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

June 16, 1995

Michael Sanderson, Director
Superfund Division
U.S. Environmental Protection Agency
Region VII
726 Minnesota Avenue
Kansas City, KS 66101

SUBJECT: DEFERRAL OF REGULATORY OVERSIGHT TO THE U.S. ENVIRONMENTAL PROTECTION AGENCY FOR THE WEST LAKE LANDFILL, BRIDGETON, MISSOURI

Dear Mr. Sanderson:

The Nuclear Regulatory Commission is deferring regulatory oversight to Environmental Protection Agency (EPA) for the remedial actions at the West Lake Landfill site in Bridgeton, Missouri. I have enclosed a paper written by the NRC staff entitled "Deferral of Regulatory Oversight to the U.S. Environmental Protection Agency for Two Sites with Radioactive Contamination and Landfill Disposal of Licensed Material from Remediation of a Third Site." In this paper, the NRC staff proposed to defer, to EPA, the regulation of the remediation of two sites: E.I. DuPont, Newport, DE; and West Lake Landfill, Bridgeton, MO. These sites contain both hazardous and radioactive waste, both are in various stages of remediation by EPA, and neither hold a current NRC license. The NRC staff consulted with EPA, the State, and other interested parties in developing this paper.

The NRC and EPA conduct regulatory programs for site remediation under the Atomic Energy Act and the Resource Conservation and Recovery Act (RCRA), and the Comprehensive Environmental Response, Compensation, and Liability Act, respectively. Based on the reviews to date, the NRC has concluded that the remedial programs being administered by EPA at these two sites are adequate to protect the public and the environment from the risks associated with the radioactive contamination at these sites.

Therefore, on April 28, 1995, the Commission approved the staff's request to defer to EPA for the oversight of remediation activities at these two sites. The deferral of these sites is considered in effect as of the receipt of this letter. In addition, the West Lake Landfill will be removed from NRC's Site Decommissioning Management Plan (SDMP) list.

The NRC staff does not plan to take any further action on the West Lake Landfill site unless specifically requested by EPA.

POLICY ISSUE
(Notation Vote)

March 9, 1995 SECY-95-056

FOR: The Commissioners

FROM: James M. Taylor
Executive Director for Operations

SUBJECT: DEFERRAL OF REGULATORY OVERSIGHT TO THE U.S. ENVIRONMENTAL PROTECTION AGENCY FOR TWO SITES WITH RADIOACTIVE CONTAMINATION AND LANDFILL DISPOSAL OF LICENSED MATERIAL FROM REMEDIATION OF A THIRD SITE

PURPOSE:

To obtain the Commission's approval for the staff to defer to the U.S. Environmental Protection Agency (EPA) for the oversight of remediation activities involving radioactive contamination at two sites and for staff's intent to allow disposal of licensed radioactive material in a hazardous waste landfill.

SUMMARY:

The Nuclear Regulatory Commission and EPA conduct regulatory programs for site remediation under the Atomic Energy Act (AEA) and the Resource Conservation and Recovery Act (RCRA), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), respectively. Under certain conditions, NRC staff believes it would be appropriate for NRC to defer to EPA, or an authorized State environmental protection program, for the oversight of remediation of radioactively contaminated sites under NRC

Contact: Heather M. Astwood, NMSS
415-5819

NOTE: TO BE MADE PUBLICLY AVAILABLE WHEN THE FINAL SRM IS MADE AVAILABLE.

jurisdiction. The staff is proposing to defer, to EPA and an authorized State environmental program, regulation of remediation of two unlicensed sites: E.I. DuPont, Newport, DE; and West Lake Landfill, Bridgeton, MO. In addition, the staff intends to authorize disposal of licensed material generated from remediating Dow Chemical sites in Midland and Bay City, MI, in a hazardous waste landfill regulated by the Michigan Department of Natural Resources under the EPA-authorized RCRA program. Remediation activities at these sites are at various stages of completion. Based on reviews to date, the staff believes that the remedial actions and disposal required by EPA, or the authorized State program, will be sufficient to protect the public and the environment from the risks associated with the radioactive contamination at these sites. Deferral would conserve Federal and licensee resources, streamline the remediation process by eliminating duplicative agency reviews, and simplify the review process by consolidating regulatory oversight within a single agency. If the Commission approves deferral and disposal, the staff would: continue to provide limited technical assistance to EPA or State agencies, on request, for all sites (licensed and non-licensed); monitor remediation activities; and review all relevant cocuments developed by the licensee and EPA or State for each site with an NRC license.

BACKGROUND:

As part of NRC's decommissioning program for nuclear facilities under the AEA, some contaminated facilities pose special problems because of the presence of both non-radiological and radiological hazards, limited technical and financial viability of licensees, and concurrent regulatory jurisdiction over various aspects of decommissioning. Some of the sites are being, or will be, remediated under EPA's Superfund Program, in accordance with CERCLA and the National Contingency Plan in 40 CFR Part 300. Other sites involve assessment and disposal of hazardous waste under EPA's RCRA Program. Similar interfaces exist between NRC and State regulatory programs, in which EPA's authority under CERCLA and RCRA has been delegated to States. EPA actively promotes delegation of the RCRA program to authorized States and tends to defer to States that are willing to oversee preparation of the Remedial Investigation/Feasibility Studies (RI/FS) for individual sites.

