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TO: D/Reg

REPLY FOR _____'s SIGNATURE

REPLY FOR SIGNATURE BY: GM _____ DR _____

FOR APPROPRIATE HANDLING

PLEASE SEND TWO COPIES OF REPLY TO OFFICE OF CHAIRMAN

FOR INFORMATION: GM DR COMMISSIONERS

REMARKS:

A. W. JACKSON
For the Chairman



STATE OF ILLINOIS
POLLUTION CONTROL BOARD

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CHICAGO, ILLINOIS 60606

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DAVID P. CURRIE, CHAIRMAN
SAMUEL R. ALDRICH
JACOB D. DUMELLE
RICHARD J. KISSEL
SAMUEL T. LAWTON, JR.

February 18, 1972

Dr. James Schlesinger
Chairman
Atomic Energy Commission
Washington, D.C.

Re: Dresden Nuclear Plants

Dear Dr. Schlesinger:

The attached statement by Illinois Representative Harold Katz and Dr. Edward Radford is quite disturbing. Dr. Radford (see page S-4 of his statement) computes the dosage to people one mile northeast of the Dresden, Illinois nuclear plants (near Morris, Illinois) as being 680 millirems per year.

This dosage is far above the new 5 mr AEC standard and also above the old 170 mr standard.

I would ask that you immediately have your staff check into Dr. Radford's computation and, if verified, cause the radioactive emissions to be drastically reduced.

Very truly yours,

A large, stylized handwritten signature in cursive script that reads "Jacob D. Dumelle".

Jacob D. Dumelle
Board Member

JDD:rj
Encl.

Rec'd on: Dir. of Reg.
Date 2/22/72
Time 11:40

DR-4228

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STATE OF ILLINOIS)
) SS
COUNTY OF COOK)

RECEIVED
FEB 8 1972
POLLUTION CONTROL BOARD

BEFORE THE POLLUTION CONTROL BOARD
OF THE STATE OF ILLINOIS

In the Matter Of:)
))
Application of General Electric)
Company For a Permit to Operate)
Its Midwest Fuel Recovery Plant)

PCB 71-238

SUPPLEMENTAL STATEMENT OF UAW
TO MAKE MORE DEFINITE AND CERTAIN
THE NATURE OF THE TESTIMONY TO BE ADDUCED
IF ITS PETITION TO INTERVENE
AND MOTION TO REOPEN RECORD IS ALLOWED

Now comes the Intervenor, ILLINOIS COMMUNITY ACTION PROGRAM of the INTERNATIONAL UNION, UNITED AUTOMOBILE, AEROSPACE AND AGRICULTURAL IMPLEMENT WORKERS UNION OF AMERICA, UAW, a voluntary association of one and a half million members, and, in response to the order of the Pollution Control Board of the State of Illinois of January 19, 1972, that it specify in greater detail the general nature of the testimony of Dr. Edward P. Radford that would be adduced if the record is reopened to permit him to testify, states as follows;

1. The present state of the record does not contain adequate data upon which the Pollution Control Board of the State of Illinois could make a reasoned decision as to whether the operation of the Midwest Fuel Recovery Plant (MFRP) involves a significant public health hazard,
2. The location of the MFRP near the vicinity of Dresden I, II and III was a serious environmental mistake since the combined impact on the area involved of the three operating nuclear reactors in terms of radioactivity already exceeds existing Federal standards and existing standards of public health,

3. The record is deficient in not including adequate meteorological data upon which the Commission could act. This is particularly unfortunate since the existence of the three reactors does provide an ideal experimental situation for the making of extensive meteorological findings of critical importance in the evaluation of the public health problem presented. The record should certainly contain facts concerning wind speed, direction, frequency of stable conditions, and actual radiation doses from the Dresden plant that reach surrounding communities. A perfect opportunity is presented for determining the persistence of the plume under the atmospheric conditions there existing. The record is seriously deficient in containing no such data.

4. The record does not contain evidence upon which a sound evaluation can be made of the adequacy of the sand bed filter system, the critical last filter system which is designed to take out particulates before they go up the stack. The record is incomplete in failing to contain the characteristics of the system as it has operated at Savannah River or any other location. The assumed efficiency and adequacy finds no support in evidence in the record. The question of what radioactive material will be eliminated from the particulate matter that will be emitted from the stack is of such great importance in evaluating the plant's radioactive impact on the area that supporting data should be required to be presented.

