the exposures that could be expected to occur from releases of radioactivity from the Monticello reactor to the river are much lower than the level cited by Mr. Hatling.

Any health risks associated with exposures as low as those under discussion are too small to be determined by observation or experiment and can only be inferred by extrapolation from observable effects of exposures that are far higher. The method of extrapolation commonly used, is to assume that at these very low levels, the ratio of dose to effect is the same as at very high levels. This assumption is considered by most radiobiologists to provide reasonable estimates of upper limits of the resultant incidence of disease in a large population rather than actual values. There is reason to believe that the actual incidence at these low levels may be much lower than estimated upper limits.

9. It may be noted that the source of the statement that Northern States Power estimates a total waste, including fuel leaks, of 91.4 curies yearly is attributed to an article by members of the faculty of the University of Minnesota printed in the Journal of the Minnesota Academy of Science.

Discussions with Northern States Power suggest that this estimate is based on a statement by Northern States Power that in a single day the amount of radioactivity in liquid wastes released from the reactor could possibly go up to 0.25 curie. Apparently, the authors have assumed that it is the expectation of Northern States Power to release this much activity daily during the entire year. Neither we nor Northern States anticipate that annual releases of liquid effluents will approach amounts comparable to 91.4 curies.

Mr. Hatling also attributes to the Journal of the Minnesota Academy of Science a statement that the General Electric Company "guesses 30,000 curies" of radioactivity would be discharged into the Mississippi River the first year from the Monticello plant. We are not able to find such an estimate by General Electric.

10. The curie is the basic unit adopted to express amounts of radioactivity in terms of the number of atomic disintegrations per second, and equals the number of disintegrations per second in the radioactivity of a gram of radium. This does not mean, however, that one curie of a particular radioisotope is equivalent to one curie of another in any other respect. It indicates nothing about the varying kinds and strengths of radiation emitted by different kinds of radioactive materials. For example, recommended maximum concentrations in drinking water, measured in curies per unit volume, range up to a million times higher for tritium than for radium. The properties of radium are such that public health authorities are concerned if only a few milligrams of it are lost or misplaced. The cited attempt to compare the radioactivity in releases from nuclear power plants during routine operations with "the activity of the entire world supply of radium" has no validity, and is altogether misleading as to the relative importance of the two.

11. Levels of radiation under which ecological systems have developed are generally of the order of 100 to 150 millirems per year, but there are sizable inhabited areas in Brazil, India, and at least one island in the Pacific in which natural levels of radiation are many times higher. By comparison General Electric Company has estimated that radioactivity released to the Mississippi River during operation of the Monticello plant would increase the radiation exposure of animals and plants using the water by very small fractions of the lowest levels occurring in nature. We are confident that Dr. Odum (not Dolum) was not concerned with such minute increases when he was writing of the effects of higher levels of radiation on strains or species of animals.

12. The number of curies mentioned in the quotation is not relevant to the question of discharge of radioactivity from the Monticello plant to the Mississippi River. The question of balance between reduction in levels of radioactivity released and effort to achieve such reduction has been discussed in Item 6, above.

Enclosures:
1. Article, "Oregon Malignancy Pattern and Radioisotope Storage - A Reappraisal"
2. Booklet, "Licensing of Power Reactors"

PUBLIC HEALTH REPORTS

Volume 81 Number 4

APRIL 1966

Published since 1878

CONTENTS

Continued ▷

Frontispiece

This pharmacy of the 1890's is part of the permanent exhibit of medical history which opened this month in the Museum of History and Technology, Smithsonian Institution, Washington, D.C.

—Smithsonian Institution photograph

Oregon Malignancy Pattern and Radioisotope Storage

JOHN C. BAILAR III, M.D., and JOHN L. YOUNG, Jr., M.P.H.

AN INCREASED mortality rate for cancer, including leukemia particularly, among Oregon residents near the south bank of the Columbia River or along the Pacific Coast was reported recently by Fadeley (*1*). This would be an important observation if it were confirmed, because there is an increase in the radioactive content of water which flows through or past the Hanford (Washington) Atomic Storage Preserve before it is carried downstream past the areas which Fadeley reported to have high mortality rates. Because of the following features of his report, however, we have re-examined the question.

1. Several inland counties were omitted without explanation in the analysis.

2. Basic data (numbers of deaths) were not reported, and random variations of rates calculated on the small numbers of deaths occurring in single counties were not considered.

3. Although the age and sex structure of the population varies from one county to another, the rates were neither age adjusted nor sex adjusted.

4. The fact that throughout the United States and in many other countries cancer mortality rates are higher in cities than in rural areas (*2, 3*) was not mentioned. The river and Pacific counties generally are more densely populated than the inland counties, and, on this basis, they might be expected to have higher rates.

5. No study was made of cancer mortality data from earlier years to determine if the reported excess risk was present before the Hanford Atomic Energy Facility started operation.

6. No study was made of cancer mortality rates along the north bank of the Columbia River, which is in the State of Washington.

The authors are with the Biometry Branch, National Cancer Institute, Public Health Service.

Method of Analysis

Total cancer mortality rates and leukemia mortality rates for groups of counties in Oregon and Washington from 1934 through 1963 were adjusted by the indirect method (*4–6*) for differences between counties in the age and sex composition of the population (table 1 and fig. 1). The 1950 observed mortality rates for all forms of cancer and for leukemia in the U.S. white population (*7*) were taken as standard. For the years prior to 1949, the rates include a small adjustment for differences in cause-of-death assignments in the fourth, fifth, and sixth revisions of the International Classification of Diseases (*8, 9*).