Although the RCRA and CERCLA Programs both address hazards to the environment, CERCLA is the more comprehensive statute because it addresses both operating and inactive facilities and includes hazardous materials, as well as source, special nuclear, and byproduct material as defined in the AEA. The staff previously discussed EPA's RCRA and CERCLA Programs in SECYs 93-235 and 93-322. RCRA uses a general regulatory program to manage hazardous waste from generation to ultimate disposal. CERCLA provides authority to respond whenever there is a release or potential release of hazardous material. The facility owner or operator implements RCRA corrective action, whereas CERCLA responses may be implemented by a number of different parties, including private or public responsible parties, States, or Federal authorities. CERCLA "hazardous substances" include RCRA "hazardous wastes," as well as toxic pollutants under the Clean Water Act (CWA), Clean Air Act (CAA), and Toxic Substances Control Act (TSCA). Although source, special nuclear, and byproduct materials are excluded from regulation under CWA, TSCA, and RCRA, they are included under the CAA, so they are included within the scope of CERCLA. Consequently, EPA can require remediation of both non-radiological

and radiological contamination, including source, special nuclear, and byproduct material, in accordance with CERCLA.[1]

As a general policy, EPA has declined listing NRC-licensed sites for remediation on the National Priorities List (NPL), in deference to NRC regulation under the AEA, provided that remediation is progressing under an NRC license. However, EPA has required remediation under RCRA or CERCLA at sites that exhibited non-radiological contamination (e.g., chromium contamination at the Shieldalloy facility in Newfield, NJ) or that were licensed by Agreement States (e.g., Homestake uranium mill in Milan, NM). Based on the most recent version of the NPL (February 1994), the total number of sites listed on the NPL is 1191. The Superfund Program is well-established, and has defined remediation procedures and criteria, including those that address radioactive materials. Although the remediation process and criteria are not identical to NRC's, they are parallel in scope and purpose, and in the staff's judgment, are generally adequate for the protection of the public and the environment. A detailed explanation of the Superfund site remediation and closure process is given in Enclosure 1 of SECY-93-235.

The Commission has previously considered staff recommendations to establish procedures for transferring sites from NRC to EPA, for remediation under the Superfund Program. In a staff requirements memorandum (SRM) concerning SECY-89-224, dated August 22, 1989, the Commission stated that it will decide whether to pursue the transfer of sites, to EPA, for remediation, on a case-by-case basis, or through a memorandum of understanding (MOU). The March 16, 1992, general MOU between EPA and NRC explicitly excludes matters arising under CERCLA and RCRA. Since the general MOU was signed, NRC staff has negotiated site-specific cooperative agreements for remediation of the Homestake uranium mill, under CERCLA, and the Sequoyah Fuels and Engelhard Corporation facilities, under RCRA. The staff is also currently discussing cooperative agreements with State agencies in Ohio and Pennsylvania.

In another SRM dated December 21, 1989, the Commission rejected the staff's recommendation to develop a protocol with EPA to govern the application of Superfund to contaminated sites. Instead of developing a protocol, the Commission directed the staff to provide, for each site the staff proposes to defer to EPA or a State agency, under Superfund, analyses of: (1) the cleanup standard that would apply under Superfund, and the differences between that standard and the AEA standard; (2) the rights and authorities the State would have if Superfund were extended to the site; and (3) the rights and authorities that private citizens would have to sue the Federal Government or the licensee(s), using the citizen-suit provisions of Superfund.

More recently, the staff proposed to the Commission, in SECY 93-235, to communicate with EPA about transferring the Safety Light Corporation (SLC) site at Bloomsburg, PA, to EPA, to supervise site remediation under Superfund. The rationale for the transfer was to accelerate the remediation of the site

[1] CERCLA does not cover releases that are subject to NRC required financial protection pursuant to Section 170 of the AE Act (i.e., Price Anderson), nor releases from a processing site under Title I of the Uranium Mill Tailing Radiation Control Act of 1978.

and limit the Federal resources devoted to the litigation to compel SLC to remediate the site. The paper explained that during the first half of 1993, the staff and the licensee tried unsuccessfully to settle the litigation and the staff believed, as of the date of the paper, that further negotiations would be futile and litigation would resume shortly. While the Commission was considering SECY-93-235, the parties resumed negotiations; and in an SRM dated November 2, 1993, the Commission returned SECY-93-235 to the staff, "...pending the outcome of the negotiations," and instructed the staff to "...keep the Commission informed of further developments and, based on the outcome of the negotiations, submit recommendations for further action to the Commission, should that be necessary." The staff recently completed negotiations with SLC and successfully concluded a settlement agreement that governs characterization and remediation planning for the Bloomsburg site.

In a related matter, SECY-93-136 presented the Commission with an analysis of the State of Utah decision to allow Envirocare of Utah to use only institutional controls as a means of reducing the risk to the public health and safety after closure, without government land ownership. EPA regulations do not always require government land ownership of sites such as these. The Commission determined that this approach was adequate for protection of the public health and safety in this particular case, and in a Director's Decision under 10 CFR 2.206 issued by the Office of State Programs on January 26, 1995, the Commission did not revoke Utah's Agreement State status.

DISCUSSION:

At sites where radioactive and non-radioactive materials are located in distinct and separate areas, NRC and EPA oversight and regulation of remedial actions can proceed effectively and efficiently. Although the effectiveness of the government's response and oversight can be strengthened through interagency cooperation, each area can be remediated independently in accordance with each agency's requirements and administrative process.

However, independent regulation of remedial activities is not always possible. There are some sites that contain commingled radioactive and non-radioactive contamination. At other sites, the contamination is not commingled, but remediation of one type of contamination would affect the responsible party's ability or approach to characterization and remediation of the other type of contamination. In other cases, although the predominant hazard may be associated with one type of contamination, the licensee or property owner is not capable, technically or financially, to remediate either type of contamination, thus preventing timely and effective completion of necessary decommissioning or remedial actions. In yet other cases, the responsible party desires a coordinated government response to reduce overall costs, improve efficiency, and promote a compatible solution for both types of contamination.

