

UNDERSTANDING RADIATION IN OUR WORLD



SUPPLEMENT FOR JOURNALISTS

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National Safety Council's Environmental Health Center

1025 Connecticut Ave., NW Suite 1200

Washington, DC 20036

202/293-2270

<http://www.nsc.org/ehc.htm>

A Publication of the
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For information on ordering additional copies of this guide or copies of the supplemental materials, please visit the Environmental Health Center website:
<http://www.nsc.org/ehc/rad.htm> or call 202/293-2270.



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Introduction

The guidebook, *Understanding Radiation in Our World*, which accompanies this supplement, is written in a way meant to be understandable by a general reader. It explains in simple terms what radiation is, and the different kinds of radiation. It discusses the many sources of ionizing radiation in our environment and some of the key benefits and the risks associated with different types of ionizing radiation. It covers the issues of nuclear waste clean-up, transportation, and disposal and describes the measures that are taken to protect people from radiation risks and the complex structure of government agencies which are responsible for protecting people.

This supplement provides additional information for journalists along with suggestions for story ideas, examples of reporting on radiation, and additional resources and contacts.

Why Cover Radiation?

Ionizing radiation has been at the heart of some of the biggest news stories of the 20th century: the atomic bomb dropped on Hiroshima and Nagasaki; the Cold War nuclear arms race; the use of radiation in the treatment of cancer; nuclear power and the “Energy Crisis”; and the nuclear power plant disasters at Three Mile Island and Chernobyl.

Ionizing radiation is not only an element in blockbuster stories, but is also a key part of readers’ and viewers’ daily lives. It is a complex subject, full of controversy, that affects society and individuals in many ways, but it is often not well understood by the public. It is also a subject about which government agencies are frequently making crucial decisions.

Radiation: What It Means

Radiation is energy—the primal energy of the universe, originally created billions of years ago. Ionizing radiation is emitted in the form of waves or particles as the unstable atoms of radioactive materials “decay” to a stable state. This process can take from a fraction of a second to billions of years, depending on the material. Radioactive materials (called radioisotopes or radionuclides) and the radiation they produce are everywhere—in the soil, in our food and water, and in our bodies.

It is important to remember that not all radiation is the same and that different kinds of radiation affect living things in different ways. The term radiation is often used to refer to the kind of high-energy radiation that can be harmful to people—known as ionizing radiation.

There is also an important difference between radiation and radioactivity (although the terms are often mistakenly used interchangeably):

- *Radiation* is the propagation of energy in the form of waves or particles over a distance.
- *Radioactivity* is a property of a substance, such as uranium or plutonium, which emits ionizing (high-energy) radiation.

Opportunities and Pitfalls

Government agencies make decisions almost every day regarding exposure to ionizing radiation and efforts to limit it (e.g., where and how to dispose of various types of radioactive waste; whether to extend a license for a nuclear power plant; which commercial, medical, and industrial facilities will be licensed or re-licensed to use radioactive materials; or which irradiated foods may be sold and how the public is informed). News reporters who cover government agency

decisions will find numerous story possibilities.

The Nuclear Regulatory Commission (NRC), U.S. Department of Energy (DOE), and the U.S. Environmental Protection Agency (EPA) are among the federal agencies involved in making decisions about radioactive materials. State agencies and private companies also make decisions related to radiation every day.

Nuclear energy and radioactive waste are newsworthy because the potential environmental and health risks of radiation are a concern to many readers and viewers.

Because people have real fears, it is easy to generate stories focussing on perceived threats or immediate public fears. But this focus may overlook the greater dangers. Radon seeping into people's basements from rocks and soil (responsible for an estimate 15,000 to 22,000 lung cancer deaths each year), for example, may for many people be a much bigger threat to health than the hazards of nuclear accidents or nuclear waste disposal.