Because the 1960 nonwhite populations were rather small in Oregon (2.1 percent) and Washington (3.6 percent), no adjustment was made for race. The numbers of deaths on which the rates in table 1 are based are shown in table 2.

Table 3 lists the counties included in each area, and figure 2 shows the boundaries of the counties and county groups. Counties in the Metropolitan Portland area were considered separately from the other river counties because of the different cancer risk between urban and rural areas in general (*2, 3*).

The age-sex-adjusted mortality rates for all forms of cancer and the numbers of deaths upon which these rates were based for Oregon

and Washington are shown by county in tables 4 and 5. We did not include a similar tabulation of leukemia mortality in this report because the numbers of deaths in most counties were quite small.

Results

Several trends are clear from figure 1. First, total cancer mortality rates in Oregon and Washington have been consistently lower than the average rate for the U.S. white population. In contrast, leukemia mortality rates in both States have been above average for as long as data by county are available (1940 in Oregon and 1934 in Washington). Although the rates in both States have increased rapidly in recent years, the increase has been about the same as in the rest of the United States. Interestingly, the excess in leukemia mortality existed before the Hanford Preserve began operation in 1945.

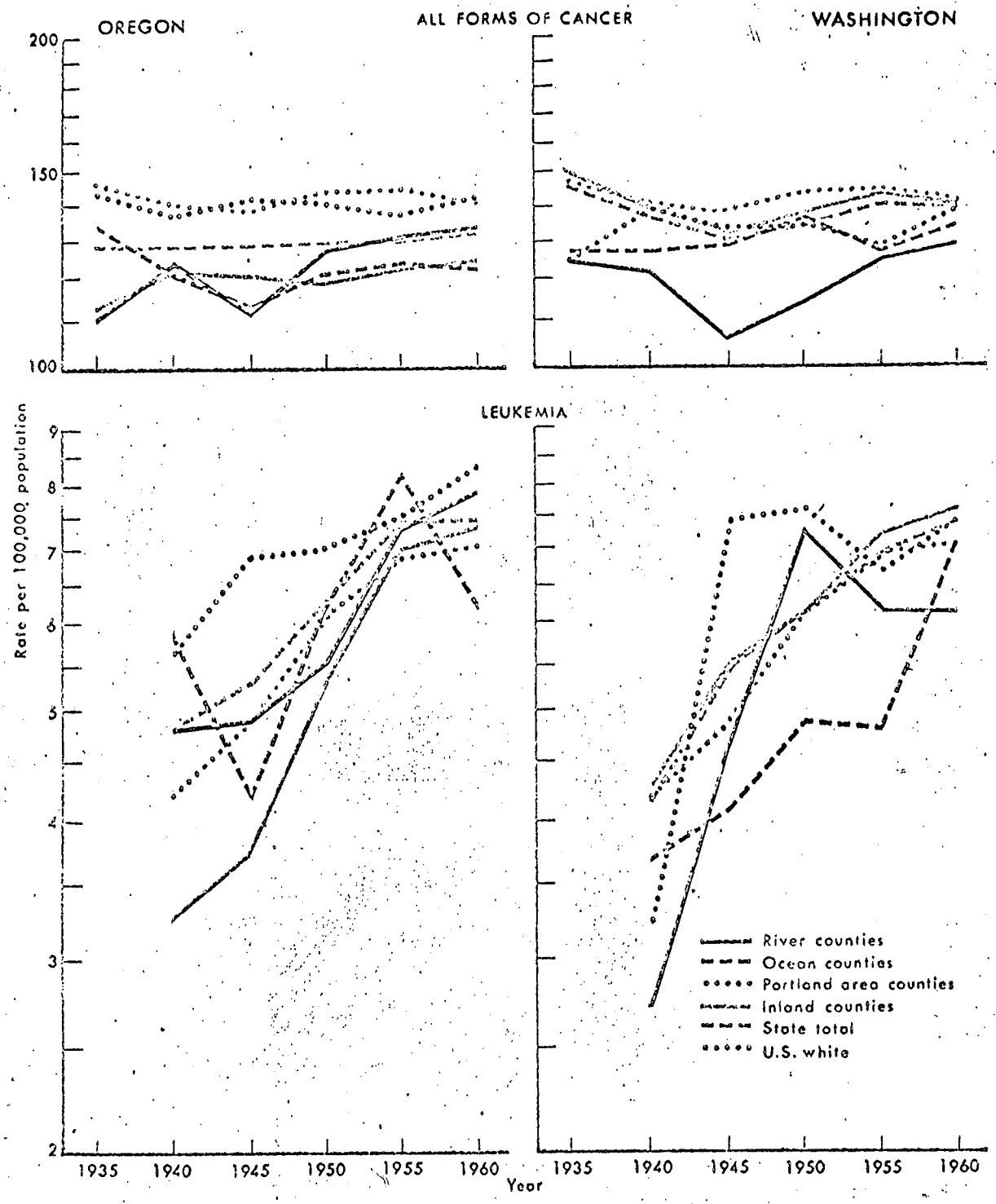
Second, total cancer mortality rates in the Portland region of Oregon have remained essentially unchanged since 1935. Mortality in the river counties has increased up to the State average, but remains substantially below that for the entire United States, and mortality in the ocean counties has actually declined. In Washington total cancer mortality in the river counties has been consistently lower than in other parts of the State. Mortality rates for

