DSI-5
(36)

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 2, 1996

MEMORANDUM TO: John C. Hoyle
Secretary of the Commission
US Nuclear Regulatory Commission
Attn: Chief of Docketing Service Branch

FROM: Phillip R. Reed Phil Reed
Waste Management Branch
Division of Regulatory Applications
Office of Nuclear Regulatory Research

SUBJECT: COMMENTS ON STRATEGIC ASSESSMENT ISSUE PAPER
DSI 5: LOW-LEVEL WASTE

In response to the Commission's solicitation, I am enclosing my comments on NRC's Strategic Assessment Issue Paper DSI 5: Low-Level Waste.

I find the Strategic Assessment and Rebaselining Initiative to be a significant step toward refocusing the NRC's goals, assumptions and strategies in a rapidly changing environment in which NRC conducts its activities.

I am pleased to provide my views on low-level waste policy issues as a member of the NRC staff.

Enclosure: As Stated

COMMENTS ON STRATEGIC ASSESSMENT ISSUE PAPER

DSI 5: LOW-LEVEL WASTE

1. Commission's Preliminary Views

I strongly support Option 2 as the most efficient way the NRC can presently participate in providing leadership in the national LLW program, improving protection of public health and safety, and participating in international LLW disposal activities. Option 2 appears balanced to ensure that both the current as well as potentially emerging issues concerning LLW are addressed.

I am in favor of restoring all the activities of the LLW program that were performed before the recent reductions in the LLW program. I wholeheartly endorse the Commission's decision under Option 2 to reestablish the LLW research program to previous levels and to acknowledge that research can play a role in the development of new technologies for the disposal of LLW. An important outcome of the Commission's decision to reinstate research activities directed solely to LLW disposal is that a number of excellent staff supported RES LLW research programs which were terminated, severely cut back, modified or prevented from doing follow up research can now be reactivated but at a considerable increase in cost.

But NRC needs to do more to ensure that public health and safety is protected from the disposal of LLW disposal. The NRC needs to be more aggressive in working within the framework of the LLRWPAA to facilitate the licensing of new LLW disposal facilities. NRC should commit to both policy and technical initiatives at the federal, State and local levels and provide extensive staff efforts to support these policy and technical issues. If LLW disposal is hampered at the State level by opposition at the State and local levels, NRC must get involved by providing assistance and participating in discussions to resolve all outstanding issues delaying the disposal of the LLW including. Therefore, the Commission should also approve some, but not all, aspects of Option 1 in conjunction with Option 2. The Commission should not be an active advocate of new disposal facilities and need not encourage the Congress to pass legislation that would encourage new disposal facilities. However, In assuming a greater leadership role, the Commission would become actively involved in all federal and State actions affecting the protection of public health and safety resulting from radionuclide release and transport from commercial LLW disposal facilities. The Commission would provide visible authority as the sole federal agency responsible for setting radiation exposure regulations from radionuclide releases at LLW disposal facilities. These actions by the Commission would include NRC's active participation in the Ward Valley, CA low-level waste disposal dispute with the Department of Interior (DOI) and involvement in situations where individual States may attempt to set radiation exposure standards and radionuclide release limits from proposed LLW disposal facilities more stringent than NRC's regulations or recommendations. It is important that NRC, a federal agency with responsibilities for establishing regulations on dose limits due to radionuclide releases from LLW disposal facilities, be actively involved in all discussions with any State where the State is seeking to propose or implement radiation dose regulations or guidelines more stringent than those approved by NRC.

2. NRC Participation in Development of New Technologies of LLW Disposal

The DSI 5: Low-Level Waste issue paper requests comments on whether NRC should actively participate in the development of new technologies for waste compaction and better waste forms for on-site storage for licenses, to maximize safety and efficiency across the entire waste management and disposal process.

I believe one needs to define what is meant by "..development of new technologies." Does this mean the NRC is going to fund the actual development of new waste compaction and LLW waste form disposal technologies from laboratory conception to pilot studies to full-scale operations? Or, does this mean the nuclear industry will actually develop these new technologies and the NRC will approve their topical reports and determine the performance criteria and testing procedures to assess the capabilities of these new technologies to meet NRC performance standards for radionuclide release etc.?