Under certain circumstances, the staff believes it would be appropriate for NRC to defer to EPA or authorized State oversight of remediation efforts, under CERCLA, RCRA, or State statutes. Deferral at these sites would reduce the amount of duplicative effort by both agencies and by the site owners. For example, the types of analyses performed by EPA as part of the development of the RI/FS, under CERCLA (40 CFR 300.430), are very similar to the analyses

conducted by NRC in developing an Environmental Impact Statement (EIS) under the National Environmental Policy Act of 1969 (NEPA) and 10 CFR Part 51. Both agencies require submission of fairly extensive information on the environmental characteristics of the contaminated sites and the nature and extent of contamination. In addition, the agencies require preparation and submission of a plan for implementing remedial measures found necessary to remove or contain contamination in accordance with applicable remediation criteria. EPA's plan is called a Remedial Design; NRC calls this a decommissioning plan.

Without cooperation between the agencies, therefore, it is conceivable that site owners could be required by the government to develop separate reports for each agency on site characterization, assessment of remediation alternatives, projected environmental impacts, plans for remedial measures, and documentation that the remedial measures were appropriately implemented. Such an approach could result in an unnecessarily duplicative and burdensome effort by the site owners and by the agencies.

At worst, the requirements of one agency could explicitly conflict with those of the other agency, thus frustrating the government's overall intent to ensure protection of the public and the environment from residual contamination. If, for example, EPA decided to allow hazardous waste to remain onsite, to avoid excessive worker exposure and cost, and NRC decided that commingled radioactive waste would have to be exhumed and disposed of offsite, it would be difficult and burdensome, if not impossible, for the site owner to simultaneously comply with the requirements of both agencies The conflict would be especially significant if one action preceded the other (e.g., EPA requires a cover to be placed over the waste; NRC later determines that the radioactive waste needs to be removed for off-site disposal).

The staff believes that it is appropriate to rely on EPA's environmental remediation programs to ensure protection of the public and environment at the DuPont and Westlake Landfill sites. Both cases may rely, at least in part, on institutional controls to ensure long-term protection. As discussed previously and in the attachments, such reliance on institutional controls is somewhat inconsistent with NRC's established policies for low-level radioactive waste disposal (cf. State or Federal land ownership requirement for low level waste disposal in 10 CFR 61.59(a)). However, the staff believes that EPA remediation will be sufficient to provide adequate protection under the Atomic Energy Act.

In addition, deferral to EPA provides numerous savings in terms of reducing the administrative and regulatory burden on responsible parties conducting the remediation and in conserving NRC staff resources. The staff estimates that deferral of each site should save between 0.25 and 0.5 FTE per year in direct staff resources required to oversee remediation at the sites. These resources would partially duplicate the oversight functions that EPA staff will provide in overseeing the safe and protective execution of the planned remedial actions. In addition, deferral should save NRC an additional 0.5 FTE per year and $600K in program support that could be necessary at each site to prepare an Environmental Impact Statement (EIS) to support consideration of exemptions from NRC's existing requirements for decommissioning for unrestricted use.

Since November 1993, the staff has initiated several EISs to consider exemption requests as appropriate considering the requirements in 10 CFR Part 51. Deferral should also improve the timeliness of remediation by avoiding the potential delay that could be associated with administration of independent and complementary regulatory approval processes for remediation. Remediation could be further delayed by opportunities for legal challenges to NRC approval of remedial actions.

Allowing disposal of the Dow wastes in the hazardous waste landfill cells in Midland may also allow a small increase in the long-term risk to the public and environment due to some reliance on institutional controls. As previously described for the Westlake and DuPont site remediation projects, however, NRC staff believes that such disposal would provide adequate protection of the public, and any small increase in the associated risk is counterbalanced by the improvements in efficiency, reduction in regulatory and administrative burden, and savings of NRC and responsible party resources.

The staff does not consider, however, that these cases would necessarily establish a precedent for resolution of other waste disposal and decommissioning cases or establishment of general requirements in these areas. The decisions on deferral and on approving waste disposal are specific to these cases. In the cases of DuPont and Westlake Landfill, the radioactive components appear to be intimately mixed with non-radiological contaminants and wastes that are not subject to the Commission's jurisdiction. In fact, at least for some of the wastes, the dominant risks to the public and environment may be attributable to the non-radiological contaminants. In addition, both sites are already li ted on the National Priorities List for remediation under CERCLA, and the basis for listing and selection of the remedies included consideration of the radiological contaminants.

In the Dow case, the staff has considered the merits of disposing of the specific wastes present at the Dow sites and under the specified conditions for disposal as proposed by the licensee and the State. Staff has already approved other disposals of radioactive waste in or adjacent to hazardous waste landfill cells in accordance with the provisions of 10 CFR 20.302 and 20.2002. Each of these disposals has been based on a site-specific review by the NRC staff to ensure adequate protection of the public and that potential radiological doses do not exceed NRC's limits in 10 CFR Part 20. In most cases, the staff has assured that the potential doses do not exceed a small fraction of the public dose limit. The Dow case is especially significant, however, because it involves the disposal of a relatively large volume of radioactive waste that will be generated in decommissioning an SDMP site and that intrusion into the waste, if it were to occur, could result in doses that may exceed the public dose limit (e.g., if the intruder were to live on top of exposed waste for an extended period). The staff believes that the likelihood of such intrusion is remote in the Dow case because of the design of the disposal cells and the use of the general area for disposal of hazardous waste. It is likely that an intruder into the waste would recognize that a waste disposal cell had been breached and could suffer risk from the non-radiological contaminants in adjacent cells even if the NRC did not authorize disposal of the radioactive waste.