Table 1. Mortality rates [1] per 100,000 population for all forms of cancer and for leukemia in the United States, Oregon, and Washington, in various time periods

Area	1934–37	1938–42	1943–47	1948–52	1953–57	1958–63
	All forms of cancer					
Total United States [2]	145.6	140.6	138.2	143.8	144.9	[3] 141.9
Oregon	[4] 128.8	[5] 128.8	128.5	129.9	130.5	132.5
River counties	[4] 111.0	[5] 123.8	112.7	127.3	131.4	133.7
Ocean counties	[4] 133.4	[5] 120.3	113.5	121.5	123.8	121.8
Portland counties	[4] 143.0	[5] 137.8	142.3	140.9	138.1	142.4
Inland counties	[4] 112.7	[5] 121.6	120.3	118.8	122.6	123.8
Washington	144.8	136.7	130.2	135.0	130.3	138.5
River counties	125.4	121.5	106.0	114.4	125.0	128.9
Ocean counties	126.3	126.5	128.7	135.8	127.2	133.7
Portland counties	123.0	139.4	134.1	134.9	128.1	137.5
Inland counties	149.1	138.8	131.0	136.4	142.0	139.7
	Leukemia					
Total United States [2]	3.4	4.2	4.9	6.1	6.8	[3] 7.0
Oregon	[6]	[7] 4.8	5.3	6.2	7.4	7.6
River counties	[6]	[7] 4.8	4.9	5.5	7.3	7.9
Ocean counties	[6]	[7] 5.9	4.2	6.2	8.1	6.2
Portland counties	[6]	[7] 5.6	6.9	7.0	7.5	8.3
Inland counties	[6]	[7] 3.4	3.7	5.3	7.0	7.3
Washington	[8] 3.1	4.1	5.4	6.1	6.9	7.4
River counties	[8] 3.3	2.7	4.6	7.2	6.1	6.1
Ocean counties	[8] 3.1	3.7	4.1	4.9	4.8	7.1
Portland counties	[8] 1.1	3.2	7.4	7.6	6.7	7.4
Inland counties	[8] 3.2	4.3	5.5	6.1	7.2	7.6

[1] Rates adjusted for age and sex by the indirect method, taking U.S. 1950 observed rates for males and females in 10-year age groups as standard.
[2] Rates for white population only.
[3] Rates for 1958–62.
[4] Rates for 1935 only.
[5] Rates for 1939–42.
[6] Leukemia deaths by county not available for these years.
[7] Rates for 1940–42.
[8] Rates based on leukemia deaths in 1935 and 1937 only. Leukemia deaths not available by county for 1934 and 1936.

Figure 1. Annual mortality rates per 100,000 population for all forms of cancer and for leukemia, United States, Oregon, and Washington, 1935–60



NOTE: Available leukemia mortality data for 1935–40 are shown in tables 1 and 2.

the ocean counties have also been generally low.

Trends in mortality rates for leukemia are somewhat less clear-cut than trends for total cancer because of the small numbers of deaths in some areas. In Oregon leukemia mortality increased at about the national average in the Portland area, slightly faster in river counties, and even faster in the inland counties. Rates for the ocean counties have fluctuated widely, but in the most recent period (1958–63) they were the lowest in the State.

In Washington leukemia mortality rates in the river counties increased rapidly before 1950, but they have actually decreased since that time while rates in other parts of the State and in the total United States were rising. Leukemia mortality rates in the ocean counties also have increased rapidly since 1934, but the increase

Table 2. Numbers[1] of deaths from all forms of cancer and from leukemia in the United States, Oregon, and Washington, in various time periods

Area	1934–37	1938–42	1943–47	1948–52	1953–57	1958–63
	All forms of cancer					
Total United States[2]	527, 601	733, 045	824, 840	969, 037	1, 102, 279	[3] 1, 200, 361
Oregon	[4] 1, 229	[5] 5, 845	8, 659	10, 229	11, 641	15, 832
River counties	[4] 100	[5] 521	682	878	992	1, 314
Ocean counties	[4] 173	[5] 754	1, 119	1, 456	1, 746	2, 368
Portland counties	[4] 606	[5] 2, 786	4, 298	4, 994	5, 495	7, 528
Inland counties	[4] 350	[5] 1, 784	2, 560	2, 901	3, 408	4, 622
Washington	8, 644	12, 127	13, 690	16, 462	19, 130	25, 352
River counties	415	593	648	843	1, 068	1, 501
Ocean counties	755	1, 080	1, 221	1, 421	1, 448	1, 970
Portland counties	204	345	434	541	590	857
Inland counties	7, 270	10, 109	11, 387	13, 657	16, 024	21, 024
	Leukemia					
Total United States[2]	13, 706	22, 085	30, 246	41, 476	51, 030	[3] 68, 360
Oregon	([6])	[7] 170	354	[8] 484	648	873
River counties	([6])	[7] 16	30	38	54	74
Ocean counties	([6])	[7] 30	44	79	121	127
Portland counties	([6])	[7] 84	199	234	280	408
Inland counties	([6])	[7] 40	81	132	193	264
Washington	[9] 98	365	573	745	941	1, 342
River counties	[9] 6	14	31	59	56	75
Ocean counties	[9] 10	32	39	50	52	99
Portland counties	[9] 1	8	25	32	31	45
Inland counties	[9] 81	311	478	604	802	1, 123

[1] Numbers which were reported. Before the rates were calculated for table 1, comparability ratios were applied to adjust for differences in cause-of-death assignments between the 4th, 5th, and 6th revisions of the International Classification of Diseases.