The House of Representatives Report Energy Reorganization Act of 1974, HR 93-1445, which went on to become PL 93-438 that created the NRC provides some guidance on this matter. The House report states that "..the regulatory agency need not and should not perform process development, develop construction procedures or designs, or conduct quality control work (which is the responsibility of the licensee or vendor),..." This is the approach the Commission should take. Let the nuclear industry develop the new technologies for waste compaction and better waste forms and let NRC develop the criteria and testing procedures to ensure the new technologies meet NRC regulations and guidelines. This is the way NRC has dealt with the solidification of LLW using cement, bitumen or vinyl-ester styrene. Section 61.56(b) of 10 CFR Part 61 requires that all Class B and C LLW be stabilized to prevent deterioration by water, chemicals, microbes, etc. NRC developed the Branch Technical Position on Waste Form, Rev 1, that included criteria (e.g., leaching tests, compression, microbial) and the testing methods to ensure the waste forms met the criteria for stability. The NRC should set the policy to ensure the new technologies meet Part 61 requirements, develop the criteria and specify the test procedures to meet the criteria (i.e. Branch Technical Positions), require industry to submit topical reports, and fund research programs to test actual waste forms and compacted waste to ensure NRC's testing procedures work and the criteria are being adhered to by industry.

3. Low-Level Waste Research Programs

The RES LLW research program should be reinstated and focused on: (1) long-term field studies (e.g., radiological programs, radionuclide behavior, lysimeter studies); (2) source term research (e.g., radionuclide solubilities, chemical impacts on releases, leaching, LLW characterization and classification); (3) unique technical issues that only NRC can do (e.g., colloids, ^{239}Pu, ^{14}C, decontamination waste, radionuclide/chelates,); (4) performance assessment research (e.g., modeling, code updates, computer simulations); (5) new radwaste technology for which no data and information are available (e.g., LLW glassification, compaction); (6) radionuclide transport (e.g., radionuclide sorption, chemical speciation); (7) special studies (e.g., radionuclide release in concrete systems, PA code validations); (8) waste forms (e.g., stability, new

disposal technologies); (9) reactor decommissioned waste (e.g., LLW inventory, activated metals); and (10) pathways and critical groups.

Additional LLW Performance code modifications, calculations and analysis are needed to understanding the LLW PA process under variety of disposal conditions. The additional analysis and calculations would include: (1) advanced decays schemes for ingrowth of daughter radionuclides from parent radionuclides, (2) reevaluation of mechanism of radionuclide release, behavior, sorption and source terms in concrete/cementitious disposal environments, (3) evaluation of redox state on radionuclide behavior, solubility, and release, (4) determination of chemical effects on radionuclide releases and sorption, and (5) environmental pathway evaluations, (6) assessment of biosphere and critical groups, and (7) evaluations and assessments using modified computer codes.

4. Other Views and Concerns

A. The statement is made on page 8 under Research that some research projects are being refocused to address decommissioning aspects, although the results can also be used in the LLW program. I think this is may be an exaggeration. Very little research from the decommissioning research program is expected to be used in the LLW program. Most SDMP decommissioning research studies focus primarily on two naturally occurring nuclides, U and The, while the LLW research program is directed toward many fission products, several activated materials, and a few transurancic radionucildes. In addition, LLW research studies involving LLW performance assessments tend to be orders of magnitude more complex than research involving decommissioning performance assessments due to the very nature of the radionuclide release, transport, pathway, wptake, and critical groups. I believe it would be more appropriate to say that the LLW research program results could be used in the decommissioning program.

B. I'm not sure DOE facilities should store or become involved with commercial low-level radioactive waste. There are differences between commercial LLW and the LLW DOE is used to dealing with. Congress wanted commercial nuclear power issues separated from DOE's military functions, and that would include storing commercial LLW at DOE facilities without NRC regulatory supervision.

C. If NRC were asked to regulate DOE waste disposal practices at DOE facilities, NRC should accept. NRC has the expertise to become familiar with DOE's disposal practices and waste forms (maybe not with glass right now) and to assess the performance of DOE disposal facilities to meet their design objectives and applicable radiation exposure regulations.

D. GTCC waste. Send it to the HLW repository. If a HLW repository is not ready, store it at the reactor site. But, don't put it in a LLW disposal facility.

E. Interim storage of LLW at nuclear reactors may not be a problem, but interim storage at hospitals, universities, and some industries can be major problems.

F. Incineration waste should also be included as a special technology for additional studies. So should molten metal technology. There may be special issues here especially if one starts with Class A waste and ends up with Class

B or C waste due to concentration of radionuclides during the incineration and molten metal process.

G. Assured storage of LLW. Interesting concept. But make it a permanent disposal facility. Could dispose of GTCC in such a facility. Would have large volume of LLW and higher activities of some long-lived radionuclides than staff normally deals with in LLW disposal. Probably be only one. Sort of like a national repository for LLW. Could put it on a DOE facility, out in the middle of nowhere. NRC should license it and perform all assessments. Consider adding SDMP soils and slags and really make it interesting. Solve the SDMP problem and LLW issue in one large facility; SDMP soils and slags could be disposed in containers or go into construction materials and engineered barriers for the assured storage site . Put it into nonagreement state and let NRC license it. The concept is worth pursuing.