The staff would be prepared to entertain similar requests to the Dow request from licensees to dispose of licensed material in hazardous waste landfills or

other suitable disposal facilities (e.g., monofills, sanitary landfills) in accordance with the requirements of 10 CFR 20.2002. In such cases, as with the Dow case, the burden would rest with the licensee to demonstrate that the requirements of 10 CFR Part 20 will be satisfied, specifically that the potential doses will be consistent with the Part 20 limits and are as low as is reasonably achievable. Credit for institutional controls, such as those that accompany Dow's proposal, would also be considered on a site-specific basis.

For these reasons, the staff believes that NRC should defer to EPA or State oversight regulatory programs for specific aspects of the remediation of two contaminated sites: E.I. DuPont, Newport, DE; Cotter Corporation (West Lake Landfill), Bridgeton, MO; and allow disposal of radioactive waste from remediation in a RCRA permitted landfill for Dow Chemical, Midland and Bay City (Salzburg Landfill), MI. By deferral, the staff means a variety of approaches depending on the specific status of the contaminated sites.

For the DuPont site, the staff proposes to recognize EPA's approved remedial measures under CERCLA as being sufficiently protective of the public and environment. The site is not currently licensed by NRC; NRC licensing and oversight of the remediation of a small quantity of thorium waste in a landfill would not be necessary, nor required, under the AEA. No further action would be taken by the NRC staff, unless specifically requested by EPA.

For the West Lake Landfill site, EPA has already agreed to assume lead responsibility for the site. The West Lake Landfill is listed in NRC's Site Decommissioning Management Plan (SDMP). The NRC staff is proposing to defer to EPA oversight of remedial measures under CERCLA. EPA's remediation of the site already considers both radioactive and non-radioactive materials. The site is not currently licensed by NRC; the staff would take no further action at the site after deferral, unless specifically requested by EPA. NRC would remove the site from the SDMP after EPA completes remedial measures at the site.

Regarding the Dow Chemical sites in Midland and Bay City, Michigan, the staff proposes to allow the licensee to dispose of thorium-contaminated waste in a licensee-owned and permitted hazardous waste landfill designed and operated in accordance with the RCRA requirements administered by EPA and the State of Michigan. The staff would authorize disposal in accordance with NRC requirements in 10 CFR 20.2002 and support the decision with an Environmental Assessment that would presume the effectiveness of RCRA controls in ensuring protection of the public and environment. Regulatory responsibility for the management and long-term control of the thorium in the disposal site would, in theory rest with NRC. However, in terminating the license, NRC would recognize that controls for the hazardous waste, developed under RCRA, while relying on land use restrictions which are not dependant on State or EPA regulatory power, will be adequate for the thorium as well. In allowing disposal in the Salzburg Landfill, NRC would be recognizing that disposal of thorium-contaminated wastes in a hazardous waste landfill may be acceptable under the AEA, instead of requiring offsite disposal at a licensed radioactive waste disposal facility. The Dow storage sites are listed in the SDMP and are being remediated under an NRC license. NRC staff would continue to license and regulate the remedial measures directed at removing the thorium waste from its present locations. At such time as all waste has been satisfactorily

disposed of in the hazardous waste landfill and residual radioactivity has been reduced in accordance with existing criteria, the staff would terminate Dow's license for the Midland and Bay City sites and no further action would be taken by the NRC staff.

Background information for the DuPont, Westlake Landfill, and Dow sites is provided in Attachments 1 to 3, respectively. The potential advantages and disadvantages of deferral for each site are summarized in Attachment 4.

Requested Analysis:

In accordance with the Commission's previous direction on information to support deferral decisions, the staff provides the following analyses of: (1) the cleanup standard that would apply under Superfund and the differences between that standard and the AEA standard; (2) the rights and authorities the State would have if Superfund were extended to the site; and (3) the rights and authorities that private citizens would have to sue the Federal Government or the licensee(s), using the citizen-suit provisions of Superfund. The following analyses are presented in generic terms that would apply to all three sites. The discussion about remediation criteria is only pertinent at this time to the West Lake Landfill site; EPA has already decided to stabilize the thorium waste in place at the Dupont site, and the thorium waste from Dow would be disposed of in an RCRA-regulated landfill cell. To compare specific EPA and NRC remediation standards for the West Lake Landfill, more information would be needed on the remediation criteria EPA intends to implement at that site. EPA will determine these criteria through the RI/FS and Record of Decision (ROD) process, as described below.

(1) Remediation Standard

As previously stated, both NRC and EPA have been granted the authority to regulate radioactive materials, in certain situations. To determine what remediation standards would govern the remedial actions at a specific site, EPA would perform a Feasibility Study (FS). This study is the basis for the development of a ROD that establishes remediation standards and remedial actions for each site. EPA would prepare the FS after the site had been scored and entered on the NPL, as explained in Enclosure 1 of SECY-93-235.

EPA's requirements for FSs in 40 CFR 300.430(e)(2)(i) require that the lead agency establish remedial action alternatives, including remediation objectives and goals. The remediation goals establish acceptable exposure levels to protect human health and the environment and are developed considering: applicable or relevant and appropriate requirements (ARARs) under Federal or State environmental laws, drinking-water standards and goals, water-quality criteria, and other factors. For known or suspected carcinogens (including ionizing radiation), acceptable exposure levels are generally concentration levels that represent an excess upper-bound lifetime cancer probability, for an individual, of about 10^{-4} and a cancer probability of 10^{-6} for as many in the population as practical. The 10^{-6} probability is used as the point of departure for determining remediation goals when ARARs are not available or are not sufficiently protective, because of the presence of multiple contaminants or multiple pathways.