[2] White population only.

[3] Data for 1958–62.

[4] Data for 1935 only.

[5] Data for 1939–42.

[6] Data not available by county.

[7] Data for 1940–42.

[8] Total includes one with county of residence unknown.

[9] Data for 1935 and 1937 only. Leukemia deaths not available by county for 1934 and 1936.

SOURCES: Oregon leukemia deaths by county for 1940–57 and deaths due to all forms of cancer by county for 1941–44 were obtained from the State Registrar, Oregon State Board of Health, Portland. Washington leukemia deaths by county for 1935 and 1937–57 and deaths due to all forms of cancer for 1934, 1936–38, and 1941–44 were obtained from the State Registrar, Washington State Board of Health, Olympia. The remainder of the data were obtained from annual volumes of Vital Statistics of the United States.

has been no greater than that of the State as a whole.

No significant trends were observed in individual counties in either Washington or Oregon.

Summary

Because of recent concern over possible contamination of the Columbia River by radioactive products from the Hanford (Washington) Atomic Storage Preserve, an independent study was undertaken to determine cancer trends in Washington and Oregon from 1934 to 1963.

For the analysis, the counties within the two States were divided into four categories: river, ocean, Metropolitan Portland, and inland.

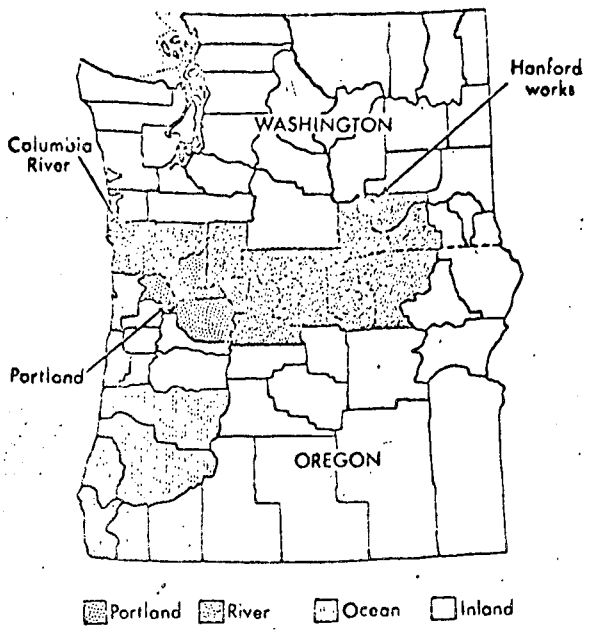
Results of the study revealed that in both States mortality rates for all forms of cancer combined have been consistently below the mortality rate for the U.S. white population. Both States have had a consistent excess in leukemia mortality, but the excess was present before the Hanford Preserve began operation. No important mortality trends were observed in individual counties in either State.

No evidence was found that persons living downstream from the Hanford Preserve or along the Pacific coast of Oregon have had an excess risk of death from cancer in general or from leukemia in particular.

Table 3. Counties in Oregon and Washington, by geographic category

Area	Total counties	Area	Total counties
Oregon	36	Washington	39
River	8	*River*	7
Clatsop		Benton	
Columbia		Cowlitz	
Gilliam		Franklin	
Hood River		Klickitat	
Morrow		Skamania	
Sherman		Wahkiakum	
Umatilla		Walla Walla	
Wasco			
Ocean	6	*Ocean*	7
Coos		Clallam	
Curry		Grays Harbor	
Douglas		Island	
Lane		Jefferson	
Lincoln		Pacific	
Tillamook		San Juan	
		Whatcom	
Metropolitan Portland	3	*Metropolitan Portland*	1
Clackamas		Clark	
Multnomah			
Washington			
Inland	19	*Inland*	24
Baker		Adams	
Benton		Asotin	
Crook		Chelan	
Deschutes		Columbia	
Grant		Douglas	
Harney		Ferry	
Jackson		Garfield	
Jefferson		Grant	
Josephine		King	
Klamath		Kitsap	
Lake		Kittitas	
Linn		Lewis	
Malheur		Lincoln	
Marion		Mason	
Polk		Okanogan	
Union		Pend Oreille	
Wallowa		Pierce	
Wheeler		Skagit	
Yamhill		Snohomish	
		Spokane	
		Stevens	
		Thurston	
		Whitman	
		Yakima	

Figure 2. Counties in Oregon and Washington, by geographic category



REFERENCES

(1) Fadeley, R. C.: Oregon malignancy pattern physiographically related to Hanford Washington radioisotope storage. J Environ Health 27: 883–897, May–June 1965.

(2) Levin, M. L., et al.: Cancer incidence in urban and rural areas of New York State. J Nat Cancer Inst 24: 1243–1257, June 1960.

(3) Haenszel, W., Marcus, S. C., and Zimmerer, E. G.: Cancer mortality in urban and rural Iowa. PHS Publication No. 462 (Public Health Monograph No. 37). U.S. Government Printing Office, Washington, D.C., 1956.
(4) Hill, A. B.: Principles of medical statistics. Ed. 7. Oxford University Press, London, 1961.
(5) Linder, F., and Grove, R. D.: Vital statistics rates in the United States, 1900–1940. U.S. Government Printing Office, Washington, D.C., 1947.
(6) Spiegelman, M.: Introduction to demography. The Society of Actuaries, Chicago, 1955.
(7) Gordon, T., Crittenden, M., and Haenszel, W.: Cancer mortality trends in the United States. Nat Cancer Inst Monogr 6. U.S. Government Printing Office, Washington, D.C., 1961.