In addition, if news stories focus only on dangers, they may miss opportunities to inform audiences about ways in which they can impact government and corporate decisions to reduce radiation hazards. The human tragedy of a case of radiation-induced cancer draws more attention than the dull civics-lesson stories of funding, rulemaking, and enforcement which can keep such tragedies from happening.

On the other hand, the prevalence and wide use of radioactive materials and the real potential for impacting our lives offers significant reporting opportunities. Some examples of news stories are highlighted at the end of this supplement.

Balancing the Benefits and Risks of Ionizing Radiation

Ionizing radiation offers tremendous potential benefits but it can also pose substantial risks.

The incredible destructive force of radiation has at times been quite easy to see, such as the destruction of human lives at Hiroshima and Nagasaki or Chernobyl. Despite the end of the Cold War and improved technology, the risks of nuclear war, nuclear terrorism, and accidents still exist. Other risks are less evident, such as exposure to indoor radon or cosmic radiation.

The uses of radiation go beyond that of nuclear

weapons and generating electric power. It is used in numerous medical treatment and diagnostic procedures, in making some foods safer by killing bacteria (although food irradiation is not without drawbacks and controversy), in the manufacture of many consumer products, and in many other ways that make our lives better and safer.

Keeping Risks in Perspective With Other Risks

The risks of ionizing radiation are real. But they vary a lot according to the situation. Most people do not have as much exposure to ionizing radiation as someone who has had occupational exposure or someone who has been exposed to improperly handled nuclear waste materials.

For most people, most of their exposure to ionizing radiation comes from daily exposure to "natural" background radiation, such as from radon or cosmic rays (background radiation accounts for an average of 82 percent of annual exposure), and from deliberate exposures like dental X-rays. While the potential exposure consequences of a nuclear accident are significant, the likelihood of an accident occurring is small (a "low probability, high consequence" event).

The overall risk a person typically faces from radiation (both voluntary and involuntary) may pale in comparison with many other health threats – for example, auto accidents. The risk of living near a chemical plant may be greater than that of living near a nuclear plant – if the track record in the United States over the last few decades is any indication. The likelihood of harm to health from, say, transportation of gasoline on highways appears greater than that from transportation of nuclear materials. For example, in 1999, radioactive materials were involved in 30 transportation incidents, resulting in no deaths or injuries and flammable-combustible liquids were involved in more than 6,500 incidents, resulting in 72 injuries and six deaths, according to the Department of Transportation's Hazardous Materials Information System.

Story Ideas

1. Your electric power service area may well draw power from a nuclear generating plant. Go to the NRC and state regulators to check out its safety record. What, if any, releases of radiation have occurred over the years and what level of risk did they present? Has the company addressed problems?
2. Does your regional nuclear power plant have a problem with storage of spent fuel? How is it addressing this problem? What will it do until the federal government takes the waste? What, if any, risks does it present to the public?
3. Your state is probably involved in an interstate compact for disposal of low-level nuclear waste. What is the status of the compact? When is waste disposal likely to be possible? Where is the facility to be sited? What risks and problems may be associated with it? What will be done to minimize them?
4. Identify some of the major university research labs and hospitals in your area which are using nuclear materials. What programs do they have in place for public protection? How is their radioactive waste managed and disposed of? What exposures do workers incur? How are they regulated? Have they had to change or curtail any medical procedures because they can't dispose of the radioactive waste for economic or other reasons?
5. Somewhere in your part of the country there may very well be a facility which is part of the vast national nuclear weapons complex. Check with DOE, local officials, and non-governmental organizations to see what kind of contamination has occurred there from waste disposal and other activity. What public exposures are likely and what are the health risks? What are the plans for cleaning up? Have they been funded? Has implementation begun? How long will it take? Have DOE officials prepared annual site environmental reports detailing radiation exposure to the community and the environment? Where and how is radioactive waste from the site being stored and disposed of?
6. What agency in your state is responsible for protecting the public from exposure to ionizing radiation? For protecting the environment from radioactive contamination? For responding to radiological emergencies (e.g., fire department, police)?
7. Is your community prepared to respond to an accident involving radioactive materials? From a transportation accident? From a facility using or processing radioactive materials? From a terrorist attack?
8. What agency in your state is responsible for overseeing transportation of nuclear materials? What risks are presented by transportation of nuclear materials in your state? What routes are used to transport nuclear materials? How do the risks compare to those for transportation of other hazardous materials like liquid natural gas and gasoline?
9. Are there any radioactively contaminated sites in your area, such as Superfund sites with radioactive contamination or sites contaminated during the production of nuclear arms?
10. Where are there high-voltage power distribution lines in your community? Has anyone measured the fields that they generate? How far are the lines from residential areas and other populated places?
11. Do any industrial facilities in you area expose workers to EMF levels much higher than those a person in an ordinary residence would be exposed to?
12. Are irradiated foods widely available in your area? Are consumers buying them or are they concerned about the foods? Are there any plans for increase state or local regulation of irradiated foods?