These risk goals do not necessarily take into account human intrusion in the future. If human intrusion were to be considered in the dose pathway analysis, the calculated dose for thorium contaminated sites could be in excess of 100 mrem/yr assuming standard exposure scenarios (e.g., resident farmer scenario). Therefore, sites with significantly elevated thorium concentrations would not necessarily meet the provisions of the proposed NRC rule on radiological criteria for decommissioning (proposed amendments to 10 CFR Part 20; 59 FR 43200). The statement of considerations for the proposed rule acknowledges that some sites could not meet the limits proposed in the rule. Deferral to the Federal Superfund/RCRA approach is a possible way to address these cases.

NRC risk analyses differ from EPA risk analyses in several ways. EPA calculates risk based on the chance of developing cancer. NRC relates risk to both the chance of developing cancer and the chance of a fatality as a result of cancer. NRC staff calculated the risk to a maximally exposed member of the public who at some time in the future, could reside on top of the site. By using a general risk estimate of $5x10^{-2}$ fatal cancers per sievert ($5x10^{-4}$ per rem) of received dose developed for exposure of a large population, NRC can estimate a potential risk, to an individual, produced by a specific exposure. Nevertheless, were an actual measured exposure to occur, the staff recognizes that it would be more appropriate to estimate the risk to that individual using the cancer risk tables developed by the National Cancer Institute.

In general, NRC has not relied on institutional controls as a means for protecting the public or the environment for decommissioning purposes. However, EPA and DOE have relied on institutional controls to prevent or reduce the likelihood for human intrusion and otherwise protect the public (e.g., restrictions on groundwater use). Staff compared regulatory considerations of institutional controls in SECY-93-322, dated November 26, 1993. Reliance on institutional controls directly affects projected risks to exposed humans.

Based on information provided by the EPA staff, NRC has reviewed 19 RODs for sites that include some radiological contamination. Most cases involved contamination by radium-226 and its decay products and other naturally-occurring radionuclides. In most of the RODs, EPA selected ARARs based on EPA's standard, for remedial action, at uranium mill tailings sites in 40 CFR Part 192. In many cases, EPA also identified NRC guidance in Regulatory Guide 1.86 "Termination of Operating Licenses for Nuclear Reactors," as an ARAR for surface contamination on buildings and equipment. Other sources of ARARs for radiological contamination include: NRC's air concentration limits in 10 CFR Part 20, Appendix B; State guidance on acceptable surface contamination; DOE orders for acceptable public and worker doses; Federal and State water quality standards; and Federal and State air-emission limits.

(2) State Authority under Superfund

For facilities covered by CERCLA, 42 USC 9605, *et seq.*, the States are encouraged to enter into cooperative agreements to enable them to undertake certain actions, under the National Contingency Plan (NCP), as the lead agencies. State and local response organizations are expected to initiate measures necessary to protect the public health and safety, consistent with the containment and cleanup requirements in the NCP.

The RI/FS required under 40 CFR 300.430(d) and (e) are to be performed by a lead agency, in coordination with any support agencies. Under 40 CFR 300.5, the State may be designated as the lead agency to plan and implement a response, if it is operating pursuant to a contract or cooperative agreement, under Section 104(d)(1) of CERCLA, or designated as the lead agency in a Superfund Memorandum of Agreement (SMOA) or other agreement. In addition, even if the State does not serve as lead agency, the lead agency is required to consult with the local officials and community representatives before commencing field work for the remedial investigation. Under 40 CFR 300.430(c), support agencies are afforded an opportunity to identify their own ARARs, under 40 CFR 300.430(d)(3). Support agencies are to be notified, by the lead agency, of the alternatives that will be evaluated in detail, to facilitate the identification of ARARs and any appropriate guidance to be considered, under 40 CFR 300.430(e)(8).

In addition to the above, 40 CFR 300.430(e)(9)(iii)(H) requires that the State's concerns be assessed, including its views on the preferred and other alternatives for remedial action and the ARARs or proposed use of waivers.

Further, 40 CFR 300.430(f)(1)(i)(C) provides that the lead agency must consult with the State, and that State and community acceptance are modifying criteria that are to be considered in the remedy selection. Section 300.430(f)(4)(i) provides that the State's views are to be considered by the lead agency in its final remedy selection from among the various alternatives.

(3) The Rights of Private Citizens under Superfund

As discussed above, EPA is to solicit community participation in the identification of ARARs and other aspects of the RI/FS process. In addition, private citizens are authorized under CERCLA to undertake a response action to eliminate a release of a hazardous substance, pollutant, or contaminant, subject to the citizens' compliance with the provisions of 40 CFR 300.700. Various mechanisms are provided in CERCLA for a private citizen to recover the cost of such response action. These mechanisms are summarized in 40 CFR 300.700, and include: (a) recovery of the response cost, plus interest, from the parties found to be liable; and (b) recovery from Superfund of the private citizen's reasonable costs, plus interest.

In addition, "citizens suits" are authorized under Section 310 of CERCLA. Private citizens are authorized to commence a civil action, on

their own behalf, against: (a) any person who is alleged to be in violation of any standard, regulation, condition, requirement, or order under CERCLA; and (b) any Federal official who is alleged to have failed to perform a required duty, under CERCLA. Judicial relief, in such actions, may consist of an order to enforce and/or correct the violation or an order imposing any civil penalty provided for the violation; and the court may award the prevailing party his costs of litigation, including reasonable attorney and expert witness fees.

RECOMMENDATIONS:

That the Commission:

1. Approve deferral to EPA's CERCLA program for the remediation of the thorium waste located on the E. I. DuPont Superfund site in Newport, DE.

2. Approve deferral to EPA's Superfund program for remediation of the West Lake Landfill/Cotter Corporation site in Bridgeton, MO.

