ENTERED

December 12, 1996

Backgrounder #5

Backgrounder

ENVIRONMENTAL HEALTH CENTER

Suite 401
1019 - 19th St., N.W.
Washington, DC 20036

Voice:
(202) 293-2270

Fax:
(202) 293-0032

E-mail:
ehc@cais.com

Website:
http://www.nsc.org/ehc/wipp.html

EHC Contact:

Dawn Amore
(202) 293-2270 ext. 483

DOE Contacts:

Dennis Hurtt:
(505) 234-7327

WIPP Information Center:
(800) 336-WIPP

WIPP Website:
http://www.wipp.carlsbad.nm.us

RECEIVED
JAN 13 1997

How Much Waste Will Come to WIPP?

Transuranic waste is to come to the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico, from sites across the United States.

Most of the transuranic waste, by volume, consists of protective clothing, tools, glassware, and equipment contaminated with elements like plutonium, which have atomic weights higher than that of uranium. No "high-level" waste (the highly radioactive waste from reprocessing of spent fuel) or "low-level" waste is to be disposed of at WIPP

Transuranic waste is classified according to how radioactive it is. Waste called **"contact-handled"** emits no more than 200 millirems per hour at the surface of the container. It can be safely handled in metal drums with no further protective measures. **"Remote-handled"** waste emits more than 200 millirems per hour and requires special equipment to handle. About 81 percent by volume of the waste scheduled to go to WIPP is contact-handled waste.

The waste is to come from the nationwide complex of facilities used during the Cold War era for research, military reactors, and weapons production. Some of the waste has been stored at the sites, and more will be generated as the sites are cleaned up in coming years.

The following tables list the amounts of waste by volume expected to come from each site. The amount stored is listed separately from the amount expected to be generated in the future. Both amounts are still rough estimates in many cases. Totals may not add because of rounding.

WIPP Waste Volume by Generator Site

Remote-Handled Transuranic Waste (RH TRU) Volume in Cubic Meters

State	Location of Storage/Generator Site	Volume Now Stored	Projected Volume	Total Volume
WA	Hanford Reservation (Hanford)	200	2,420	2,620
ID	Idaho National Engineering Laboratory	86	53	139
NM	Los Alamos National Laboratory	94	136	230
TN	Oak Ridge National Laboratory	962	193	1,155
OH	Battelle Columbus Laboratories	581	0	581
PA	Bettis Atomic Power Laboratory	0	2	2
CA	Energy Technology Engineering	6	1	7
CA	General Electric Vallecitos Nuclear	5	8	13
NY	Knolls Atomic Power Laboratory	6	<1	7
NM	Sandia National Laboratories	1	2	3
1.	**Total RH TRU Volume**	1,941	2,816	4,757
Total 1. + 2.	**Total (RH+CH) TRU Waste Volume**	103,966	41,253	145,219

Source: National Transuranic Waste Management Plan, DOE/NTP-96-1204

This backgrounder was produced by the National Safety Council's Environmental Health Center under Department of Energy *Co-operative Agreement DE-FC02-96EW12729*

961206

WIPP Waste Volume by Site

Contact-Handled Transuranic Waste (CH TRU) Volume in Cubic Meters

State	Location of Storage/Generator Site	Volume Now Stored	Projected Volume	Total Volume
IL	Argonne National Laboratory – East	83	12	95
WA	Hanford Reservation (Hanford)	16,407	9,251	25,658
ID	Idaho National Engineering Laboratory	65,102	81	65,183
CA	Lawrence Livermore National Laboratory	249	905	1,154
NM	Los Alamos National Laboratory	7,770	9,259	17,029
OH	Mound Plant	239	12	251
NV	Nevada Test Site	623	12	635
TN	Oak Ridge National Laboratory	1,303	256	1,559
CO	Rocky Flats Site	1,043	14,741	15,784
SC	Savannah River Site	9,165	3,773	12,938
	Small Quantity Sites			
IA	Ames Laboratory (Ames)	0	<1	<1
PA	ARCO Medical Products Co. (ARCO)	<1	0	<1
VA	Babcock & Wilcox — NES (Lynchburg)	18	0	18
PA	Bettis Atomic Power Laboratory	0	123	123
CA	Energy Technology Engineering Center	2	0	2
CA	General Electric Vallecitos Nuclear Center	5	4	9
CA	Lawrence Berkeley Laboratory	<1	1	1
KY	Paducah Gaseous Diffusion Plant	2	0	2
TX	Pantex Plant	<1	0	<1
NM	Sandia National Lab. – Albuquerque	7	6	13
NJ	Teledyne Brown Engineering	<1	0	<1
IL	U.S. Army Material Command	3	0	3
MO	University of Missouri Research Reactor	<1	<1	<2
2.	**Total CH TRU Volume**	**102,025**	**38,437**	**140,462**

Source: National Transuranic Waste Management Plan, DOE/NTP-96-1204

# # #

Backgrounder

What Is Radiation? How Do We Measure It?

