ENVIRONMENTAL HEALTH CENTER
A Division of The National Safety Council
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http://www.nsc.org/ehc.htm

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Dear Colleague:

Enclosed are four informational pieces regarding the U.S. Department of Energy's (DOE) Waste Isolation Pilot Plant (WIPP) in southeastern New Mexico.

The National Safety Council's Environmental Health Center (EHC) prepared these papers with funds from a cooperative agreement with the U.S. Environmental Protection Agency (EPA), which has regulatory responsibilities related to the WIPP. The papers address site issues; regulatory issues; transportation issues; and the international perspective on deep geologic disposal. We hope these papers will further citizens' interest in, and understanding of, the facility and of federal regulatory responsibilities related to it.

Let me briefly introduce EHC. The Environmental Health Center is a division of the National Safety Council, a nonprofit, nongovernmental organization headquartered outside Chicago, Illinois. The Council established EHC in January 1988 to help society and citizens better understand and act knowledgeably in the face of environmental health risks. Since that start, EHC has built a strong record of effective, nonpartisan communication.

EPA earlier this month completed its evaluation of the DOE's plan to protect public health and the environment as related to use of the WIPP for storing transuranic (TRU) wastes, and EPA has certified the WIPP to begin accepting those wastes. **The WIPP facility could begin accepting transuranic radioactive waste as soon as June, 1998.**

If you have questions on the WIPP or would like additional copies of the enclosed materials, please contact me directly at 202-974-2487 or by e-mail at mccaulek@nsc.org. EHC also distributes several other informational materials on the WIPP, including a *Reporter's Guide to the WIPP*, *Frequently Asked Questions on the WIPP* and informational posters on EPA's certification process. This information is also available on the National Safety Council's Web site at http://www.nsc.org/ehc/wipp.htm.

Sincerely,

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Waste Isolation Pilot Plant Fact Sheet

Regulatory Issues

Did the U.S. Environmental Protection Agency (EPA) consider alternatives to the WIPP for transuranic waste disposal?

No. EPA has responsibility for regulating many of the U.S. Department of Energy's (DOE) activities at the WIPP, but not for choosing the disposal site. The National Academy of Sciences' National Research Council studied ways to dispose of accumulating inventories of radioactive waste, and recommended burying transuranic waste deep within stable geologic formations. It recommended salt deposits as one of the disposal media for these wastes because salt deposits are in stable geological areas; the presence of salt demonstrates the absence of flowing fresh water; and salt formations will eventually "creep," fill in mined areas, and seal the radioactive waste from the environment. DOE chose the site for the WIPP based on its conclusions that it met these recommendations.

Did EPA and DOE work together to open the WIPP?

No. EPA and DOE did not collaborate on choosing the WIPP site. After Congress authorized construction of the facility, DOE became responsible for developing and managing the WIPP. The WIPP Land Withdrawal Act made EPA responsible for regulating many of DOE's environmental activities at the WIPP. Before the WIPP can open, DOE must obtain EPA's certification that the facility is in compliance with EPA's disposal standards for transuranic wastes, and that a variety of public health and environmental protection requirements have been satisfied.

Is EPA required to consider public comment before making its WIPP certification decision?

Yes. EPA has held public meetings and hearings to obtain public comments on all of its regulations relating to the WIPP. It has also accepted and considered written public comments received during many separate comment periods since 1992. The most recent public hearings were held in New Mexico in January 1998. In addition, throughout the WIPP's operation,

DOE must submit a recertification application to EPA every five years, and EPA is to review relevant public comments before issuing a final recertification decision on the WIPP's continued operation.

Is EPA's role over once the WIPP is open?

No. Throughout its 35 to 40-year operation of the WIPP, DOE by law is to submit a recertification application to EPA every five years. EPA is to review the recertification applications to determine whether the facility remains in compliance with applicable standards, and the public will have an opportunity to inspect and comment on the applications. In addition, EPA can inspect the WIPP and generator sites at any time to ensure compliance with the agency's standards. EPA also has authority to modify, suspend, or revoke the certification with cause.

