Citizens Against Nuclear Power

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July 23, 1980

Director, Division of Licensing
U.S. NRC
Washington DC 20555

RE: Docket No 50-10

Dear Director:

Contained herein is CANP's "Comments" on NUREG-0686, the draft EIS done for the proposed chemical decrudding of the Dresden One reactor.

It has been brought to my attention this morning as we prepared to mail this document to you, that the date by which all comments on NUREG-0686 were to have been received to ensure that they would be taken into consideration during the preparation of the final EIS, was July 21, 1980. CANP was ignorant of this requirement, as the copy of NUREG-0686 which we were sent by Jan Strasma of the Region III NRC office, was blank where the date was to have been printed (the page on which the "Abstract" appears).

Since you should receive this document only 3 days after the July 21 deadline, and since the copy of NUREG-0686 we received was silent on the exact deadline, CANP strongly requests that you do everything in your power to ensure that the enclosed document is indeed taken into consideration in the process of preparing the final EIS.

For a nuclear-free future,

Edward Gogol

Edward Gogol, Coordinator

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COMMENTS on the

DRAFT ENVIRONMENTAL STATEMENT

REGARDING THE PROPOSED

REMOVAL OF RADIOACTIVE "CRUD"

FROM THE INTERIOR OF THE

DRESDEN ONE REACTOR

DOCKET NO. 50-10

July 21, 1980

CITIZENS AGAINST NUCLEAR POWER

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By: Edward Gogol
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The document NUREG-0686, entitled "Draft Environmental Statement related to Primary Cooling System Chemical Decontamination at Dresden Nuclear Power Station Unit No. 1", is extremely inadequate, wrong in several important respects, and unsubstantiated in the majority of its conclusions. As such, it fails to adequately fulfill the U.S. Nuclear Regulatory Commission's statutory responsibilities under both the National Environmental Policy Act and the NRC's own legislative mandate to protect the public health and safety.

I. Concerning how much radioactivity is deposited on the interior surfaces of the reactor, and of which nuclides the radioactivity is composed

Any evaluation of the public health and environmental consequences of the proposed Dresden One "decrudding" must begin with an estimate of how much insoluble radioactivity there is on the surfaces interior to the primary coolant boundary, of what nuclides this material is composed, and in what proportions. NUREG-0686 provides such "information" as Table 1 on page 2-2. However, no information whatsoever is given concerning the means of arriving at this "estimate". Until the full details of how this "estimate" was made are made public, there will be no way of determining its correctness.

Table 1 by itself is sorely lacking since it provides no information on the composition of what it terms "mixed fission products". Since it is generally assumed that the more radiotoxic and environmentally mobile fission products (such as isotopes of strontium and cesium) are present in "mixed fission products", failure to provide any information on the proportions of such nuclides in "mixed fission products" is a major flaw.

The main body of NUREG-0686 is totally lacking in information concerning the presence of transuranic radionuclides in the "crud". This constitutes a major flaw. This question is only addressed in the response to Question 4a of Ms. Kay Drey's petition dated March 19, 1979, in which it is stated that "no fissile material is expected in the decontamination waste"; and in the response to Question 3 of the Illinois Safe Energy Alliance's (ISEA's) Sept. 20, 1979, petition, in which it is stated that "the presence of transuranic elements in levels in excess of 10 nanocuries per gram is definitely not expected based upon measurements of the transuranic content of the corrosion product film observed on artifacts and samples removed from the Dresden Unit No. 1 primary system and other boiling water reactors." The actual results of such tests are nowhere given in NUREG-0686; indeed, the documents in which such tests are reported are not even attributed! No explanation is given for the 10 nCi/g figure, although NUREG-0686 seems to imply that as long as the concentration of transuranics remains below that figure, transuranics may be dismissed as insignificant. No justification is given for this implication. Furthermore, no breakdown by radionuclide is given for the up to 10 nCi/g figure which NUREG-0686 seems to imply may be expected in the radioactive waste. And if up to 10 nCi/g of transuranics may be present in the decontamination waste, there is simply no justification for not listing the total amount of transuranics expected to be present in Table 1 of the main body of NUREG-0686.