Suite 401
1019 - 19th St., N.W.
Washington, DC 20036

Voice:
(202) 293-2270

Fax:
(202) 293-0032

E-mail:
ehc@cais.com

Website:
http://www.nsc.org/ehc/wipp.html

EHC Contact:

Dawn Amore
(202) 293-2270 ext. 483

DOE Contacts:

Dennis Hurtt:
(505) 234-7327

WIPP Information Center:
(800) 336-WIPP

WIPP Website:
http://www.wipp.carlsbad.nm.us

This backgrounder was produced by the National Safety Council's Environmental Health Center under Department of Energy *Co-operative Agreement DE-FC02-96EW12729*

What Is Radiation?

Radiation can be found all around us. Radiation is energy in the form of high speed particles or electromagnetic waves. Radiation is either **ionizing** or **non-ionizing**. Non-ionizing radiation does not have enough energy to alter atoms, such as microwaves and visible light (see Figure 1).

Ionizing radiation is the type whose health effects we are more concerned with. It is powerful enough to alter (ionize) cellular chemicals, disrupting normal cell functioning. Usually the cell repairs itself, but it may die or transform into a cancerous cell. Ionizing radiation comes in three main forms:

Alpha particles are the slowest of the three types of radiation. They can travel only a few inches in the air, losing their energy almost as soon as they collide with anything. They are easily shielded by a sheet of paper or the outer layer of a person's skin. Contact-handled transuranic (TRU) waste emits primarily alpha particles (see Backgrounder #2, *Transuranic Waste: What it is ... and isn't*).

Beta particles are more energetic than alpha particles. Identical to an electron, a beta particle can travel in the air for a distance of a few feet. Beta particles can pass through a sheet of paper, but may be stopped by a sheet of aluminum foil or glass. Alpha & Beta particles are in the Ultraviolet range of the electromagnetic spectrum (see Figure 1).

Gamma rays, unlike alpha or beta particles, are waves of pure energy and are a form of x-ray. Gamma rays travel at the speed of light through air or open spaces. Gamma radiation can be very penetrating and requires concrete, lead, or steel to stop it. Remote handled TRU waste emits gamma radiation.

How Is Radiation Measured?

Because radiation and its effects are diverse, there are several ways of measuring it. We may measure the actual energy in the air, or absorbed or released by a substance. We may also measure the radiation based on how much biological damage it does. The following units are used in the United States:

— more —

The **Roentgen** is a measure of *exposure* — the amount of radiation energy (in the form of gamma or x-rays) in the air.

The **Rad** (Radiation absorbed dose) is a measure of *absorbed dose* — the amount of energy actually absorbed by some material, such as human tissue.

The **Rem** (Roentgen equivalent man) is the measurement we are most concerned with. It is a measure of the actual *biological effects* of radiation absorbed. The rem is often expressed as millirem, which represents one-thousandth of a rem.

The **Curie** (Ci) is a measure of *radioactivity*. One curie of radioactive material will have 37,000,000,000 transformations of atoms (disintegrations) in one second. One curie of radium is approximately one gram.

How Much is One Rem?

To get a feel for the radiation dosage of a rem, compare it with other common dosages. We receive radiation from radon gas in our homes and drinking water, from outer space, from radioactive elements in our own bodies, and from medical x-rays. Since common human dosages are less than one rem, a more practical unit of measurement is the millirem (1/1000 of a rem). Average doses include:

Source	Dose (millirem)
Chest X-Ray	10
Mammogram	30
Cosmic Rays	31 annually
Human body	39 annually
Radon in household	200 annually (U.S. average)

The U.S. government has set maximum acceptable levels for radiation exposure at 2 rems (2,000 millirems) per year for occupational exposure, and 0.1 rem (100 millirems) per year for general public exposure.