If EPA allows the WIPP to open, won't nuclear weapons continue to be made?

The WIPP was designed to provide a solution to the waste generated by past nuclear weapons production, not to make room for the by-products of new or future nuclear weapons production. No nuclear weapons have been made in this country since 1989. In addition, the last underground nuclear test was conducted in 1992, and there is an international moratorium on underground testing. The radioactive waste to be disposed of at the WIPP does not include weapons-grade bomb materials. Transuranic waste consisting of protective clothing, tools, glassware, equipment, soils, and contaminated sludge is the only waste planned to be disposed of at the WIPP. The transuranic waste to be disposed of at the WIPP currently is stored or will be generated as a result of cleanup activities at 23 sites across the country.

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Transportation Issues

Why can't the waste stay where it is?

Based on a study by the National Academy of Sciences' National Research Council, the U.S. Department of Energy (DOE) decided the safest, most practical, and most cost-effective place to permanently dispose of the transuranic waste is in the deep underground repository at the WIPP. Every generator site is contaminated to some extent with radioactive or other hazardous materials, according to DOE. The contamination occurs not only in buildings; it is also found in soil, air, groundwater, and surface water at the sites. Most sites have significant and complicated problems that have been compounded over several decades, according to DOE. Current above-ground interim storage poses potential health risks which must also be weighed and compared against permanent underground disposal.

What steps will be taken if there is an accident or incident while trucks are en route to the WIPP?

DOE is in charge of any incident involving a shipment of transuranic waste, regardless of where the incident occurs. DOE's response would be automatic and not contingent on a state's request for assistance. DOE maintains regional offices that can receive calls for assistance 24 hours a day and are prepared to send trained personnel and equipment to incident sites. There is also a series of safety standards, tracking systems, and backup safeguards designed to avoid accidents or incidents involving the WIPP trucks, and to respond quickly if one occurs. Drivers who transport transuranic waste must comply with all the U.S. Department of Transportation requirements for transporting radioactive materials. They must have at least 100,000 miles of trucking experience, cleanly pass all substance abuse tests, and be trained and retrained each year to tackle a variety of transport conditions and situations, including rough terrain, severe weather conditions, and sabotage. All of the WIPP trucks are to be tracked through the Transportation Tracking and Communication System, known as TRANSCOM, which uses satellite communications and computer networks to track shipments and keep in touch with

drivers from start to finish. A control center is to maintain information about scheduling, routing, shipment content, and emergency response information about each shipment to the WIPP. Drivers of the WIPP trucks must complete a First Responders Course, to help them prepare for incident prevention and response.

Is radiation exposure a threat to citizens during transportation of the waste?

No. The waste traveling to the WIPP is to be stored in special containers, called the Transuranic Packaging Transporter Model 2, or TRUPACT-II, which have been tested and approved by the U.S. Nuclear Regulatory Commission for the transportation of radioactive waste. They are designed to prevent radioactive releases, even in the event of a severe accident or other emergency. Each stainless steel container is airtight and constructed with inner and outer containment vessels.

Are emergency response mechanisms able to handle an accident situation that involves radiation?

Yes. DOE has trained more than 11,000 emergency response personnel to respond to potential incidents involving shipments of waste to the WIPP. DOE's States and Tribal Education Program, which has been reviewed and certified by the U.S. Occupational Safety and Health Administration, consists of six courses on responding to potential incidents involving shipments of waste to the WIPP. Drivers of the WIPP trucks must complete a First Responders Course, so they will know how to handle an accident or incident. In addition, the DOE Albuquerque Field Office Emergency Operations Center will be in charge of any incident involving a shipment of transuranic waste, regardless of where it occurs. DOE's response will be automatic and not contingent on a state's request for assistance.

Are trucks and TRUPACTs stable enough to contain waste in an accident?