The presence of transuranics is not an idle question, since it is well known that during the first few years of operation of Dresden One, "the world's first privately financed, full-scale, commercial, nuclear power reactor," there were significant problems with leaking fuel elements. Therefore, it is quite possible that insoluble plutonium oxide is a component of the radioactive "crud".

II. Concerning Whether the Radioactive Waste produced by the "Decrudding" Will Be Successfully Solidified and Packaged

NUREG-0686 alleges on p. 3-1 that "the concentrated waste solution will be solidified in 55-gallon drums using a process developed by the Dow Chemical Company for the solidification of low-level radioactive wastes. This solidification process has been tested on the NS-1 solvent and produced a solid waste form that contained no free liquids. The waste solidification procedures include a quality control process test on each barrel of waste to provide additional assurance that the liquid waste has been properly solidified." Likewise, on the unnumbered page following page 4-7 (which I shall denote as p. 4-8) NUREG-0686 states that "solidification tests with spent radioactive decontamination solvent obtained from the actual decontamination of a Dresden Unit 1 test loop has (sic) been performed. The decontamination solvent was then solidified using the Dow system. Samples of the solidified waste indicated no free-standing liquid." This question is further addressed in the top paragraph of the second following page (designated herein as p. 4-10), which discusses "further assurances that the product will not contain free standing liquid."

The arguments given in the above-quote passages do not substantiate NUREG-0686's conclusion that the decontamination waste will be successfully solidified. Furthermore, what "facts" are given to support this conclusion are not documented. Specifically:

* The passage on p. 3-1 merely states that the "solidification process has been tested on the NS-1 solvent and produced a solid waste form that contained no free liquids." No details whatsoever are given on these tests, or on the "quality control process" referred to in the following sentence. No document which describes these "tests" and "quality control process" is referred to, let alone attributed.

* The passage on p. 4-8 merely states that samples of the waste produced by flushing the Dresden 1 test loop with Dow solvent NS-1 "indicated no free standing liquid." No details are given on this experiment, nor is any document which describes this experiment referred to or attributed. Especially important and completely missing are details on the number of such "samples" taken and the process involved; without such information, no assessment of the adequacy of such samples to detect unsolidified material can be made. Furthermore, the use of the terms "free liquid" and "free standing liquid", without any further definition, is troubling: would a sponge saturated with water be considered by the NRC to contain no "free liquid"?

(This persistent practice of making undocumented, unsubstantiated claims is extremely poor science. And the NRC staff's seeming inability to abide by the rules of grammar, not to mention the lack of a consistent page numbering system, would likely result in NUREG-0686's failure to receive a passing grade from even a high-school English teacher!)

* The paragraph at the top of p. 4-10 likewise gives no information on the Brookhaven laboratory tests, and no document in which these tests are reported is attributed. The Dow Topical Report DNS-RSS-001-P is not available to the public, and hence NRC's "reference" to it is of no value in assessing whether or not the "system design and quality control checks" will actually provide "further assurances that the final product will not contain free standing liquid". The continued use of the term "free standing liquid" is troubling: either the stuff is solid or it isn't. The mere referral to "in process sample verification during the production runs" offers no assurances that such "sample verification" will be adequate to detect unsolidified material. And "full scale qualification tests using simulated wastes" are not the real thing; the behavior of the decontamination waste which actually contains a large quantity of toxic radionuclides may be entirely different from that of "simulated wastes."

This question is discussed again in Appendix A. In NRC's response to Question 3 of Ms. Drey's petition, it is alleged, "Radioactive corrosion products, bonded with the Dow Chemical solvent, have been tested to remain free of water after being solidified by the Dow Chemical polymer process since 1974." The response to Question 3b continues that "the first solidified sample of prototype test has remained free of liquid since 1974 when the test was made...Tests have been performed to demonstrate that the stability of the solid polymer will not substantially alter for over 50 years", such tests including "accelerated aging, biological degradation, radiation degradation and temperature cycling." The same claims are made in the response to Question 5 in the ISEA petition.