Table 4. Mortality rates per 100,000 population and numbers of deaths for all forms of cancer by county, in various time periods, Oregon

County	Rates						Numbers					
	1935	1939–42	1943–47	1948–52	1953–57	1958–63	1935	1939–42	1943–47	1948–52	1953–57	1958–63
River:												
Clatsop	130.5	132.9	116.6	137.8	154.0	141.3	26	125	163	225	269	315
Columbia	119.8	112.3	101.0	129.1	117.5	142.8	20	88	110	156	150	230
Gilliam	80.3	89.1	113.1	118.1	102.1	134.6	2	10	16	17	15	26
Hood River	102.6	112.5	99.8	86.8	129.7	139.2	9	48	58	55	92	131
Morrow	124.3	113.8	136.1	149.0	122.8	119.4	5	20	31	37	32	39
Sherman	85.6	77.9	64.8	125.3	127.8	121.3	2	8	8	15	16	19
Umatilla	100.0	128.1	116.9	127.5	127.6	126.3	24	143	199	258	291	384
Wasco	101.2	143.7	123.6	129.3	126.5	126.7	12	79	97	115	127	170
Ocean:												
Coos	130.8	139.6	119.5	133.8	147.5	121.9	32	162	200	256	325	364
Curry	143.3	81.0	87.2	136.6	92.4	87.1	5	14	24	46	43	62
Douglas	121.8	97.8	110.9	117.8	125.8	119.2	31	117	209	270	334	431
Lane	142.9	122.2	111.6	123.5	120.2	124.4	79	328	485	665	776	1,122
Lincoln	106.7	112.5	112.6	103.7	112.0	121.0	12	66	108	124	155	228
Tillamook	143.0	143.2	129.8	111.0	120.5	131.8	14	67	93	95	113	161
Portland:												
Clackamas	127.4	108.5	121.3	122.4	120.5	131.8	67	274	465	557	642	965
Multnomah	147.1	144.1	149.7	146.2	143.1	147.8	493	2,802	3,549	4,047	4,367	5,906
Washington	128.1	122.3	106.6	121.5	123.4	117.4	46	210	284	390	486	657
Inland:												
Baker	131.3	127.4	128.5	120.6	125.4	107.5	21	94	119	113	126	138
Benton	125.2	121.9	107.6	95.2	104.0	115.6	20	92	118	120	150	225
Crook	115.9	105.6	144.0	88.3	149.1	109.6	4	18	38	28	56	57
Deschutes	108.9	121.0	129.6	117.4	111.8	122.6	13	72	110	113	128	195
Grant	167.5	125.4	91.7	134.2	112.7	125.8	9	30	30	38	43	61
Harney	46.3	73.8	121.6	105.6	124.6	128.1	2	14	31	29	37	49
Jackson	101.8	127.8	120.3	119.8	133.0	120.4	36	211	313	379	501	630
Jefferson	59.1	121.1	44.2	105.3	95.6	115.8	1	9	6	10	21	36
Josephine	156.7	104.5	104.3	127.9	113.4	138.7	25	84	128	187	192	320
Klamath	98.3	118.8	126.3	113.0	116.9	132.4	21	125	185	184	219	356
Lake	46.3	97.1	91.3	112.7	131.1	141.3	2	20	25	33	42	59
Linn	127.1	132.0	117.5	123.4	122.1	119.7	36	173	236	296	330	431
Malheur	94.4	85.6	103.7	115.7	124.2	131.8	10	47	84	109	132	187
Marion	113.8	131.5	122.4	116.6	119.3	126.9	79	432	593	656	780	1,131
Polk	101.6	122.1	122.0	111.8	110.8	113.3	17	95	134	138	152	205
Union	112.6	114.5	127.9	135.5	136.6	115.6	17	78	120	140	148	157
Wallowa	97.3	132.2	104.3	118.7	115.2	135.1	6	37	37	43	44	65
Wheeler	89.7	100.1	126.7	147.5	150.8	122.0	2	10	16	19	19	18
Yamhill	110.3	118.0	141.1	132.8	143.5	124.8	29	143	237	247	288	322

SOURCES: Oregon deaths due to all forms of cancer for the years 1941–44 by county were obtained from the State Registrar, Oregon State Board of Health, Portland. The remainder of the data were obtained from respective volumes of Vital Statistics of the United States.

(8) Dunn, H. L., and Shackley, W.: Comparison of cause of death assignments by the 1929 and 1938 revisions of the international list: deaths in the United States, 1940. Vital Statistics—Special Reports 19, June 1944, p. 14.

(9) Faust, M. M., and Dolman, A. B.: Comparability ratios based on mortality statistics for the fifth and sixth revisions, United States, 1950. Vital Statistics—Special Reports 51, February 1964, p. 3.