5. The efficacy of the iodine containment system is not established by adequate scientific evidence in the record.

6. With regard to the containment vaults for high level waste materials, the record is deficient in failing to include the experience at Savannah River (S.C.) and Hanford and such other experience as may demonstrate the characteristics and results of this method of containment of high level wastes.

7. The monitoring system as contemplated by the order is wholly inadequate. The environmental impact of MFRP is largely unknown due to the uniqueness of nuclear fuel reprocessing plants. The Board proposes to rely upon monitoring done by the applicant, but it can be fairly said that the record for accuracy for operating companies generally has been shown to be extremely bad with regard to monitoring radioactive discharges. Particularly in view of the existing problem of radioactivity in the area, the very closest check should be kept on the radioactivity emanating from the plant, and this most decidedly should not be the responsibility of the General Electric Company whose interests may be adverse to the public in the monitoring program. The General Electric Company should be surcharged on a per ton of fuel processed basis so that the State may carry on an adequate monitoring program to protect its citizens who live in that general area from the known hazards of radioactivity, as more fully described in the attached Statement.

8. Edward P. Radford, M.D. (Harvard University, 1946), whose studies have included work at the Massachusetts Institute of Technology, is Professor of Environmental Medicine at the Johns Hopkins University School of Hygiene and Public Health. Dr. Radford is a member of the National Academy of Sciences Committee on the Biological Effects of Ionizing Radiation, which is advisory to the Federal Environmental Protection Agency concerning proposed changes in standards of radiation exposure. He is also chairman of the Power Plant and Human Health and Welfare Studies Group, the Department of Natural Resources, State of Maryland, and a member of the committee on Power Plant Siting, National Academy of Engineering. His major academic interests include radiation carcinogenesis, movement of isotopes in the biosphere, and environmental health, particularly air pollution effects on man.

9. Attached hereto and made a part hereof is a digest of some of the testimony that will be elicited from an examination of Dr. Radford if the Board sees fit to reopen the record for this purpose.

UAW ILLINOIS COMMUNITY ACTION COUNCIL
(CAP) and ROBERT JOHNSTON, its Chairman

By:

Katz & Friedman

KATZ & FRIEDMAN

7 South Dearborn Street
Chicago, Illinois 60603
312/263-6330

STATEMENT

SUMMARY OF SOME OF THE TESTIMONY TO BE
PRESENTED BEFORE ILLINOIS POLLUTION CONTROL
BOARD HEARING CONCERNING THE MIDWEST FUEL
RECOVERY PLANT AT MORRIS, ILLINOIS.

Edward P. Radford, M.D.,
Professor of Environmental Medicine
Johns Hopkins University
School of Hygiene and Public Health

1. I currently teach radiation effects at Johns Hopkins, and some of my research in the past has dealt with radioisotopes in the biosphere. I am also a member of the National Academy of Sciences Committee on Biological Effects of Ionizing Radiation, which is reviewing the scientific basis of radiation standards. I appear as a private citizen concerned with assuring that the great increase in electric power capacity occurring in the next decade be achieved without public health consequences to the people living near the power plants and related facilities.

2. The Midwest Fuel Recovery Plant is the first commercial nuclear fuel reprocessing plant to use the new technology described already to the Board. As such, there is only a partial basis for determining the environmental effects of the plant in quantitative terms. It is regrettable that the Board has had only vaguely documented statements by the Company concerning the potential releases of radionuclides from the plant, and that the health implications of the plant have been presented only by witnesses called by the Company. The consultant witnesses are highly competent but the overall assessment of the health hazards or lack of them at the Morris-Dresden complex has been done primarily by employees of the Company. I submit that this has resulted in a presentation to the Board that is incomplete.

3. The record of nuclear power operations to date indicates that both for reactors and for fuel reprocessing facilities, the

operating companies have had inexact or incorrect information concerning the actual releases of radionuclides from their plants. In many cases the releases are indeed insignificant, but in others they are not. Only the surveys carried out by the U.S. Public Health Service have permitted scientists to evaluate which plants are releasing amounts which may have health significance. It is my strong contention that the evaluation of the health significance of the Morris-Dresden plants should be based as much as possible on actual measurements of environmental contamination and on actual operating data, rather than on calculations made by the Company. Fortunately studies of the Dresden I plant and the West Valley plant have been carried out, and there should be available some data from fuel reprocessing carried out at Hanford and Savannah River, although such data have not been presented by the Company.