Nowhere are any details given concerning any such "tests", nor is any document which describes such "tests" attributed. It should be obvious that one sample of solidified waste remaining solid since 1974 (approximately 6 years) is hardly adequate to demonstrate that the large quantity of waste which will result from the proposed Dresden "decrudding" will remain solid for even that long. And it is extremely unscientific to assert that any "tests" can demonstrate that "the stability of the solid polymer will not substantially alter for over 50 years": the only way any test can demonstrate such a thing is if such test were to last 50 years. In any event, until the exact chemical formula of Dow solvent NS-1 and the exact chemistry of the solidification process and final product are disclosed, any statement that "the stability of the solid polymer will not substantially alter" will be meaningless, since without such information there is no way to determine what chemical reactions the "solidified" waste will be subject to.

III. Concerning whether a place will be found to dispose of the barrels of decontamination waste, and whether the chelant-bound radionuclides in the decontamination waste will not leach out and become environmentally mobile

NUREG-0686 alleges on p. 3-1 that "all decontamination waste will be shipped to a commercial low level waste disposal site located at Hanford, Washington or Beatty, Nevada." This claim is repeated on the un-numbered page on which Section 4.2.3 begins. The answer to Question 2 of Ms. Drey's petition states, "Commonwealth Edison... has agreed to dispose of the Dresden 1 solidified waste at either Beatty, Nevada or Hanford, Washington commercial low level waste burial sites." The answer to Question 3 of the ISEA petition alleges that "the presence of transuranic elements in excess of 10 nanocuries per gram is definitely not expected", but that if such presence is detected, "the waste will not remain at Dresden "forever". The waste would be disposed of at a waste depository operated by the U.S. Government which is authorized to dispose of transuranic waste."

As recently as less than one year ago, there have been episodes which have been widely described as "crises in low-level nuclear waste management," during which no commercial "low-level" nuclear waste burial grounds were accepting shipments of such waste, especially from Commonwealth Edison. No assurances whatsoever are given in NUREG-0686 that this condition will not recur. NUREG-0686 offers no guarantees that the decontamination waste produced by the Dresden One "decrudding" will be accepted for burial by either the Beatty or Hanford commercial nuclear waste disposal sites. In the absence of such assurances and guarantees, it is entirely possible that the barrels of decontamination waste will remain at Dresden for an indefinite future time period, or that it will be buried at a site with unfavorable geological and hydrological characteristics. The exact same conclusion can be made concerning the bald, unsubstantiated assertion that if the waste turns out to contain transuranics in excess of 10 nCi/g it would be "disposed of" at a U.S. government operated transuranic waste "depository". What depository? Is there anything anywhere to guarantee that such will be the case? If there is, it cannot be found in NUREG-0686.

Regardless of the ultimate fate of the barrels of decontamination waste, there is nothing in NUREG-0686 to indicate that in the presence of water (quite a likelihood if the waste is not disposed of at Beatty or Hanford) the chelant-bound radionuclides will not leach out and become environmentally mobile. Indeed, in the answer to Question 2 of Ms. Drey's petition, we read that, "We do not have field or laboratory tests which quantify the migration potential of radionuclides associated with Dow solvent, assuming that some escapes from solidified waste and into the soils of the disposal site." And in the response to Question 3c we read that, "We do not know the leach rate of Dow polymer under burial conditions...There is not as yet any test which can simulate leaching under burial conditions."

This question of whether the chelant-bound radionuclides in the "decrudding" waste will become environmentally mobile is so crucial

to any assessment of the environmental impact of the proposed "decrudding", that there can be no justification for anything less than a full disclosure of the chemical formulae of all components of the Dow NS-1 solvent and the full chemical details of the solidification process. Without such disclosure, any attempt to determine the potential for the chelant-bound radionuclides to become environmentally mobile, is critically handicapped.

The NRC alleges that any such disclosure, full or otherwise, cannot be done because the Dow solvent and solidification process are "proprietary." If that is indeed the reason, then the Dow Chemical Co. should patent their solvent and solidification process. This would allow full protection of Dow's proprietary rights while affording vastly greater protection of the public health and safety.