Yes. A special fleet of trucks will transport waste to the WIPP. Unique safety measures applicable to the WIPP transport vehicles include independent mechanical and radiological inspections, weather checks prior to dispatch, satellite tracking and communications with the vehicle, designation of safe parking areas for use en route in case of bad weather, and procedures for quickly replacing or repairing vehicles that malfunction en route. To demonstrate durability under extreme conditions, the TRUPACT-II has passed a series of tests: dropping the container 30 feet onto a steel-reinforced concrete pad, submitting it to jet fuel flames at temperatures greater than 1,475 degrees Fahrenheit for at least 30 minutes, and dropping it onto a steel spike to test puncture resistance.

Can citizens be exposed to harmful radiation from the WIPP trucks if they are near a stop sign where the trucks stop, or while being stuck in traffic next to a WIPP truck?

No. The special container that will contain the waste traveling to the WIPP, called TRUPACT-II, has been tested and approved by the U.S. Nuclear Regulatory Commission for the transportation of radioactive waste. They are designed to prevent radioactive releases, even in the event of a severe accident or other emergency.

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International Perspectives on Deep Geologic Disposal of Nuclear Waste

The WIPP is not a unique concept for disposing of nuclear waste. According to a report by the National Academy of Sciences' National Research Council, every other country that must deal with radioactive waste isolation eventually plans to use geological disposal (deep burial) to isolate those wastes. Those countries include Belgium, Canada, China, Finland, France, Germany, Japan, Russia, Sweden, Switzerland, Taiwan, and the United Kingdom.

Although regulators in most other nations issue general safety goals to protect the environment from radiation in geologic repositories, they plan to avoid the level of detail embodied in the U.S. approach to regulating geologic repositories. Safety goals in other countries, such as limits on the annual radiation dose for those living near a repository site, are set in broad terms, according to the U.S. General Accounting Office's report on foreign countries' approaches to radioactive waste storage and disposal. In France, for example, the regulatory authorities have issued basic safety rules that describe the objectives of deep geologic disposal, and the waste managers are responsible for developing specific methods to meet these basic guidelines. In other countries, as in the United States, public participation in the regulatory process has generated some support and some opposition to deep geologic disposal.

The Canadian Waste Program

Canada has developed a generic concept and design for disposing of highly radioactive waste in a geologic repository, but has not yet selected a site. Officials envision that a repository will be built approximately 1,625 to 3,250 feet deep in a granite formation that stretches over much of central and northern Canada. Once sealed, the repository is planned to be a passive system which would not require monitoring, maintenance, or control.

The French Waste Program

Research on geologic disposal, waste storage, and waste reduction methods is expected to continue in France until around

2007. France does not anticipate that a repository will be available until 2020 or later.

The German Waste Program

Germany is testing the suitability of a salt formation near the town of Gorleben as a deep geologic repository for high-level radioactive waste. If the site proves satisfactory, Germany plans to begin accepting high-level waste for final disposal there in 2008. Germany has used its long experience with salt formations to develop a repository concept. Under the current concept, the salt dome at Gorleben would be the primary barrier against the release of radiation. Over time, the salt will move, encapsulating and containing the waste. The planned steel and cast-iron waste canisters will provide little long-term containment but will merely contain the waste until the salt moves around them. Two other repositories -- one under construction and one already built -- are to be used for storing lower levels of waste. When these facilities are full, all types of nuclear waste will be stored at Gorleben.

The Japanese Waste Program

Japan plans to build a deep geologic repository for high-level waste and is in the second of four stages which began in 1976 and were designed to accomplish this goal. During the current stage, Japan plans to select potential candidate sites for the repository. Next, it plans to build demonstration facilities at one or more sites before entering the final stage of constructing and operating the repository. Japan does not anticipate the need for a repository until 2030 or later.