Table 5. Mortality rates per 100,000 population and numbers of deaths for all forms of cancer by county, in various time periods, Washington

County	Rates						Numbers					
	1934–37	1938–42	1943–47	1948–52	1953–57	1958–63	1934–37	1938–42	1943–47	1948–52	1953–57	1958–63
River:												
Benton	79.2	110.0	63.7	101.7	113.4	126.4	34	67	67	153	208	328
Cowlitz	137.0	119.3	109.2	127.7	129.3	140.0	131	175	197	274	326	486
Franklin	106.4	101.5	128.9	142.5	141.6	125.5	21	30	51	71	96	129
Klickitat	99.9	106.3	95.1	123.0	134.1	127.9	36	56	54	75	89	110
Skamania	114.2	101.8	85.2	102.4	100.7	97.1	15	21	20	27	28	34
Wankiakum	93.3	118.8	94.5	60.4	91.1	163.9	12	21	19	13	20	44
Walla Walla	150.2	140.5	129.3	108.0	128.2	120.4	166	223	240	230	301	370
Ocean:												
Clallam	139.9	121.1	108.4	118.7	104.9	134.6	89	112	118	149	152	265
Grays Harbor	133.0	141.3	138.5	150.7	139.1	151.9	229	346	375	448	444	624
Island	131.3	112.8	97.4	161.3	117.2	124.1	37	48	49	94	83	124
Jefferson	136.7	112.3	129.5	114.6	159.6	110.9	41	47	60	58	86	76
Pacific	117.3	109.7	136.8	122.2	146.3	107.7	61	84	117	116	146	135
San Juan	118.5	104.6	95.2	113.9	120.2	111.0	17	21	20	25	29	35
Whatcom	118.3	125.9	131.7	133.5	110.4	131.6	281	422	482	531	508	714
Portland: Clark	123.9	130.4	134.1	134.9	128.1	137.5	204	345	434	541	590	857
Inland:												
Adams	108.5	111.4	115.8	85.7	125.3	96.5	23	31	35	28	47	49
Asotin	100.1	119.4	126.9	114.1	114.3	121.9	32	53	73	81	91	129
Chelan	125.5	126.4	104.4	123.4	124.2	133.4	125	188	179	240	267	376
Columbia	160.2	83.8	105.9	159.6	159.6	104.2	34	25	32	49	38	41
Douglas	77.3	117.0	89.8	94.0	92.6	103.9	21	46	39	45	53	83
Ferry	82.4	114.6	121.7	119.5	134.5	108.6	12	25	26	25	27	25
Garfield	72.0	105.5	138.3	131.3	124.9	150.7	9	18	25	25	24	35
Grant	86.6	110.9	65.0	103.4	111.1	103.0	24	52	40	79	122	177
King	164.1	146.5	142.3	149.8	153.6	148.7	2,926	3,967	4,677	5,809	6,784	8,833
Kitsap	145.6	143.9	137.8	146.0	135.2	129.4	208	317	392	511	548	714
Kittitas	154.0	117.9	127.7	124.9	117.2	137.4	94	107	130	141	136	196
Lewis	144.9	144.6	125.4	129.9	144.4	140.3	210	305	295	338	398	489
Lincoln	133.0	129.7	135.6	100.3	116.2	126.5	56	73	80	62	75	102
Mason	150.7	154.8	128.4	97.1	156.5	133.3	52	81	81	72	132	151
Okanogan	123.8	104.9	117.7	117.0	111.4	131.3	82	105	127	149	151	226
Pend Oreille	130.2	127.3	107.7	104.9	167.0	112.4	32	45	40	41	68	57
Pierce	146.1	142.6	134.8	130.9	140.4	142.8	966	1,397	1,564	1,760	2,096	2,807
Skagit	118.3	140.1	126.4	109.6	112.9	111.3	171	298	303	293	328	418
Snohomish	142.5	128.0	127.6	134.0	138.2	140.0	455	610	708	850	1,038	1,457
Spokane	151.6	137.3	125.3	131.3	138.2	132.6	955	1,271	1,368	1,655	1,960	2,506
Stevens	143.4	128.1	93.7	136.5	120.9	120.5	101	127	96	144	130	158
Thurston	114.8	126.2	134.0	133.5	137.3	146.5	141	231	282	318	372	533
Whitman	170.2	136.7	122.0	118.3	131.0	123.6	161	177	167	171	195	227
Yakima	136.8	131.2	120.5	124.8	136.0	133.8	380	560	628	771	944	1,235

Sources: Washington deaths due to all forms of cancer for the years 1934, 1936–38, and 1941–44 by county were obtained from the State Registrar, Washington State Board of Health, Olympia. The remainder of the data were obtained from respective volumes of Vital Statistics of the United States.

RADIOLOGICAL EFFECTS OF OPERATING THE MONTICELLO NUCLEAR GENERATING PLANT

The application by Northern States Power Company for a permit to construct the Monticello plant was reviewed from the standpoint of radiological safety by four bodies in the Atomic Energy Commission's process of licensing and regulation, as outlined in the attached booklet, "Licensing of Power Reactors." These review groups included the AEC regulatory staff, the Commission's statutory Advisory Committee on Reactor Safeguards (ACRS), and an atomic safety and licensing board which conducted a public hearing in the matter on May 25-26, 1967, at Buffalo, Minnesota. The initial decision of the board, granting a provisional construction permit, was then reviewed by the Commission itself. The construction permit was issued on June 19, 1967. Each of these review bodies concluded that the proposed plant could be constructed and operated without undue risk to the health and safety of the public.

On November 8, 1968, the applicant applied for an operating license. Further safety reviews are now being conducted by the AEC regulatory staff. The ACRS will also review this application and advise the Commission thereon. Further, if an operating license is granted, the plant will be under AEC surveillance and undergo periodic safety inspections throughout its lifetime.

Small amounts of radioactive material are permitted by AEC regulations to be released into the environment at controlled rates and in controlled amounts from a nuclear power plant. This requires a continuous program of monitoring and control to assure that release limits are not exceeded. The release limits in AEC regulations are based on guides developed by the Federal Radiation Council, a statutory body, and approved by the President for the guidance of Federal agencies. These release limits are such that continuous use of air or water at the point of release from the site would not result in exposures exceeding national and international standards for radiation protection of the public.

