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March 10, 1994

Mr. Samuel J. Chilk
Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Attention: Docketing and Service Branch

Dear Mr. Chilk,

Following are the Nuclear Information and Resource Service comments on the "Draft Radiological Criteria for Decommissioning." Thank you for the opportunity to read and comment early in the development of this rule.

We recognize the efforts of the Commission to seek in-put from a diverse range of interests as a welcome departure from the dominant "culture" of the agency. We hope that this trend will grow.

Sincerely,

Mary Olson
Radioactive Waste Project

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Comments On the NRC Staff Draft Radiological Criteria for Decommissioning Product of the Enhanced Rulemaking on Residual Radioactivity (ERORR) (10 CFR Part 20)

Mary Olson, Radioactive Waste Project
Nuclear Information and Resource Service

• Introduction & Summary

The Nuclear Regulatory Commission is setting end-point standards for the clean-up and license termination of nuclear facilities nationwide. The standard will encompass all NRC licensees from nuclear laundry services to research labs to nuclear power plants. Via the Agreement State programs, the standard will affect all private-sector licenses, totaling in the tens of thousands and located in every state in the US.

The issue is whether these sites will be cleaned up fully, or whether they will be released for public use with radioactivity remaining on the site once it is deregulated. The NRC as a regulatory agency for commercial nuclear activities is brokering public health policy. Citizens and public interest organizations have consistently called for the return of sites to background levels prior to release of the licensee, and opening public access to the site. The question becomes whether it is OK to leave a radioactive mess behind relieving the licensee of liability and responsibility.

The Staff Draft Radiological Criteria for Decommissioning (staff draft) provides a three-part standard. First: a non-binding goal to return sites to levels of radiation indistinguishable from background, which the staff defines as 3 millirems a year to those who would live or work on the site. Given the non-binding status of the goal, the staff offers a regulatory limit for unrestricted release of these same sites of 15 millirems a year to those who live or work on the site. NRC's projections for radiation induced fatal cancer from 15 millirems annual exposure is 1 in 2000. The staff draft also provides options for licensees that will not meet this the 15 millirem standard. 'Restricted release' is a loosely defined category that would allow a site to become unlicensed even though it might expose people to up to 100 millirems a year. This level would be an effective doubling of background on these sites, with a projected deathrate of 1 in 285.

These levels and this approach are not acceptable. 1 one death in every 285 people is not acceptable. In allowing ANY residual radioactivity above background after clean-up, the Rule would effectively preauthorize future contamination. There is also the concern that any level of residual radioactivity above background will become the basis for other deregulation of radioactive wastes, materials and practices as was attempted in the outlawed BRC (Below

Regulatory Concern) Policies. It is obvious that protective radiation regulation should prevent pollution, not promote it.

In a first step towards preventive measures the draft does institute a new requirement for license applications and license amendments. The applicant is required to state how they will minimize contamination and waste generation. This is an important first step, which should be matched by rigor in the regulation, and an ability to enforce pollution prevention measures.

The staff draft also makes a first effort at incorporation of site-specific public participation in the decision making about these contaminated sites. This is a good step, however, it needs to come early in the process of all site clean-ups, not only those which are problem cases. Site Specific Advisory Boards should be convened by a party independent of the licensee, and should advise the Commission in decision making concerning the site, as well as giving the licensee advice about the decommissioning processes.

Comments

- **The requirement of Site Specific Advisory Boards (SSAB) is a significant and positive feature of the draft rule. An SSAB should be established for every site that requires a decommissioning plan, and they should be independently convened to advise both the Commission and the licensee. This is a contribution towards a true "finality" of clean-up, which depends upon true public acceptance.**

It is absolutely vital that local communities be involved with and have a voice in decisions regarding the mitigation and clean-up of contaminated sites. We applaud the draft's codification of Site Specific Advisory Boards. This would be a significant change in the Commission's history of seeming indifference to local communities. However, we believe that the concept needs revision, to give it a better chance of being effective. An SSAB should be convened for every site clean-up. While the licensee should support and fund the SSAB, the body should be convened by an independent agent. SSABs should advise both the licensee and the Commission in decisions concerning the site.