Examples of News Stories

“Poisoned Workers and Poisoned Places: Secret Project Carried Hidden Dangers,” *USA Today*, September 6, 7, and 8, 2000; this extensive series by USA Today reporter Peter Eisler looks at the toxic legacy left behind after the federal government hired hundreds of private companies to work with nuclear weapons materials in the 1940s and 1950s. According to the series, the risks to workers and the environment were known by the government but standards were routinely violated and the problems were kept hidden. The companies, ranging in size from very small to very large, were not prepared to deal with the hazards, and workers were not told of the dangers. During the 10 months Eisler spent on the project, he reviewed 100,000 pages of federal documents (many only recently declassified), interviewed dozens of medical and scientific experts, and filed a half dozen Freedom of Information Act requests. Two weeks after the series ran, DOE released a list of more than 500 companies, research sites, and other places that may have been used to help build nuclear weapons.

Radiation exposure at DOE’s Paducah Gaseous Diffusion Plant. The *Washington Post* ran a series of articles by Joby Warrick beginning the first week of September 1999 on radiation exposure in DOE’s Paducah Gaseous Diffusion Plant. The articles addressed a number of issues and actions at the plant including medical evidence of dangerous exposures to workers in the past, a lawsuit by current and former workers against DOE contractors at the facility accusing them of deliberately exposing workers to highly radioactive materials, a DOE-ordered “safety stand down” at the plant after management problems were found relating to protecting workers, proposed allocation of federal funds to compensate ailing workers, and reports from investigations showing DOE and contractors ignored warnings and didn’t screen workers for exposures.

Plutonium release at DOE’s Hanford site. An article by Karen Dorn Steele, in the *Spokesman-Review* in 1996 reported that Hanford site released potentially much more plutonium than reported by the federal government. A scientist working for an attorney in Seattle reported that as much as several pounds of plutonium, not the one once reported by the government, bypassed

filters at the facility in the late 1950s and 1960s. The scientist’s review of recently declassified documents was key to his challenge of the federal report.

Food irradiation. An article in the December 7, 1997 *New York Times*, “Investing it: Red Meat May Not Be Enough for Irradiation Companies,” focused on the business aspects of food irradiation. The article came shortly after FDA approval of irradiation for red meats. It highlighted some of the widespread uses of radiation in food and described some industry analysts’ skepticism about the future of the food irradiation business. Their concerns centered on consumer reaction and the cost involved in building new facilities.

Kids and CAT Scans. A report in *Time* magazine in February 2001 raised concerns about the dose of X-rays many children are receiving during CT (computerized tomography, formerly known as CAT) scan procedures. Children often receive larger doses than necessary – doses meant for adults, according to two recent studies. Because children are more sensitive to radiation than adults, they are at greater risk of eventually getting cancer from the exposure. While noting that the benefits far outweigh the risks of CT scans, the researchers say the risks can be reduced.