3. Approve staff's plans to pursue a request submitted by Dow Chemical Company for an exemption from the unrestricted release provisions of 10 CFR 40.42(f)(3) and to authorize disposal of thorium waste from remediation in a landfill in accordance with 10 CFR 20.2002. The landfill would be regulated under Michigan hazardous waste regulations that implement the RCRA program for long term control of the waste in the Salzburg Landfill cells, including reliance on institutional and State control and long-term monitoring of the Salzburg Landfill site in Midland, MI.

4. Note:

   a. That although EPA is authorized to regulate byproduct, source, and special nuclear material under CERCLA and CAA, the State agencies, if they are not NRC Agreement States, are not authorized except under CAA. That even though NRC is allowing disposal under the RCRA program administered by EPA and Michigan Department of Natural Resources, NRC staff will continue to regulate remediation of the Dow Chemical storage sites in Michigan, which are currently licensed by NRC. With respect to the disposal in the Salzburg landfill, the staff will continue to review pertinent documents to ensure Michigan is not applying significantly less stringent waste disposal requirements than NRC.

   b. That reliance on institutional controls over the long term may not provide as high a level of protection for the public health and environment as that attained if there were no reliance on institutional controls. This lower level of assurance results from the lack of a guarantee that there will always be a responsible party to maintain the controls.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objection. NRC staff consulted with EPA and the States of Delaware, Missouri, and Michigan in preparing this paper. Neither EPA nor the States objected to the staff's proposed approach.

James M. Taylor
Executive Director
for Operations

Attachments:
1. Bkgd Info for E.I. DuPont
2. Bkgd Info for Cotter Corporation
   West Lake Landfill
3. Bkgd Info for Dow Chemical
4. Adv/Disadv of Prop Options by Site

Commissioners' comments or consent should be provided directly to the Office of the Secretary by COB Friday, March 24, 1995.

Commission Staff Office comments, if any, should be submitted to the Commissioners NLT March 17, 1995, with an information copy to the Office of the Secretary. If the paper is of such a nature that it requires additional review and comment, the Commissioners and the Secretariat should be apprised of when comments may be expected.

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**BACKGROUND INFORMATION FOR THE
E.I. DUPONT NEWPORT, DELAWARE, SITE**

The E.I. DuPont site is located in Newport, Delaware, near I-95, I-495, and the Christina River. The entire site is approximately 485,600 m^2 (120 acres) and contains a paint pigment production facility, a chromium dioxide production facility, and two industrial landfills (North and South) which are closed.

DuPont was licensed by the U.S. Atomic Energy Commission (AEC) and began using radioactive materials at this site in 1961, for the processing of thorium into metal alloys. The alloys consisted mostly of nickel, some chromium and molybdenum, and thorium (approximately 2 to 5 percent by weight thorium-232). Waste materials from this process were buried in the North Landfill, reportedly, in accordance with 10 CFR 20.304 regulations that were in effect at the time. According to DuPont, the thorium waste was placed in glass jars that were subsequently placed in 55-gallon barrels together with disposable protective clothing and debris from the waste-handling operations. The barrels were then buried in a specific, although uncertain, section of the North Landfill and covered with 3 m (10 feet) of soil. The area where the thorium was buried is estimated to be 40 m by 10 m (130 ft by 35 ft) and contains approximately 20 tons of thorium metal, which were placed in the North Landfill over a 7 year period.

DuPont believes most of the thorium in the North Landfill consists of thorium oxide, a relatively insoluble form of thorium. However, DuPont's records, as well as information in the Nuclear Regulatory Commission's docket files, indicate that thorium nitrate, a more soluble form of thorium, and other salts could also have been disposed of in the North Landfill. Long-term releases from these other forms of the thorium waste could be greater than from the thorium oxide. They could also pose a greater threat to shallow groundwater beneath the North Landfill site, because of leaching and subsequent transport.

The thorium burials comprised a small portion of the North Landfill area. The remaining portion of the North Landfill was used for the disposal of lithophone wastes (an inorganic paint pigment based on zinc and barium), organic pigment wastes, chromium wastes, and other miscellaneous wastes, including the off-specification thoriated nickel and other thorium wastes.

The Environmental Protection Agency (EPA) initiated the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Program for remediation of the site in the 1980s and proposed the site for inclusion on the National Priorities List (NPL) in 1987. EPA proposed the site for remediation under CERCLA because of extensive non-radiological contamination.

DuPont used historical records and interviews with retired employees to estimate the quantity of thorium that was buried in the landfill. However, the records are not complete and the exact quantity and form of the thorium are not known. Although the entire DuPont site is currently undergoing remediation, remediation of the North Landfill is of the most concern to NRC because of the thorium buried in the landfill. The North Landfill is only a small section of the entire 120-acre site.

Based on available records of the burials, NRC staff believes that at least some of the thorium wastes in the North Landfill exceeds the concentration criteria in Options 1 and 2 of the 1981 Branch Technical Position (BTP) entitled: "Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations" (46 FR 52061). NRC identified these criteria as the pertinent release criteria in the Site Decommissioning Management Plan (SDMP) Action Plan of April 16, 1992 (57 FR 13389) coupled with the principle that residual radiation be reduced to as low as is reasonably achievable (ALARA). Because thorium concentrations are expected to exceed these criteria in some areas by a substantial margin (e.g., 10,000 pCi/g thorium-232), the NRC staff would generally not consider onsite disposal as a viable disposal action.

In addition, as described above, it is possible that there are soluble forms of thorium in the landfill, which could become mobile and enter the groundwater beneath the site or the river adjacent to the site. DuPont has not attempted to characterize the thorium waste in the landfill for the following reasons: (1) the exact location of the thorium in the landfill is not known; (2) intrusive and extrusive sampling may be necessary because the waste is very heterogeneous, which would make accurate sampling through a limited number of boreholes difficult; and (3) exposure to the hazardous material in the landfill would cause risks to workers during the characterization and sampling process.