4. In assessing the health significance of releases from MFRP, two points must be kept in mind. First, so far as the people living in Northern Illinois are concerned, especially those in the principal downwind directions, it is the total contribution of radiation exposure from all nuclear power sources that is important. In other words, evaluation of radiation exposures from the Dresden plants must be considered in relation to the MFRP releases. Because of their proximity and the prevailing winds, the LaSalle plants under construction might also contribute radiation exposure to people in the Morris-Channahon area, but they are likely to be small and will not be considered further in this discussion.

The second point of importance is to put the health significance in perspective. My evaluation of the cancer risks from whole body radiation exposure is that lifetime exposure to 1000 mrem per year would increase the cancer risk to the individual

by 4% to 20%. The range expressed in these figures is principally due to our uncertainty in the degree to which the risk is lessened by having the radiation exposure stretched out over long periods of time, but it also includes such factors as whether the individual smokes cigarettes or not. Now I would not consider this an acceptable risk from environmental contamination, nor does the AEC, since the maximum individual exposure permitted under current regulations is 500 mrem per year. On the basis of the linear hypothesis, a lifetime exposure to 1 mrem per year would increase the cancer risk to the individual by 0.004% to 0.02%. I personally consider such small additional risks are negligible, and I believe that any reasonable person should agree. The problem arises when exposures are between these two extremes, one acceptable and the other clearly not acceptable. At 10 mrem per year, the added cancer risk is 0.04% to .2%. In this range it is a matter of judgment what constitutes an acceptable risk, and I personally believe that the risk at 10 mrem per year is acceptable, but not the risk at 100 mrem per year. Cancer is too devastating a disease, and even a 1 to 2% increased risk that can be avoided should be, when that risk is not incurred for the direct benefit of the individual himself.

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5. The exposure data, from Dresden I, II and III that I have available is based on the U.S.P.H.S. survey of Dresden I done in 1968, and discharge data provided by Commonwealth Edison for 1969 and previous years. My calculations indicate that in 1968 the ratio for exposure at about 1 mile in the northeast direction, to power produced is 0.2 to 0.3 mrem per year per MWe. In 1969 the noble gases released were three times greater, even though the electric output was not much higher. For 1969, therefore I estimate the above ratio to be 0.4 to 0.7 mrem per year per MWe.

The uncertainty in the correct figure lies as much in the uncertainties in actual releases as it does in the lack of meteorological data. In 1968, Kahn and associates had no actual meteorological data for Dresden and used Argonne National Lab data instead. Their studies also showed that actual releases at the stack were about 50% higher than were reported by the Company from off-gas delay line measurements in the plant, and in addition that the mixture of xenon and krypton isotopes varied considerably from day to day. Finally the sharp rise in radioactivity in 1969 has been ascribed to greater leakage from new fuel rods inserted during refuelling at that time.

I conclude that under the most up-to-date conditions, with a stack height of 90 meters, the Dresden plants should produce from noble gas discharges a radiation dose at one mile of 0.4 mrem per year per MWe, but there is a factor of nearly two uncertainty in either direction (higher or lower). Extrapolation if this figure to the three reactors can be done by assuming the same stack height and comparable operative conditions. The total capacity of Dresden I, II and III is about 1900 MWe, and on the assumption of operation at 90% of capacity the power generated would be 1700 MWe per year. Thus I estimate that at this load the dose to people at one mile to the northeast would be about 680 mrem per year. On the basis of projections of the Oak Ridge National Laboratory for dispersion in the plume, the dose at Channahon would be about half, or 390 mrem per year, and at 20 km, (Joliet), about one-twelfth, or about 55 mrem per year still an unacceptable exposure in my opinion. In short, in my opinion, even without the addition of MFRP, the radiation exposure is already excessive in the vicinity of the reactors, affecting people not only to the northeast but also in other directions where the wind direction commonly blows. To meet what I believe are currently acceptable standards of radiation exposure to the general

public, the releases of noble gases should be substantially reduced, by retrofitting for longer gas containment times (currently being done for Dresden II and III) or reducing the power levels. It is clear that the decision to locate the MFRP adjacent to these large reactors was a great mistake,

6. The radiation exposures from MFRP are more difficult to assess, since with a few exceptions, such as krypton, the amount of various isotopes actually released from this process are not known, especially over long periods of operation. I agree with Dr. Whipple and with the Company's Environmental Report that the skin dose from krypton-85 releases is not likely to be great, although on meteorological grounds I assign greater uncertainty than they imply. The risk of cancer from skin irradiation is not known at this time with any certainty for man, particularly in relationship to synergistic action of ionizing and ultraviolet radiation on the skin. For the other isotopes handled at MFRP, there is inadequate basis presented by the Company to determine the amounts and the health significance of the expected releases.