Plutonium experiments. Eileen Welsome wrote a Pulitzer prize winning series in the *Albuquerque Tribune* in 1993 on DOE intentionally exposing people to plutonium and other human experiments without their informed consent in the 1940s and 1950s, and 1960s. Her series prompted the Clinton Administration to establish an investigative commission to study the experiments and to release many previously classified documents. Welsome later wrote a book, *The Plutonium Files: America’s Secret Medical Experiments in the Cold War*, further detailing the history of nuclear arms and related human experimentation in the United States.

Resources and Contacts

Institute for Energy and Environmental Research

Phone: 301/270-5500
Fax: 301/270-3029
ieer@ieer.org
<http://www.ieer.org>
Contact: Arjun Makhijani

Natural Resources Defense Council

40 West 20th Street
New York, NY 10011
Telephone: (212) 727-2700
Fax: (212) 727-1773
<http://www.nrdc.org/nuclear/default.asp>
Contact: Thomas B. Cochran or Christopher E. Paine, Area of expertise: nuclear weapons and waste
Contact them through their press contact:
enegin@nrdc.org, 202-289-2405.

Nuclear Energy Institute

176 I Street, NW, Suite 400
Washington, DC 20006
Phone: 202/739-8009
Fax: 573/445-2135
<http://www.nei.org>
Contact: Mitch Singer, 202/739-8009 or swp@nei.org.
Area of expertise: commercial nuclear energy industry

Nuclear Information and Resource Service

1424 216th Street, NW, Suite 404
Washington, DC 20036
Phone: 202/328-0002
Fax: 202/462-2183
nirsnet@nirs.org
<http://www.nirs.org>
Contact: Kevin Kamps, 202/328-0002 or devin@igc.org.
Area of expertise: radioactive waste

Union of Concerned Scientists

2 Brattle Square,
Cambridge, MA 02238-9105
Phone: 617-547-5552
Email: ucs@ucsusa.org
<http://www.ucsusa.org>
Contact: David Lochbaum, Area of expertise: nuclear power safety expert Tom Collina, Area of expertise: nuclear weapons testing expert.
To set up interview, contact Paul Fain, Assistant Press Secretary at 202/223-6133 or pfain@ucsusa.org.

U.S. Environmental Protection Agency

Ariel Rios Building
1200 Pennsylvania Avenue, N.W.

Washington, DC 20460
Phone: 202/564-9290
<http://www.epa.gov/radiation>
Contact: Frank Marcinowski, 202/564-9290 or marcinowski.frank@epa.gov.
Area of expertise: environmental radiation protection standards, WIPP certification process, EPA regulatory process, Yucca Mountain standards

U.S. Department of Energy

1000 Independence Ave., SW
Washington, DC 20585
Phone: 1-800-dial-DOE
Fax: 202-586-4403
Contact: Jacqueline Johnson, 202/586-5806
Area of expertise: civilian radioactive waste management
For other media inquiries, call 202-586-5806.

U.S. Nuclear Regulatory Commission

11555 Rockville Pike
Rockville, MD 20852-2738
Phone: 301/415-7000
<http://www.nrc.gov>
Contact public affairs office at 301/415-8200 or opa@nrc.gov.
A list of regional contacts is available at
<http://www.nrc.gov/OPA/guide>.

See Appendices in Understanding Radiation in Our World for additional list of resources and publications.

Directory of B-Roll on Radioactive Waste and Nuclear Power

Title: Toxic Wastes Today

Summary: Explains the scientific concepts needed to understand toxic wastes, including the nature of chemicals, the biosphere, radiation, radioactive wastes, food chains and tolerance levels in organisms.