Monitoring well sampling found slightly elevated levels of radium-226 and radium-228 in the groundwater adjacent to the landfill. DuPont believes the elevated levels are representative of background. Elevated levels of radium were not found in surrounding wells or in wells located between the landfill and the well containing the elevated readings.

EPA will require DuPont to place a low-permeability cover system over the landfill, capable of reducing infiltration by over 99 percent, to minimize groundwater contamination below the site. In addition, DuPont is required to construct a physical barrier wall extending from the top on the landfill, along the river bank and down to the base of the Columbia aquifer. This wall will cause mounding of the groundwater in the landfill. Groundwater extraction wells will be installed to control this mounding. The recovered groundwater shall be treated. This wall will prevent the contaminated groundwater from entering the river. Monitoring will be needed to ensure there will not be erosion of the river bank and the potential for erosion from the river into the landfill itself.

The potential risks produced by the thorium contamination are small compared with the risks posed by the other hazardous waste in the North Landfill, as well as the materials on the remaining portions of the site. EPA's risk assessment supporting the ROD concluded that non-radiological risks predominate over radiological risks associated with the thorium waste buried in the landfill. EPA requires in the ROD that DuPont: monitor groundwater to detect any potential migration of thorium or its decay products; apply institutional controls to restrict public access to the waste and to groundwater beneath and adjacent to the site; and assess the existence of radiological contamination at other locations onsite. The remedial action identified in the ROD was developed through a public process that involved DuPont, State of Delaware, local community officials, members of the public, and other interested parties.

would be sufficient to protect the public and the environment from the risks associated with the thorium waste. Although NRC and EPA staffs suspect that a majority of the thorium is in the relatively insoluble oxide form, there is a possibility that some more soluble thorium compounds exist in the landfill. However, with the cap, wall along the river bank, groundwater monitoring, institutional controls, and groundwater use restrictions, the staff believes that any significant contamination of the groundwater by thorium is unlikely to occur. However, if it does, the staff believes the contamination would be accompanied by other contaminants, promptly detected, and mitigated before causing any significant health or environmental hazards.

Since the site is not currently licensed by NRC, the staff would not undertake any other activities directly related to remediation of the site, including: performing reviews of licensing (Superfund-required) documents; undertaking site visits or inspections; monitoring EPA progress on the remediation; and examining the completion of cleanup activities.

**BACKGROUND INFORMATION FOR THE
WEST LAKE LANDFILL/COTTER CORPORATION
BRIDGETON, MISSOURI SITE**

The West Lake Landfill is a 809,000 m^2 (200-acre) tract located in St. Louis County, Missouri, approximately 16 miles northwest of downtown St. Louis. Beginning in 1962, portions of the property were used as an unregulated dump for solid and liquid industrial wastes, municipal refuse, and construction debris. In 1973, Cotter Corporation, a Nuclear Regulatory Commission licensee, disposed of over 39,000 metric tons of uranium ore processing residues and contaminated soil in two areas covering about 64,750 m^2 (16 acres) of the site. This is a relatively small portion of the larger 809,000 m^2 (200-acre) site. In 1976, the unregulated landfill was closed, and in following years, the Missouri Department of Natural Resources issued several permits for various portions of the 809,000 m^2 site. Efforts to remediate the site included NRC survey and site characterization work in the 1980s. In 1990, the Environmental Protection Agency (EPA) listed West Lake Landfill as a Superfund site by adding it to the National Priorities List. Under Superfund, EPA is now regulating remediation of the site for both radiological and other hazardous wastes.

The radioactive wastes in the two soil areas are mostly covered by other landfill materials. The site poses no immediate radiological threat to the public. Radioactive wastes, in concentrations greater than the current NRC standards for unrestricted release, are found in two soil piles and include uranium-238, thorium-230, and radium-226. Elevated levels of radioactivity (gross alpha particle contamination) have been detected in groundwater monitoring wells onsite, indicating slight contamination above background.

The NRC staff proposes to defer to EPA's Superfund Program for the remediation of uranium contamination. NRC staff has already acknowledged that EPA's Superfund Program is responsible for the remediation of the radioactive waste on this site. A letter dated May 1991 states that ". . . EPA is taking the lead for site remediation activities . . . ." NRC staff has performed limited reviews of EPA-required documents, including the Remedial Investigation/ Feasibility Study for the site, that included considerations of both radiological and non-radiological material onsite. The NRC staff believes the remedial actions that would be required by EPA, under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), would be sufficient to protect the public and the environment from the risks associated with the uranium contamination.

Under this deferral scenario, NRC staff would continue to provide certain technical support to EPA, at the specific request of EPA. In addition, NRC would retain a copy of the Record of Decision in the permanent files for the site. The staff would take no further action at the site after deferral to EPA, since the site is not currently licensed by the NRC.

BACKGROUND INFORMATION FOR THE DOW CHEMICAL COMPANY BAY CITY AND MIDLAND, MICHIGAN, SITES

Dow Chemical Company possesses thorium-contaminated waste under a Nuclear Regulatory Commission license at two sites in Michigan: Bay City and Midland. The Bay City site is located 1 mile south of Saginaw Bay and is 20 miles east of Midland, Michigan. The thorium-contaminated waste at this site is stored in a fenced-in area owned by Dow Chemical Company. Approximately 30,500 m^3 (40,000 yd^3) of thorium-contaminated waste is estimated to be stored at the Bay City site. This waste has an average concentration of 188 pCi/g thorium-232, with a range of from 2 to 7000 pCi/g thorium-232. Dow estimates that there are about 9.2 Ci of thorium-232 and an equivalent amount of thorium-228 at the Bay City location.