The reason that ALL sites should have an SSAB is to insure that not only the clean-up job is done well, but that the public is satisfied and confident of this. Industry has recurrent concerns about whether they will be required to revisit a site. The very best insurance to prevent this is not only to do the job right the first time, but also to involve the community of concerned and affected individuals, the first time. The licensee should provide support not only for administrative needs but also for the SSAB to retain credible, independent verification that the job has been well done.

- **Communities already involved in site clean-up should define the role and guidelines for operating procedures of the Site Specific Advisory Boards.**

We support the model that people who are already affected by contaminated sites and the clean-up process should be involved in designing workable, effective and meaningful mechanisms for the SSAB to do its job. The NRC should sponsor a conference bringing together a group from across the country currently living with site clean-ups. These people should be representative of the constituents for the SSAB. The purpose of the meeting would be to gather information about

what works, what is needed, and what lessons have been learned. It might be useful to pull in people gaining experience through the Department of Energy site remediation efforts in public participation and SSABs. We hope that the SSABs will also look at ways to communicate with the broader community to insure an open, inclusive and representational body rather than exclusive, private advisory process.

- **SSABs should have access to ALL documents pertaining to the site, previous and current operations and any other information deemed relevant.**

In order to give meaningful and credible advice to the Commission and the licensee, the SSAB must have access to ALL documents and data pertaining to the full operating history at that site and any other information that they deem relevant. Virtually all the data pertaining to the site and operations should enter the public record at the onset of planning for decommissioning.

- **Public participation is not the same thing as "stake-holder" forums.**

The SSAB should "look like" the community it is intended to represent. There must be a greater number of members of the public than industry interests, just as there is a greater number of non-industry-affiliated individuals in most communities. Direct financial ties to the clean-up or the licensee should be viewed as an unethical conflict of interest. After all, the licensee itself represents these interests already.

- **We support the NRC Staff's intention to return contaminated sites to levels of radiation that are indistinguishable from background radiation. However, this intention should be elevated to a commitment and used as the criteria for release of the site. There is no safe dose of radiation, so there is no acceptable dose above background without individual, voluntary, informed consent--zero release of radioactivity.**

A supporting document summarizing current NRC criteria for decommissioning states:

"Implementation of residual contamination criteria is dependent upon the establishment of acceptable dose or risk criterion for unrestricted use of nuclear facilities."

The word 'acceptable' contains another ingredient necessary for successful implementation of such a standard--public acceptance. The NRC set out in this enhanced rulemaking to hear from the public on these issues. The record reflects that they heard in every ERORR workshop that was held, that the public does not accept ANY increased dose or risk over background. The NRC staff heard in the workshops that there is a difference between informed consent to exposures from medical treatment and diagnosis, and exposures that are completely unknown, unwitting and unasked for. As a recent commentator has said: "What do you call it when you poison one person? Answer: Murder." Incomplete clean-up of contaminated sites opens the door to this situation for whole communities, now and in future generations.

There is no safe dose of radiation. Scores of technical and government documents can be cited which state that there is no threshold --no level of radiation exposure that can be deemed "safe." The biological basis for this is that radiation causes damage at the cellular level. Damaged cells have the potential to contribute to many health impacts and may cause genetic damage as well. There is growing evidence from the study of affected populations that in fact, low-doses of

radiation produce a higher health impact per unit of exposure than do higher, more acute exposures. Ongoing study of the impact of alpha radiation also suggests that the long term effects of internalization of alpha particles may be grossly underestimated. The current models used by the NRC and various expert organizations and agencies to calculate "dose" and to project "risk" or forecast health effects do not reflect this information.

Therefore, the voice that the NRC Staff have heard consistently from the public calls for a return of any licensed site to previous existing, naturally occurring background levels prior to release. Further, the position was stated again and again that the licensee should not be released from liability until the site is restored. Even then, some have said that there should be a fund to insure continued monitoring and provide for remediation should unforeseen complications occur.