Figure 1. Electromagnetic Spectrum of Different Types of Energy

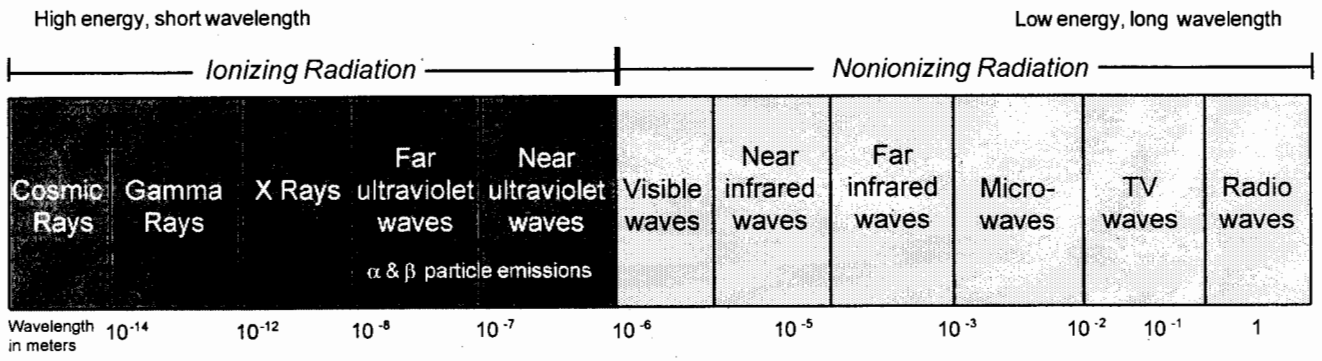

Figure 1. This electromagnetic spectrum represents different types of energy travelling as electromagnetic waves that differ in their wavelength (distance between each peak or trough) and energy content. Cosmic rays, gamma rays, X rays, and ultraviolet radiation have a high enough energy content to alter atoms into positively or negatively charged ions. This is called **ionizing radiation**. The other forms of electromagnetic radiation do not have enough energy content to form ions and are called **nonioning radiation**. Alpha and Beta particle emissions are not electromagnetic waves or rays. They are listed on this chart for illustrative purposes, approximating their relative radioactivity. Adapted from: Miller, *Living in the Environment*, Seventh Ed., 1992.

# # #

The Department of Energy is holding public hearings on WIPP!

This is your opportunity to have your voice heard...The Waste Isolation Pilot Plant's Supplemental Environmental Impact Statement (SEIS-II) is now in the public comment period. Please note the dates and times.

1/6-7/97	Albuquerque, NM morning, afternoon & evening	ABQ Convention Center 505-768-4575	Albuquerque, NM morning, afternoon & evening	ABQ Convention Center 505-768-4575
1/8-10/97	Santa Fe, NM morning, afternoon & evening	Sweeney Convention Center 505-986-6901	Santa Fe, NM morning, afternoon & evening	Sweeney Convention Center 505-986-6901
1/13/97	Denver, CO afternoon & evening	Arvada Center 303-431-3080	Carlsbad, NM afternoon & evening	Pecos River Village 505-887-6516
1/15/97	Boise, Idaho afternoon & evening	Red Lion Inn Riverside 208-343-1871	Richland, Washington afternoon & evening	Red Lion Inn Richland 509-946-7611
1/21/97	Oak Ridge, TN afternoon & evening	AMSE 423-576-3200	Morning = 9 a.m. to 12 p.m. Afternoon= 2 p.m. to 5 p.m. Evening = 7 p.m. to 10 p.m.	
1/23/97	North Augusta, SC afternoon & evening	Community Center 803-441-4290		

Red Lion Inn Riverside
2900 Chinden Blvd.
Boise, ID 83714

American Museum of Science & Energy
300 South Tulane Avenue
Oak Ridge, TN 37830

Albuquerque Convention Center
401 2nd Street NW
Albuquerque, NM 87103

Arvada Center for Arts and Humanities
6901 Wadsworth Blvd.
Denver, CO 80003

Red Lion Inn Richland
802 George Washington Way
Richland, WA 99352

North Augusta Community Center
495 Brookside Drive
North Augusta, SC 29841

Sweeney Convention Center
201 West Marcy
Santa Fe, NM 87501

Pecos River Village
711 N Muscatel
Carlsbad, NM 88220