IV. Concerning whether the process will result in any radionuclides dissolved by the decontamination solvent being released to environment around Dresden

NUREG-0686 states that the decontamination solvent and first wash will be evaporated and that the resulting 180,000 gallons of distillate from evaporator "will be sampled and sent to the existing plant holdup system or will be polished through the demineralizer before being stored for plant reuse." The main body of NUREG-0686 contains no further information on this. However, in the answer to Question 3d of Ms. Drey's petition it is alleged that, "At the evaporation temperature, the chelating agent portion of the solvent is not volatile except for ammonia and organic compound components. Carryover of chelated radionuclides entrained in the vapor mist is an insigificantly small fraction. This carryover will be further reduced as the spent solvent is further processed by a mixed-bed demineralizer which has been tested to be effective in removing chelated radionuclides." The answer to Question 5a. further alleges that, "the amount of chelating agent in the second or third rinse should be minimal. The first rinse will be processed through the evaporator. No significant amount of chelating agent should be present in the distillate. Additional treatment by demineralizer of the distillate and/or subsequent rinses may be performed if necessary. The licensee's tests indicate that the demineralizer is effective in removing radioactive metals bonded by the chelating agent." And in the answer to Question 5b we read that, "no liquid waste, including water from all the rinses, from the decontamination operation will be discharged into the river."

NUREG-0686 contains no justification whatever for its assertion that the carryover of chelant-bound radionuclides during the evaporation step is "insignificant", nor does it contain any definition of just how much carryover would not be considered "insignificant". No specific tests are mentioned to justify any such conclusion, nor is any document which describes such tests attributed. Likewise, no document is attributed which describes the tests performed by Commonwealth Edison which are alleged to show that the demineralizer is effective at removing chelant-bound radioactivity from the distillate. In the absence of any such documentation, there is no reason not to expect that substantial radioactivity from the decontamination will end up in water which is to be used in the operation of Dresden One. If so, a fraction of such radioactivity will be released to the Illinois

River through the same mechanisms as result in Dresden One releasing any radioactivity to the river. In any event, there is no justification in NUREG-0686 for the claim that the Dresden One "decrudding" will not result in an increased load of radiation to the Illinois River.

V. Concerning Whether the decontamination process will weaken or corrode critical plant components, leading to increased risk of dangerous nuclear accidents

On the unnumbered page on which Section 5.3 is printed, NUREG-0686 states that the NRC staff has concluded that, "the use of NS-1 solvent will not result in excessive corrosion of the materials of construction." No further discussion of this can be found in the main body of NUREG-0686. However in the response to Question 1 of the ISEA petition, it is alleged that:

> "All primary cooling system materials that will be in contact with NS-1 have been tested extensively to assure that the integrity of the primary cooling system will not be degraded by the cleaning. The corrosion research program covered several thousand individual corrosion tests of all the basic Dresden Unit No. 1 primary cooling system materials that will be exposed to the solvent under conditions of time and temperature exceeding those proposed for the actual decontamination.
>
> "Based on the staff's review of the tests carried out by CECo, we have concluded that the plant materials will not be significantly damaged by the decontamination solution...In addition, pilot-scale projects utilizing NS-1...have provided assurance that full-scale operations utilizing NS-1 will produce similar results to the laboratory scale experiments.
>
> "The inspection program that will be carried out by CECo after the cleaning will be used to determine whether the decontamination has caused the structural integrity of the primary cooling system to be degraded."

Nowhere in NUREG-0686 are the documents attributed which describe these various laboratory and pilot-scale tests and their specific results. Thus there is no way to determine if these tests actually yielded the results claimed.

Similarly, no documents are attributed which describe in depth Commonwealth Edison's proposed post-cleaning inspection program, and NUREG-0686 is silent on this. Without knowing the details of this program, it is impossible to determine the efficacy of the proposed inspection program to detect primary cooling system structural degradation. One especially important thing which NUREG-0686 does not make clear is the extent to which radiography will be used as part of the post-cleaning inspection program. Without radiography, it is doubtful that primary cooling system structural degradation can be detected, since such degradation will occur from the inside out.

This is not an unimportant question. Undetected degradation of the structural integrity of the primary cooling system can easily lead to severe accidents when and if the reactor is put back into operation, up to and including total meltdowns of the reactor core. It is therefore extremely unsettling to find NUREG-0686 so deficient in this respect.

The importance of this question is yet another reason why full disclosure of the chemical formulae of the components of Dow solvent NS-1 is essential. Without such disclosure there will be no way to tell whether the claimed results of the various corrosion tests are plausible.