The Staff's stated goal of returning the site to levels that are indistinguishable from background is a goal that we share. However, unless the goal is also the limit, the situation results that radioactivity is left behind at levels above background, and this is not acceptable for the release of these radiation zones. Further, the attainment of the goal must be verifiable. The standard must be set in terms of parameters that can be measured directly-- such as concentrations. Reliance on models gives no assurance that the situation conforms to the model's projections unless the site is carefully surveyed directly anyway. Millirems are completely unverifiable. Returning the site to background levels of radioactivity should be the criteria for release, not a non-binding "goal."

- **Use of Superfund risk level as the regulatory basis for 3 millirems a year is not justifiable.**

The staff draft compares their proposed 3 millirem goal for clean-up to the risk associated with released sites from the Superfund program. They site a risk of fatal cancer from annual exposure to 3 millirems of 1 in 10,000. This rate is not acceptable, nor are the situations comparable. In other arenas, even one death in a million is debated as to whether it is acceptable when the results of an institutional activity. Superfund levels are the result of dealing with catastrophic sites. To codify a standard which preauthorizes the level of risk and contamination that the legacy of Superfund has given this society is not a responsible, or protective measure.

- **Draft rule would open the door to the permanent sacrifice of sites, but also offers a first step towards pollution prevention.**

If it was known when an application for a nuclear license came into a community that the site would never be restored to its original condition, how many communities would support that new license? There are currently 24,000 licensees in the U.S. Damage to the land and water-- universal resources-- at even a fraction of these locations is not trivial.

Additionally, license extension of nuclear power plants is an issue of concern in terms of further contamination of sites and regions from extended operations. What is the justification for continuing to add to these pernicious problems through extending operations, while at the same time creating a standard that is about insuring that sites are cleaned up to acceptable levels?

We applaud the staff for taking a step towards the minimization of contamination in the future, as well as radioactive waste generation, both in the case of new licensees and in the case of license

amendments of existing operations. The fact that this section is included in the draft rule is evidence that the staff heard the voice of the public, raising concerns on this point. It is also in the long run to the benefit of industry to avoid the costs of a stringent clean-up requirement, by simply not making the mess in the first place. We hope that these provisions will eventually have real teeth. Examples of improvements would include the NRC requiring demonstration that the same goods and services could not be provided via non-radioactive alternatives before such licenses and license amendments are granted. This should be extended to the area of license renewal and extension of nuclear power plants and fuel cycle facilities as well. There should be provisions for enforcement if the operations do not conform to their stated plans. Monitoring of performance and compliance in the areas of contamination prevention and waste minimization should occur prior to decommissioning. Prohibition on the contamination of ground water should be specifically included.

- **Radiation standards should be protective of everyday, real people (not computer models) and must be enforceable. 15 millirems is not protective, millirems are not the basis for an enforceable standard.**

It is difficult to comment on a standard in millirems since it is not at all clear from the draft rule how these doses would be calculated, what primary measurements they rest upon and what assumptions are made. We disagree with a linear dose-response relationship. We also disagree with using the Standard Man assumption, and we think that special attention should be paid to high-LET exposures that are often not even factored at all. For all of these reasons, returning the site to background levels of radioactivity as the regulatory limit is actually far simpler.

The proposed 15 mr per year exposure limit that would define "unrestricted release" is 50 % higher than the 10 mr per deregulation proposed under the outlawed Below Regulatory Concern Policy. Using previously published NRC projections for fatal cancer rates from a given level of millirems, it is possible to calculate a death rate from an annual exposure to 15 millirems of about 1 death in 2000 from fatal cancer. This assumes a lifetime annual exposure of 15 millirems over background. This rate is portrayed as "acceptable?". One in 2000 is 500 times higher than one in a million, which in other arenas has been taken as a questionable level of risk to individuals from institutional activities.

There are 10's of thousands of contaminated sites. Projecting this expected death rate roughly across the affected population and into the future, this is not a trivial rate, even using NRC's linear and simplified assumptions about the relationship between dose and fatal cancers.