The Swedish Waste Program

Sweden plans to construct a deep geologic repository to dispose of highly radioactive waste but has not yet selected a site for the facility. The Swedish nuclear waste program requires that nuclear utilities demonstrate a safe disposal plan before new reactors can be licensed, and that nuclear power be phased out by 2010. To satisfy the first requirement, utilities developed a concept for disposing of spent fuel that involves burying the waste in long-lived containers deep in the Swedish crystalline rock. Sweden plans to use copper and steel canisters to contain and isolate the waste approximately 1,625 feet deep in the crystalline bedrock. The canisters are to be surrounded by clay, and the repository will be sealed by filling shafts with a mixture of bentonite and sand. The repository is to then become saturated with water after closure.

The Swiss Waste Program

Switzerland plans to dispose of high-level waste in a deep geological repository and is attempting to locate a potential site. Swiss utilities have investigated crystalline rock and clay formations for their suitability as a repository, where they would bury their waste approximately 1,300 to 3,250 feet deep.

The British Waste Program

The United Kingdom is deferring decisions on the final disposal of highly radioactive waste for at least 50 years. Government officials believe that the country will eventually dispose of the waste in a geologic repository, but the government will make its decision at a later time. In the meantime, the United Kingdom will reprocess most of its spent fuel and store the resulting high-level waste.

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Site Issues

How was the WIPP site chosen?

The U.S. Department of Energy (DOE) chose a site in southeastern New Mexico for the WIPP facility based on recommendations by the National Academy of Sciences' National Research Council that deep underground disposal in a suitable rock formation would be the safest, most practical, and most cost-effective means of permanently disposing of transuranic wastes. The site consists of a thick layer of salt deposited about 225 million years ago, making it highly stable.

An important criterion in site selection was that safety of the WIPP not be compromised in the future by earthquakes and collapsing caverns. The ancient salt beds at the WIPP are the kind often found in geologically stable areas that have little or no discernible earthquake activity. Salt formations will eventually "creep," surround the waste, fill in mined areas, and seal the waste from the environment. Surrounding and filling the repository shafts with crushed and compacted salt should also ensure that these shafts are effectively sealed. The WIPP was designed to take advantage of this encapsulation so that transuranic waste placed in the WIPP will be completely surrounded, thus minimizing the potential for waste migration. Because of these and several other factors, the National Research Council concluded that "the WIPP repository will provide an adequate level of long-term isolation of transuranic waste under a broad range of natural conditions and stresses for tens of thousands of years into the future."

How can the U.S. Environmental Protection Agency (EPA) and DOE predict what will happen to the WIPP 10,000 years into the future?

The thick layer of rock salt at the WIPP site has been stable since it was deposited about 225 million years ago. The National Research Council concluded that "provided it is sealed effectively and remains undisturbed by human activity ... the WIPP repository has the ability to isolate transuranic waste for more than 10,000 years." Geologists, hydrologists, and climatologists say they are generally comfortable in making 10,000 year projections in their disciplines. If the WIPP site meets EPA standards for 10,000 years, it is highly likely that the site will be safe also after that time.

What will keep people away from the WIPP once it is closed?

During the first hundred years or so after the WIPP repository is closed, EPA standards require DOE to act to discourage people from disturbing the WIPP site. "Active" controls, which involve human maintenance in the near future, include such measures as routine security patrols and security fences. "Passive" controls, which are intended to convey information far into the future about site hazards, include permanent site markers, controls on land use in the area, and archived documents.

How could the WIPP site be affected by potential future drilling activities?

Although the WIPP is in a sparsely populated area, oil drilling, gas drilling, and potash mining do take place in the general vicinity. EPA required DOE to consider potential effects of drilling at the site. EPA concluded that the DOE was in compliance with its standards even when current and potential future drilling and mining activities at the WIPP site are considered, and that DOE had demonstrated that the possible effects of drilling events had been adequately considered. EPA's standards also require DOE to discourage people from disturbing the WIPP site. If, despite warnings at the site, future generations drill near the WIPP site, the agency projects that the amount of radionuclides released will be minimal and within EPA standards.