Tritium has been discussed at considerable length by Dr. Cronkite, and it is significant that his estimates of the dose from this isotope differ somewhat from those of the Company's representatives. There are some areas of disagreement between my analysis and that of Dr. Cronkite concerning the tritium hazard, which I believe are somewhat greater than he has indicated, but they are less important than the fact that the tritium distribution pattern is so poorly known for discharges of this magnitude as tritiated water vapor. The only comparable experience with tritiated water vapor releases has been at Savannah River, and unfortunately the data available there are inconclusive because a substantial part of the tritium has been directly discharged

as a liquid. It is apparent that extensive determinations of tritium in the environs will have to be undertaken if the plant begins operating.

I shall mention only a few of the other isotopes which may add to the above exposures. Iodine 129 containment will be important, because it is now known that this long-lived isotope has accumulated in the vicinity of the West Valley, New York plant and therefore will build up progressively as long as the plant operates. Iodine containment systems 99.9% effective have been described and the Company should supply the appropriate data. The Special Studies Group of the Environmental Protection Agency, using this containment figure, has estimated that the thyroid dose from iodine isotopes from a MFRP type of plant at two miles would be about 25 mrem per year, half from I129 and half from I131. To these thyroid doses are added those from whole body irradiation, tritium and other internal emitters.

If containment techniques are as effective as hoped for the MFRP, isotopes such as cerium, strontium and cesium should not constitute a significant health problem, but again it is worth emphasizing two points. First, the region will have to be monitored to detect if releases are present, and, second, an accidental release could result in rapid dissemination of large amounts of these and other nuclides, in concentrations that could be important.

7. An important special problem at MFRP is containment of the alpha-emitting elements plutonium and the heavy actinides americium and curium. In order to meet the design specification for non-volatile alpha-emitting elements, containment of all but about 1×10^{-7} of the elements processed will have to be achieved, that is, the containment systems will have to prevent any more than one-tenth part per million of the fuel processed from escaping.

Whether the commercial operations can achieve this result with this technology is not clear, but such a high degree of containment is not assumed by the authors of ORNL Report No. 4451, "Siting of Fuel Reprocessing Plants and Waste Management Facilities."

The problem from these elements is that they become entrained in evaporated droplet nuclei, adsorbed on larger particles and when released will attach to soil and other particles. Since nearly all have long physical half-lives, they will accumulate in the vicinity and may be inhaled as radioactive particles. In the soluble form, the analysis of the Special Studies Group indicates that the dose to the respiratory lymph nodes from an MFRP type plant could be 420 mrem for a year's exposure at two miles (dose delivered over 50 years). I am also concerned with inhalation of insoluble forms that "hot" particles may irradiate bronchial epithelium with high local doses. Under these conditions a few particles may deliver relatively high doses from the highly effective alpha radiation. There are no data that will permit estimates of risk from this source but it is known from Rocky Flats data that local recycling in dust occurs. It is significant that the extent of local contamination from plutonium at the Rocky Flats plant was largely unknown until local groups investigated this problem on their own after the Rocky Flats fire.

8. The MFRP will calcine high level wastes and store them as solids under water in tanks on site. It is known that similar tanks holding liquid wastes at Hanford and at Savannah River have cracked and released radioactivity into the ground. There is no statement by the Company of the levels of activity in the liquid expected in these tanks. Such data should be supplied along with test evidence on which they conclude that cracking of the high level waste tanks will not occur.

9. To summarize exposures from MFRP to the population in the region of the plant, a number of tissues (skin, thyroid, lung tissues) can be expected to accumulate significant radiation doses (10 to 100 mrem per year, and "hot spot" doses from alpha emitters of unknown extent). In contrast to the Dresden exposures which are to the whole body, these doses are not strictly additive but because of the radiosensitivity to cancer of the thyroid and lung, they can be considered partially so. The Board should recognize that the uncertainties in these doses are very great, and the estimates could be off by as much as a factor of 10 in either direction.

10. In view of the inevitability of construction of MFRP and the importance of monitoring its effluents by an independent agency, I recommend that a surcharge per ton of fuel processed be paid by the Company to the State, the funds to be used to obtain equipment and personnel to provide radiological surveillance of this plant. In this way, those other areas of the country benefitting from this plant will help pay for assuring the safety of the citizens of Illinois living in the vicinity of the plant.

/s/ _____
Edward F. Radford, M.D.

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