Example: Using NRC's equation of 1 death in 2000, and a very conservative scenario--suppose 1,500 contaminated sites (of the 24,000 current licenses, hopefully this many will be cleaned up, someday!) are cleaned to the 15 mr/year level, (leaving persistent contaminants), and released for normal use. If only 2/3 of these are inhabited-- such that the inhabitants get the 15 millirems per year, on even very sparsely populated sites (10 people average), one would project that across these sites, at least 5 deaths each year would result from increased radiation exposures from incomplete clean-up of residual radioactivity. Dense population, such as a housing development or large industrial shop, on any of the sites would increase this deathrate proportionally. This level of

projected human sacrifice will continue for the hazardous life of the radioactive pollution allowed to remain on the site. In the case of uranium and actinides, this is virtually forever.

This example should be taken in the context of the fact that there is reason to doubt the originally stated rate of 1 in 2000 for fatal cancer. Additionally, there are many health impacts from ionizing radiation. Fatal cancer should not be taken as the only effect. Non-fatal cancer--usually one incidence for every fatal cancer, reduced immunity, premature aging, genetic damage that will affect future generations and birth defects are impacts that are very substantial threats to life liberty and the pursuit of happiness. Radiation standards should protect people from these costly and disruptive effects as well.

It is particularly troubling to see that these elevated levels of radiation hazard are tied to sites in communities that have already suffered elevated exposures from the nuclear facility while in operation as well as from the activities of decommissioning. Since radiation exposure is a cumulative hazard, it is questionable whether the dose response of 1 in 2000 is at all accurate for these communities. In fact, it is reasonable to assert that the deathrate may well be higher, specifically because of the ongoing previous exposures from facility operations.

The cost of clean-up by industry to society must weighed against the value of life lost, not against the benefits of the nuclear industry that caused the mess. Therefore ALARA (As Low As Reasonably Achievable) should not be relied upon to reduce radioactivity on a site since it allows such cost-benefit analysis. If the Commission chooses to invoke "cost to society" as a reason not to clean a site, it will be a major break with previous precedent in nuclear regulation. If it is relied upon, then it should be allowed retroactively to all the NRC proceedings where it was previously denied as a consideration, such as in the matter of generating radioactive wastes in the first place.

The NRC has recently affirmed that the millirem as a unit is subject to interpretation. The recent revision of the entire Part 20 Radiation Standards, of which this rule will be part, illustrated that the millirem is plastic rather than static as a unit. The effective dose equivalent approach to calculation allows higher concentrations of radioactivity to be present in the environment for many radionuclides per millirem of exposure under the new Part 20, when compared with the old Part 20. Thus the millirem itself is open to interpretation. Since one cannot measure millirems directly, there is no way to verify directly that the interpretation "15 millirems" has been met.

It appears that the rule factors exposures to the average member of the critical group, those who spend the most time on the site. If this is the case, it is certainly a more ethical basis than factoring exposures across the entire population of the area. Using the average member of this group means that the doses calculated are assuming an adult male rather than his unborn child. Radiation standards for areas that are no longer regulated should protect the most vulnerable, including children, pregnant women, elderly and those with greater susceptibility for other reasons.

- **Inclusion of previously buried wastes is vital as part of returning the sites to the community.**

The fact that the staff draft speaks in the introduction of including previously buried on-site wastes in the plan for clean-up of nuclear sites. There is absolutely no basis for excluding

radioactivity previously put in the soil from the problem at hand, which is to make the site safe for people. There should be a specific provision in the Rule addressing this. We want more than a "hard look." As stated above, an ALARA cost-benefit should not be allowed to determine the level of protection provided to this and future generations.

Further, in the light of the step towards streamlining future decommissioning and prevention of contamination, we suggest that the Commission should revoke any further authority from the licensees to continue this practice.

- **Restricted release is not compatible with the principles of zero release. Source term in many cases will consign many generations to a legacy of increased radiation hazards. 100 millirems would allow radiation exposure be as if the facility had never ceased to operate.**

Licensees should not be released from liability for the site until the areas that are released are returned to background levels.