The concentrations of liquid radioactive effluents released from the plant are further reduced by dilution in the body of water to which they are discharged. A survey of all operating nuclear power plants has shown that the concentrations of radioactivity in liquid releases during 1967 were only a small fraction of the release limits applicable to the radionuclides in the effluent.

FROM

CONTROL NUMBER 2382

ACTION COMPLETION DEADLINE

DATE OF DOCUMENT 3/21/69

FILE LOCATION

TO

OGC

ACTION PROCESSING DATES

Acknowledged

Interim Report

Final 4/17/69

INFORMATIONAL COPY DISTRIBUTION

___Chairman	___ADNS	___COM
___GM	___ADA	___SS
___Dep. Dir.	___OGC	___SLR
___A. D.	___RL	___ML

DESCRIPTION Ltr ☒ Original ☐ Copy ☐ Other 5/CYS

REMARKS RK-2057

Ltr fr Russell Mating protesting the licensing of the Monticello plant and trans cy of a report on dumping of radioactive wastes into the Mississippi River.

For signature of Dir. of Reg.

Refer response to attention of Bob Mannion

GM 82826

REFERRED TO	DATE
Henderson f/action	3/27/69
Cys: KPrice	Shapar
Beck	PDR (50-26)
Moon	
Boon	
Western	
Morris	

DO NOT DETACH THIS COPY

DIRECTOR OF REGULATION
COMMUNICATIONS CONTROL

Form HQ-32 (7-64)
U. S. AEC

U. S. GOVERNMENT PRINTING OFFICE: 1962—635858

[redacted], WALTER P. MONDALE (SEN.)	DATE OF DOCUMENT 3/21/69	DATE RECEIVED 3/25/69	CONTROL NUMBER 82826
	SUSPENSE DATE	FILE CODE	
TO	CLASSIFICATION	REPLY DATES	SPECIAL INSTRUCTIONS
DCR:	Series:	Acknowledge 3/26	☐ Appropriate Handling
	Copy ____ of ____	Interim ____	
		Final ____	☐ ____

DESCRIPTION: LTR. ☒ Original ☐ Copy ☐ Other

ENCL: A LTR. FM RUSSELL RATLING, MINNEAPOLIS, MINN., OBJECTING TO THE PROPOSED NUCLEAR POWER PLANT IN MONTICELLO.

PREPARE FOR SIGNATURE OF:

☐ CHAIRMAN ☒ DIV./OFFICE DIRECTOR

☐ GENERAL MANAGER ☐ ____

☐ ASST. GENERAL MANAGER ____

REMARKS:

ENCLOSURES LTR. FM: RATLING W/8 ENCL: A REPORT

REFERRED TO	DATE	RECEIVED BY	DATE
DEC.	3/25		

INFORMATION COPIES SENT TO: W/O ENCL. RMPT.

☐ CHAIRMAN ☐ GENERAL MANAGER

☒ DCR M STR. [redacted]

☐ ____ ☐ ____

GENERAL MANAGER'S COMMUNICATIONS CONTROL
U. S. ATOMIC ENERGY COMMISSION

FORM WA-284
(5-62)

DATE: Mar. 21, 1969

DR - 2082

United States Senate

RE: Mr. Russell Hatling
144 Melbourne Ave., S. E.
Minneapolis
Minn 55414

Respectfully referred to
Congressional Liaison
Atomic Energy Commission
Washington, D. C.

.....

For your consideration of the attached letter, and for a report.

_____ To be forwarded directly to the constituent, with a copy to me for my information and records.

__XX__ To me, in duplicate to accompany return of enclosure.

_____ As requested below.

Additional comments:

Please refer response to attention of

Bob Mannion, of my staff,

on the outside of the envelope only.

Thank you.

WALTER F. MONDALE
U.S. SENATE

Rec'd Off. Dir. of Reg.
Date 3/26/69
Time 11:45

DR - 2082

144 Melbourne Avenue Southeast
Minneapolis, Minnesota 55414

Senator Walter Mondale
Senate Office Building
Washington, D.C.

Dear Senator Mondale:

As a citizen of Minnesota, I have objected to the proposed nuclear power plant in Monticello. I believe no one has the right to subject any citizen to the dangers of radiation. . . no one has the right to make a value judgment that the risk to life is offset by the benefits of such a system. . . no one has the right to foul the rivers and lakes which belong to the people of the state.

I am enclosing a report I have prepared and circulated at the DFL City Convention in Minneapolis. I have asked others to join me in protesting the licensing of this plant to dump radioactive waste into the Mississippi. I find the idea almost unbelievable.

I implore you to use every means at your disposal to help block this licensing.

Sincerely,

Russell Hatling

Russell Hatling

MONTICELLO: A nuclear energy gamble
The stakes: mutation, cancer, death

Citizens are concerned about the idea of radioactive wastes being dumped into the Mississippi at Monticello. We should be. It's our drinking water. And in spite of the assurances of safety from the Atomic Energy Commission and Northern States Power Company -- the safety and performance records of nuclear energy plants have been dismal.

Of the original 12 nuclear power plants that have been put into operation, 8 have failed -- including the one at Elk River where radioactive leaks forced shutdown -- and the Northern States Power "Pathfinder" plant in Sioux Falls which exceeded its yearly concentration limit despite being operated below full power. Three plants have been abandoned (one at an estimated $7 million decontamination cost, paid by the taxpayer, of course).[1]

In all cases where these plants failed, citizens had been assured, as now, of complete safety.