VI. Concerning whether the proposed "decrudding" process is experimental

The response to Question 3a of Ms. Drey's petition states that "The Dresden decontamination is not an experiment, it represents the application of a proven method of decontamination that has been specifically developed and tested before being used on the Dresden Unit 1 primary cooling system."

It is difficult to see how the proposed Dresden "decrudding" cannot be considered an experiment. True, a variety of laboratory and pilot-scale tests may have been carried out; however, this is no guarantee that the results obtained under full-scale conditions will not be quite different. Dresden One is the first large commercial power reactor to be "decrudded"; thus the "decrudding" can only be considered an experiment to see what will happen when such a reactor is "decrudded" using Dow solvent NS-1. The phobic reluctance of the parties involved (the NRC, CECo, and Dow) to disclose the chemical formulae of the components of the solvent can only fuel the public fear that it is we, the public, who are being experimented on. And the NRC admits that, "We do not know the leach rate of Dow polymer under burial conditions...There is not as yet any test which can simulate leaching under burial conditions."

VII. Concerning whether the occupational radiation exposure incurred by the "decrudding" has been and will be as low as claimed

NUREG-0686 alleges on p. 4-3 that "with over 90% of the pre-decontamination installation completed, the occupational exposure expended was kept to about 200 man-rem," and on p. 4-4 that "the estimated total occupational dose for the entire decontamination procedure is about 300 man-rem."

Nowhere in NUREG-0686 is the specific means by which these estimates have been arrived at described, nor are any documents attributed which contain any such detailed estimates.

VIII. Concerning whether all alternatives have been considered, and the best alternative chosen

Section V of NUREG-0686 clearly has not considered all possible alternatives. One alternative not considered is to carry out the proposed decontamination, but only after a delay of some years from now,

for example 5 to 10 years. This would have the advantage that the total quantity of radioactivity to be removed would be dramatically decreased, especially if the components of the radioactivity in the "crud" are as described in Table 1.

NUREG-0686 has not demonstrated that both the above alternative and the alternative of shutting the reactor down permanently are inferior to the chosen "chemical decontamination using NS-1" alternative. The only argument advanced for chemical decontamination as opposed to keeping the reactor shut either temporarily or permanently is an economic one: viz., the need to purchase replacement power. This argument is not valid because Commonwealth Edison has a large excess of generating capacity above and beyond needed reserve. Thus keeping Dresden One shut will have no effect on Com Ed's need to purchase power.

A permanent or temporary "mothballing" of Dresden One would result in drastically lower occupational radiation exposure than would any course of action which involves re-opening the reactor. Thus it cannot be argued that the chemical "decrudding" of Dresden One will result in keeping occupational radiation exposures ALARA, since a permanent or temporary shutdown of Dresden One is a quite reasonable alternative.

When the economic effects of accidents that may result from structural degradation of Dresden One's primary cooling system, or of human disease and death that may result from a large quantity of chelant-bound radioactivity becoming environmentally mobile in the Dresden vicinity, are considered, it becomes clear that if the NRC allows the proposed "decrudding" to go forward, the costs of doing the "decrudding" are likely to be much higher than the true costs of shutting down the Dresden One reactor permanently.

Conclusion

This document has demonstrated that there is no justification whatever contained in NUREG-0686 for that document's conclusion that there will be no significant environmental impact associated with the proposed "decrudding" of Dresden One and that the chemical "decrudding" using solvent NS-1 is the best possible alternative.

The potentially extreme hazard associated with the proposed "decrudding" and the experimental nature of the operation necessitate the fullest possible public disclosure of all details of the proposed "decrudding". Especially important for disclosure are the chemical formulae of the NS-1 solvent and the chemical details of the solidification process. Without this information it is impossible to properly assess the true environmental impact of the proposed "decrudding". There can be no justification for anything less than such full disclosure.

The potentially extreme hazard associated with the proposed "decrudding" and the experimental nature of the operation likewise necessitate the removal of the ultimate decision-making power

concerning the proposed "decrudding" from the NRC staff. The public health and safety can only benefit from the appointment of an Atomic Safety and Licensing Board to make this decision, and from full public hearings and the adversary process that will thereby result.