100 millirems a year is completely unacceptable for the release of a site. One MUST assume that over time any restriction or institution will fail. Sites contaminated with uranium will be hazardous virtually forever. Somewhere over that span of time, any restriction will be long forgotten. Here is what the staff say in the draft about this level: "the Commission believes allocation of the total dose limit to the decommissioning of a single facility would be inappropriate." We agree. Further, the Commission currently allows a 100mr/y exposure to the public via air from an operational licensed facility. For those using the site after release, the net result is effectively as if the operations had never ceased. Is the staff proposing an age of 'virtual' nuclear industry? All of the costs and none of the benefits.

The NRC has previously published a hypothetical fatal cancer rate for 100 mr/year exposure levels of 3.5 in 1000 or 1 in 285. This rate is completely unacceptable, considering that living or working on these sites after failure of restrictions would likely mean that exposures would be consistent. Over time, in a housing complex of the future, that could mean one death a year per site, using NRC's projections of fatal cancers.

- **Deregulation of "residual radioactivity" is BRC, recycling is BRC.**

Decommissioning and license termination is, by definition, deregulation. In 1986 the Commission tried to address aspects of decommissioning with the Below Regulatory Concern (BRC) Policy which would have deregulated large portions of the radioactive waste stream. The 1990 expanded version would have deregulated many radioactive materials and practices as well as consumer products. This generic deregulation policy was vigorously opposed by the public. After 15 states passed laws to require continued regulation, Congress revoked the BRC Policies in 1992, before they were fully implemented. Residual radioactivity above background is below regulatory concern.

All radioactivity from licensees activities should be contained. Suggestions that contaminated materials left on the site may be recycled at some point opens the door to radioactive materials entering the source stream for building and consumer products. All of these undisclosed

exposures would be allowed under the draft rule to be considered simply elevation of unnatural background. These exposures are not verifiable nor are they acceptable.

Use of existing standards as the basis of justification for new ones leads to the inevitable conclusion that a 15 to 100 millirem release limit for sites may become the basis for future deregulation of wastes, materials and practices such as was attempted in the outlawed BRC Policies. The only way to insure that radioactive materials do not wind up in consumer products in the department store and in municipal land fills is to require zero release of radioactivity.

- **Specific protection of ground water.**

Ground water should be explicitly addressed as being included in the parameters and pathways that are assessed in planning and implementing clean-up and verifying its accomplishment. In terms of pollution prevention, a specific component should pertain to both surface and ground water pollution.

- **"Grandfathering" the catastrophes of the Nuclear Age: Three Mile Island, Chernobyl and ongoing 'routine releases'--Unnatural background.**

The staff draft states that "The definition of background radiation (10 CFR 20.1003) would be revised so that the fallout from past nuclear accidents like Chernobyl which contribute to background radiation and are not under the control of the licensee are included in the definition." If this change in the broad definition of background radiation is adopted, it will codify and dismiss the fact that all human nuclear activities contribute to a cumulative and inexorable increase in the global ambient ionizing radiation field, over and above the radiation that is truly naturally occurring background. The combination of multiple factors, including no record keeping industry-wide of radiation releases, the tendency of living systems to sequester radioactivity, and the latency period of most observable effects of radiation exposure, makes it impossible to know how much radioactivity is already loaded into the biosphere.

With this change in definition, we would lose any distinction between the naturally occurring pre-nuclear-age background that was part of the evolution of life as we know it, and the use of the planet's transport systems as a sewer for discharges from nuclear industry and radioactive waste sites. At the very least, the Commission should create a second category for the "grandfathering" of radioactivity that is already exempt from any given license. This category should be carefully accounted for, and have its own designation. We suggest "unnatural background." In areas where there are high concentrations of unnatural background, the NRC should take an active role in determining where the release originated, whose liability it is, and act to insure clean-up of this material as well. That might mean multiple "responsible parties" in the clean-up of currently licensed sites.