Q. <u>If there were a real danger to health from radioactive waste, would the Atomic Energy Commission approve of such a plant?</u>

A. It appears that the AEC not only would but in fact has approved of such plants. The Hanford, Washington Atomic Energy facility on the Columbia River is an example.

A 1965 study showed that Oregon counties bordering the Columbia River downstream from the Hanford facility had a 53 percent higher cancer rate than the rest of the state. The JOURNAL OF ENVIRONMENTAL HEALTH reported: "This physiographic pattern of malignancy provides strong circumstantial evidence that not just leukemia but all types of cancer are influenced by bodily ingested radioisotopes in quantities heretofore thought safe."[2] We might add, 'declared safe' by the AEC.

Q. <u>But why would the AEC approve a nuclear power installation where even the slightest question of safety exists?</u>

A. It is important to keep in mind that the AEC was established to promote the use of nuclear energy. Limiting such use, even for safety reasons, is clearly a conflict of interest for the AEC.

Q. <u>What is a 'safe level' of radioactivity in the environment?</u>

A. There is no 'safe level' of radioactivity. Radiation as minimal as X-ray exposure of an unborn child is associated with leukemia in later life.[2] Standards depend on how many deaths and mutations we are willing to accept.

For example, the Federal Radiation Council has set its standards at .5 rem yearly exposure. "If we assume the population of the Twin Cities metropolitan area to be two million, then a continuing yearly exposure of .5 rem -- the FRC standard dose -- would be expected to cause from 10 to 100 cases of leukemia per year and about an equal number of other

types of neoplasms (cancer) ... Whether a loss of this magnitude is acceptable to society can only be determined by considering the benefits to be gained from a particular use of atomic energy."[3]

A question one might ask is 'whose benefits and whose deaths?'

Q. How much radioactive waste would the proposed Monticello Plant discharge into the Mississippi?

A. Northern States Power estimates a total waste, including fuel leaks, of 91.4 Curies yearly.[4]

General Electric, who has a reputation for seriously underestimating radioactive discharge, guesses 30,000 Curies the first year. Note the discrepancy: 29,998.6 Curies. The real figure is anybody's guess. ("A Curie is equivalent to the activity of one gram of radium. We can all recall the excitement and intensive searches instituted when capsules containing a few milligrams of radium were lost or misplaced. Yet the quantity of radioactivity proposed for release from a single nuclear power plant each year, even under the most optimistic assumptions as to its operation, is several times the activity of the entire world supply of radium.")[4]

Q. What about the present argument between Northern States Power and the Pollution Control Agency as to allowable limits of radioactive contamination?

A. This is a sham battle diverting attention from the real point that no amount of radioactive waste is safe and under no conditions should dumping it in our drinking water be tolerated.

Eugene P. Dolum, in his widely used textbook, FUNDAMENTALS OF ECOLOGY, says: "Should a system receive a higher level of radiation than that under which it evolved, nature will not take it 'lying down,' so to speak; adaptations and adjustments will occur along with elimination of sensitive strains or species."

Put another way: radioactive waste dumped into the Mississippi will result in mutations or freaks in plants, animals, fish and people. Cancer and the death rate due to cancer will increase. No limits have been set on the increase of illness and death that is "acceptable." That will apparently depend on how loud people protest as they learn what is happending.

Q. Is is necessary to discharge radioactive waste into the Mississippi River?

A. NO. "The quantity of radioactive wastes which is discharged depends on the extent of the waste treatment system. Radioisotopes in the wastes can vary from none to several million Curies per year. There need be no radioactive discharge since those that are released are the result of deliberate decisions. The only gain offsetting these releases is a slightly lower, and as yet unspecified electrical cost to the consumer."[4]

Q. What can you do?

A. Make your voice heard. Don't leave it to the other guy. Protest now against dumping radioactive waste in any amount into the Mississippi River or any other body of water in Minnesota.

Send your protest to:

- Governor Harold LeVander, State Capitol Bldg., St. Paul, Minnesota
- Mayor Arthur Naftalin, Minneapolis Court House, Minneapolis, Minnesota
- Your Own State Legislator, State Capitol Bldg., St. Paul, Minnesota
- Mr. John Badalich, Chairman - Pollution Control Agency, Department of Health Building, University of Minnesota, Minneapolis, Minnesota

ATTEND POLLUTION CONTROL AGENCY MEETING
(Permit for NSP will be granted or denied at this meeting)

Tuesday, March 11
9:00 AM

Veterans Service Building
Capitol Approach - St. Paul

. . . . .

Source Material:

(1) United States Atomic Energy Commission, "Operating History of U. S. Nuclear Reactors"

(2) Robert Cunningham Fadeley, "Oregon Malignancy Pattern Physiographically Related to Hanford Washington Radioisotope Storage," JOURNAL OF ENVIRONMENTAL HEALTH, May-June, '65

(3) R. E. Pogue and D. E. Abrahamson, "Benefits, Risks, and Regulations," JOURNAL OF MINNESOTA ACADEMY OF SCIENCE, Vol. 35, No. 1, 1968.

(4) Abrahamson and Pogue, "Discharge of Radioactive and Thermal Wastes," JOURNAL OF MINNESOTA ACADEMY OF SCIENCE, Vol. 35, No. 1, 1968.

Prepared and Distributed by Russell Hatling, 2nd Ward