Year Released: 1997

Produced By: Hawkhill Associates

Length: 20 min

Format: 3/4"

Audio: Natural, Voice

Price: Negotiable

Contact: Bill Stonebarger

Hawkhill Associates

125 E. Gilman Street

Madison, WI 53703

Telephone: 800/422-4295

Fax: 608/251-3924

E-mail: hawkhill@inexpress.net

URL: <http://www.hawkhill.com>

Title: Protectors and Polluters

Summary: Presents a look at the toxic legacy left by the unregulated disposal of waste at military bases across the country.

Year Released: 1992

Produced By: Center for Defense Information

Length: 28 min

Format: Betacam SP, 3/4"

Audio: Natural, Voice

Price: Negotiable

Contact: Steve Sapienza

Center for Defense Information

1779 Massachusetts Ave., NW

Washington, DC 20036

Telephone: 202/332-0600

Fax: 202/462-4559

E-mail: ssapienz@cdi.org

URL: <http://www.cdi.org/adm>

Title: The Military and the Environment

Summary: Looks at the effect of military activity on the environment.

Year Released: 1990

Produced By: Center for Defense Information

Length: 28 min

Format: Betacam SP, 3/4"

Audio: Natural, Voice

Price: Negotiable

Contact: Steve Sapienza

Center for Defense Information

1779 Massachusetts Ave., NW

Washington, DC 20036

Telephone: 202/332-0600

Fax: 202/462-4559

E-mail: ssapienz@cdi.org

URL: <http://www.cdi.org/adm>

Title: Controversy over Using Ward Valley as a Low-Level Radioactive Waste

Summary: Has in-studio interviews with activists opposing dump sites in California Desert.

Year Released: 1992

Product ID: #1035

Produced By: Educational Communications

Length: 28 min 7 sec

Format: 3/4", 1/2"

Audio: Natural, Voice

Price: Negotiable

Contact: Nancy Pearlman

Educational Communications

Box 351419

Los Angeles, CA 90035

Telephone: 310/559-9160

Fax: 310/202-7553

E-mail: ecnp@aol.com

URL: <http://home.earthlink.net/~dragon-flight/ecoprojects.htm>

Title: Hazardous Wastes on Military Bases

Summary: Shows handling hazardous waste on military bases, chemical demilitarization, storage facilities, and weapons being broken down.

Year Released: 1993-98

Produced By: U.S. Department of Army

Length: 60 min

Format: Betacam

Audio: Natural

Price: Free

Contact: Melissa Udbina

U.S. Department of Army

2320 Mill Road

Alexandria, VA 22314

Telephone: 703/325-5536

Fax: 703/325-5806

E-mail: stupml@hqda.army.mil

URL: <http://aec-www.apgea.army.mil:8080/>

Title: The Nuclear Threat at Home

Summary: Looks at legacy of America's nuclear bomb making during the cold war.

Year Released: 1994

Produced By: Center for Defense Information

Length: 28 min

Format: Betacam SP, 3/4"
Audio: Natural, Voice
Price: Negotiable
Contact: Steve Sapienza
Center for Defense Information
1779 Massachusetts Ave., NW
Washington, DC 20036
Telephone: 202/332-0600
Fax: 202/462-4559
E-mail: ssapienz@cdi.org
URL: <http://www.cdi.org/adm>

Title: Nuclear Power Today
Summary: Explains how nuclear reactions work in producing electrical power, outlining the pros and cons of future efficiency of nuclear power.
Year Released: 1994
Produced By: Hawkhill Associates
Length: 21 min
Format: 3/4"
Audio: Natural, Voice
Price: Negotiable
Contact: Bill Stonebarger
Hawkhill Associates
125 E. Gilman Street
Madison, WI 53703
Telephone: 800/422-4295
Fax: 608/251-3924
E-mail: hawkhill@inexpress.net
URL: <http://www.hawkhill.com>