What is in the waste containers that will be stored at the WIPP?

The 1992 WIPP Land Withdrawal Act, as amended, restricts the amount and types of transuranic wastes that can be disposed of at the WIPP. Only defense-generated transuranic wastes that have been stored for shipment since 1970 can be disposed of at the WIPP. The waste typically consists of by-products of nuclear weapons production and dismantling, such as rags, boots, protective clothing, glassware, etc. Because there are limits on the waste that can be disposed of at the WIPP, the volume and degree of radioactivity of the waste will be measured by DOE and monitored by EPA.

Will the stored waste containers at the WIPP be breached over time?

Yes. The containers storing waste will disintegrate over time, but the waste by then will be surrounded by the natural salt "creep" of the salt bed that will encapsulate the entire underground facility. This process of encapsulation should keep waste isolated from the environment.

Will waste from the WIPP pollute the groundwater?

The groundwater in the vicinity of the WIPP is salt water, and therefore undrinkable. DOE conducted an assessment of three potential underground sources of drinking water in the vicinity of the WIPP, and concluded that no radiation contaminants would reach them under undisturbed conditions. If, however, it were possible for radiation contaminants to reach the sources because of an unintentional drilling event, the contaminated portion of the groundwater would not leave the site.

Can the waste at the WIPP be retrieved?

Yes. EPA recognizes that removal of waste from the WIPP in the future would be unlikely, difficult and expensive, but the Agency nevertheless requires DOE to have a strategy to remove the waste from the repository that is projected to be feasible during the entire regulatory time frame. Although the WIPP is intended to be a permanent disposal facility, EPA believes it is important that waste can be removed if necessary.

What are the different kinds of radioactive waste, and how is the WIPP waste unique?

There are five categories of radioactive waste: (1) spent nuclear fuel from nuclear reactors and high-level waste from reprocessing spent nuclear fuel; (2) transuranic waste, generated mainly as by-products from defense programs; (3) uranium mill tailings, from the mining and milling of uranium ore; (4) low-level waste, from contaminated industrial or research waste; and (5) naturally occurring radioactive materials.

The only waste allowed at the WIPP is transuranic waste, which typically consists of rags, boots, protective clothing, glassware, tools, equipment, soils, and sludge contaminated with manmade radioisotopes heavier than uranium. These elements include plutonium, neptunium, americium, curium, and californium. Transuranic waste is produced during nuclear fuel assembly and during nuclear weapons research, production, cleanup, and dismantling. The 1992 WIPP Land Withdrawal Act, as amended, defines transuranic waste as "waste containing more than 100 nanocuries of alpha-emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years." The law specifically excludes high-level waste and spent nuclear fuel from being disposed of at the WIPP.

How does the WIPP relate to other potential nuclear waste sites such as Yucca Mountain?

Both the WIPP and the potential repository at Yucca Mountain are intended to permanently dispose of radioactive waste. However, there are some major distinctions between the two facilities. First, the WIPP is intended by Congress as a repository for those wastes which are classified as transuranic, which means having atomic numbers heavier than uranium. The transuranic waste destined for the WIPP consists of by-products of *defense* nuclear weapons production and disassembly. The by-products include protective clothing, glassware, equipment, soil and sludge, etc. Most of the WIPP waste consists of non-penetrating radioactive particles, which can be shielded by a person's skin.

For example, if Yucca Mountain, in Nevada, is found to be a suitable site, it is intended to contain high-level radioactive waste and spent nuclear fuel generated as a result of *commercial* nuclear power production. The waste intended for Yucca Mountain is generally more penetrating (more dangerous) than the transuranic waste destined for the WIPP.

Another difference between the WIPP and Yucca Mountain is the agency responsible for determining the safety of the site. In the case of the WIPP, EPA is the agency responsible for both setting the standards and determining if the facility will comply with the standards. In the case of Yucca Mountain, EPA will set the standards but the Nuclear Regulatory Commission will determine the safety of the site.