The estimated volume of the thorium-contaminated waste at the Midland site is over 9000 m^3 (12,000 yd^3). The area where the waste is stored at the Midland site measures 50 m by 90 m (160 ft by 300 ft) and is roped off. The waste is covered by a clay cover that is approximately 1-meter thick. The thorium-contaminated waste storage area is located within a larger industrial complex that Dow owns and controls access to. The radioactivity in the waste varies substantially and ranges up to 2000 pCi/g, with an average of 29 pCi/g thorium-232 and an equivalent activity concentration of thorium-228. Dow estimates that there is approximately 0.46 Ci of thorium-232 in the waste at this site.

In 1956, the U.S. Atomic Energy Commission gave Dow Chemical Company a license to use thorium metal and compounds to produce thorium-magnesium alloys. The alloying proces produced a thorium-contaminated waste. In 1973, the license was amended to authorize storage only at Dow's Bay City and Midland sites in Michigan, and at the Madison site in Illinois. The Madison site is now under the regulatory authority of the Illinois Department of Nuclear Safety.

Thorium-contaminated waste and associated contaminated soil are currently being stored at both sites. Dow proposes to dispose of its thorium-contaminated waste in two dedicated disposal cells at the Dow-owned and operated Salzburg Landfill in Midland. The Salzburg Landfill is permitted by the Michigan Department of Natural Resources and the Environmental Protection Agency (EPA), for the disposal of hazardous and non-hazardous solid wastes. The Salzburg Landfill, is relatively large [615,100 m^2 (152 acres)], and is located 1.5 miles from the Midland site and 20 miles from the Bay City site.

The proposed disposal cell design, for the thorium-contaminated waste, would be comprised of, from the bottom, a 6 meter clay underliner with a hydraulic conductivity of less than 10^{-6} cm/s; 1 meter of recompacted clay with hydraulic conductivity of less than 10^{-7} cm/s; a synthetic liner with a leak detection and removal system consisting of a 0.33-meter sand drainage layer; 1.5 meters of clay; a geosynthetic liner; and a 0.33-meter sand leachate drainage layer. This liner would underlie the thorium-contaminated waste which would be covered by 1 meter of clay; a 100-mil HDPE synthetic liner; 0.33 meters of drainage medium; almost a meter (91 cm) of a frost protection layer; and 0.66 meters of top soil. No liquid wastes are allowed to be disposed of at the Salzburg Landfill. The approximate design area for one of the proposed thorium-contaminated waste disposal cells is 61 m (200 ft) long by 40 m (125 ft) wide, and the other is 221 m (725 ft) long by 23 m (75 ft)

wide. Both disposal cells will be covered by a unified cover. There are 16 shallow monitoring wells around the proposed disposal cells. These monitoring wells are required under Resource Conservation and Recovery Act (RCRA) and State of Michigan hazardous waste requirements. Groundwater monitoring wells and domestic wells in the area are sampled as part of the Salzburg Landfill monitoring program.

The NRC staff proposes to allow Dow Chemical Company to dispose of licensed material in EPA-approved RCRA designed cells in accordance with 10 CFR 20.2002 and thereby be exempt from NRC's unrestricted release criteria of 10 CFR 40.42(j)(3) [Although the amended rule does not refer to unrestricted release, but to release in accordance with NRC requirements, the criteria of the SDMP Action Plan apply. These are essentially unrestricted release criteria.] Dow has requested to bury thorium-contaminated waste in the Salzburg landfill, per 10 CFR 20.2002, at concentrations above NRC's SDMP Action Plan criteria for unrestricted release.

There is a parallel between what is being proposed by Dow and the burial of low-level waste under 10 CFR Part 61. The performance objectives for the disposal of low-level radioactive waste, as stated in 10 CFR Part 61 and the Final Environmental Impact Statement for Part 61 (NUREG-0945), are to: 1) protect public health and safety (and the environment) over the long term; 2) protect the inadvertent intruder; 3) protect workers and the public during the short-term operational phase; and 4) provide long-term stability, to eliminate the need for active long-term maintenance after operations cease. The staff believes that disposal of the thorium waste in the landfill would be generally consistent with these objectives, although the staff has not completed the kind of detailed review that would be required for a license application under 10 CFR Part 61.

For thorium contamination of the type presently stored by Dow under its license, the dominant exposure pathway is direct exposure from human intrusion. Thorium-232 has an extremely long half-life (in excess of 14 billion years). Thus, the potential hazard will continue to exist whether the material is excavated and shipped to a licensed disposal site (at an estimated cost of about $28 million if disposed at Envirocare or significantly more if disposed at a licensed low-level waste disposal facility) or excavated and shipped to the Salzburg Landfill (at a cost of about $5 million). The primary safety issue then becomes how to minimize the potential for human intrusion over the long term under either disposal alternative. Dilution of the contamination was not considered due to the significant increases in waste volume that would be required to substantially reduce thorium concentrations down to levels approaching natural background for soils in the Midland area.

As a regulated hazardous waste disposal facility, institutional controls would be required to be maintained over the Salzburg Landfill under hazardous and solid waste regulations. Dow states that, even though the concentration of thorium in the waste exceeds NRC's criteria for unrestricted release, the co-location of the thorium waste disposal cells with the hazardous and solid waste disposal cells would offer sufficient institutional control to deter intrusion over the long term. The institutional controls offered by hazardous and solid waste regulations involve environmental monitoring and reporting, maintenance and release control, and controls on the post-closure use of the land (i.e., no disturbance of the waste or any components of the disposal