Title: Nuclear Power B-roll Package
Summary: Shows views of nuclear plants, control rooms, spent fuel pool, new nuclear fuel, animations, waste storage, transportation and shipping casks crash tests, Yucca Mountain, and more.
Year Released: 1997
Produced By: Nuclear Energy Institute
Length: 16 min 18 sec
Format: Betacam
Audio: Natural
Price: Free to TV stations
Contact: Scott Peters
Nuclear Energy Institute
176 I Street, NW. #400
Washington, DC 20006
Telephone: 202/739-8009
Fax: 573/445-2135
E-mail: swp@nei.org

Title: The Nuclear Path
Summary: Examines the nuclear industry from the earliest uranium mining to the moral and

ethical dilemmas faced by humankind today.
Year Released: 1985
Produced By: Chris Aikenhead/Doug Mulhall
Length: 24 min
Format: Betacam
Audio: Natural, Voice
Price: Negotiable
Contact: Michael Chechik
Omni Films
204 111 Water Street
Vancouver, BC, V6B 1A7 Canada
Telephone: 604/681-6543
Fax: 604/684-7165
E-mail: omni@omnifilm.bc.ca

Title: Race to Save the Planet: More for Less
Summary: Shows meters displaying core temperature at a nuclear power plant.
Year Released: 1988
Product ID: F113080
Produced By: WGBH Educational Foundation
Length: 1 min
Format: Betacam SP
Audio: Natural
Price: \$40/sec, 30 sec minimum
Contact: James Auclair
WGBH Film & Video Resource Center
125 Western Avenue
Boston, MA 02134
Telephone: 617/492-3079
Fax: 617/783-4243
E-mail: footage_sales@wgbh.org
URL: <http://www.wgbh.org/footage>

Title: Race to Save the Planet: The Environmental Revolution
Summary: Shows aerial view of English industrial town, circling factories, smoke stack, and nuclear power plant containment buildings.
Year Released: 1989
Product ID: F117068
Produced By: WGBH Educational Foundation
Length: 8 min 17 sec
Format: Betacam SP
Audio: Natural
Price: \$40/sec, 30 sec minimum
Contact: James Auclair
WGBH Film & Video Resource Center
125 Western Avenue
Boston, MA 02134
Telephone: 617/492-3079
Fax: 617/783-4243
E-mail: footage_sales@wgbh.org
URL: <http://www.wgbh.org/footage>

Title: Race to Save the Planet: More for Less

Summary: Shows high angle shots of generators in room of power plant and factory.

Year Released: 1988

Product ID: F113151

Produced By: WGBH Educational Foundation

Length: 1 min 7 sec

Format: Betacam SP

Audio: Natural

Price: \$40/sec, 30 sec minimum

Contact: James Auclair

WGBH Film & Video Resource Center

125 Western Avenue

Boston, MA 02134

Telephone: 617/492-3079

Fax: 617/783-4243

E-mail: footage_sales@wgbh.org

URL: <http://www.wgbh.org/footage>

Telephone: 617/492-3079

Fax: 617/783-4243

E-mail: footage_sales@wgbh.org

URL: <http://www.wgbh.org/footage>

Title: Race to Save the Planet: Waste Not, Want Not

Summary: Shows smoke stacks of power plant and highway in background with pan down to pipes.

Year Released: 1989

Product ID: F112022

Produced By: WGBH Educational Foundation

Length: 42 sec

Format: Betacam SP

Audio: Natural

Price: \$40/sec, 30 sec minimum

Contact: James Auclair

WGBH Film & Video Resource Center

125 Western Avenue

Boston, MA 02134

Telephone: 617/492-3079

Fax: 617/783-4243

E-mail: footage_sales@wgbh.org

URL: <http://www.wgbh.org/footage>

Title: Suicide Mission to Chernobyl

Summary: Accompanies Soviet scientists inside the structure that encases the Chernobyl nuclear reactor.

Year Released: 1991

Produced By: WGBH Educational Foundation

Length: 60 min

Format: Betacam SP

Audio: Natural

Price: \$40/sec, 30 sec minimum

Contact: James Auclair

WGBH Film & Video Resource Center

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