

Approved

Ken Grotewiel

Date

2/12/91

MINUTES OF THE HOUSE COMMITTEE ON ENERGY & NATURAL RESOURCES

The meeting was called to order by Representative Ken Grotewiel at  
Chairperson

3:30 ~~am~~/p.m. on February 7, 1991 in room 526-S of the Capitol.

All members were present except:  
Representative Webb, excused

Committee staff present:  
Raney Gilliland, Principal Analyst, Legislative Research  
Mary Torrence, Revisor of Statutes' Office  
Pat Mah, Legislative Research  
Lenore Olson, Committee Secretary

Conferees appearing before the committee:  
Donna Hinderliter, Plains Keepers Society  
Shaun McGrath, Program Director, Kansas Natural Resource Council  
Scott Andrews, Sierra Club - Kansas Chapter  
Robert Eye, attorney, Lawrence, Kansas  
Harold Spiker, Public Health Physicist, Bureau of Environmental  
Health Services

Chairperson Grotewiel called the meeting to order and opened the hearing on HB 2088.

Donna Hinderliter, Plains Keepers Society, testified in support of HB 2088, stating that Kansas certainly can't afford additional risks of groundwater contamination. She also stated that the very nature of deregulation leaves the door open to abuse. (Attachment 1)

Shaun McGrath, Kansas Natural Resource Council, testified in support of HB 2088. He stated that if BRC waste is allowed in Kansas, the potential for being exposed to radioactivity by many Kansas citizens will certainly increase. (Attachment 2)

Scott Andrews, Kansas Chapter of the Sierra Club, testified in support of HB 2088. He stated that while the federal Department of Energy may have decided to de-regulate much of the low-level radioactive waste as "below regulatory concern" (BRC), it is certainly not beneath the concern of many of their members. (Attachment 3)

Robert Eye, attorney, testified in support of HB 2088. He stated that allowing the BRC policy to go into effect in Kansas will raise the background levels of radiation and, thereby condemn some to death or non-fatal cancers and/or genetic defects. (Attachment 4)

Harold Spiker, Bureau of Environmental Health Services, testified in opposition to HB 2088. He stated that it is important to note that what NRC has issued is simply a statement. It is not a regulation and will not affect agreement states' authority to regulate radioactive material. Agreement states can choose to utilize NRC's "policy" guidance or not. (Attachment 5) Mr. Spiker responded to questions from the Committee.

A motion was made by Representative Correll, seconded by Representative Lynch, to approve the minutes of February 6, 1991. The motion carried.

The meeting adjourned.





P.O. Box 124 • Haysville, KS 67060

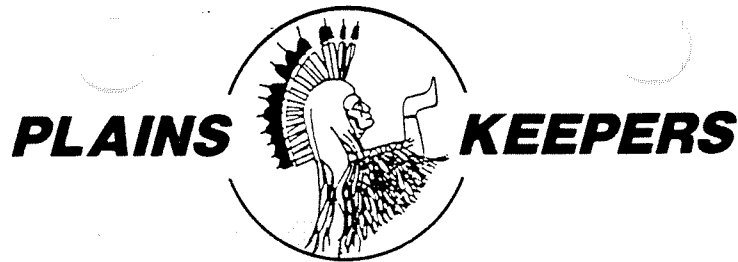
(316) 524-5719

Testimony  
before the  
House Energy and Natural Resources Committee  
on  
House Bill No. 2088

Donna Hinderliter  
6156 Pattie  
Wichita, KS 67216  
(316) 524-5719

February 7, 1991

*E+NR  
2/7/91  
Attachment 1*



P.O. Box 124 • Haysville, KS 67060

524-5719

My name is Donna Hinderliter. My address is 6156 Pattie, Wichita. I am representing Plains Keepers Society.

In June of last year, the Nuclear Regulatory Commission announced their expanded policy that deregulates approximately 30% of the existing low-level radioactive waste and also will allow the deregulation of any use of radiation that can cause levels of exposure up to a preset amount.

This deregulated material can be treated as ordinary trash. It could go to local landfills, sewers, incinerators and could be recycled into consumer products such as furniture, kitchen sinks, frying pans, zippers and jewelery. Even steel girders in buildings could be contaminated.

The term low-level is very misleading. It doesn't mean that it is a low-level risk. Waste classified as low-level includes the most dangerous and long-lived radioactive materials that will remain hazardous for hundreds to even millions of years.

The exposure standard which the NRC has set is twice as high as the Environmental Protection Agency's drinking water standards. The EPA estimates this set exposure limit equals around a 1 to 3 in 10,000 lifetime fatal cancer risk.

This policy ignores the results of recent reports on the health studies of the 91,231 survivors of the Hiroshima and Nagasaki nuclear bombing during World War 11 which indicates that the cancer risk is even greater per unit dose at low doses than it is at higher doses. As a result of these studies, the National Research Council concluded the risk of death from radiation induced cancer is three to four times greater than had been estimated earlier.

Drs. Alice Stewart and George Kneale have produced numerous studies that link just background radiation to childhood cancer.

(In addition, Dr. Carl Johnson has left many studies on increased radiation exposures and cancer cases--for instances people living near DOE facilities and downwind of the Nevada Testing Site.)

Also, this policy did not consider the nonfatal cancer cases, nor birth defects past the next two generations and the fact that radiation exposure can weaken the immune system, which increases risks of other diseases. It is known that children are at greater risk because of their rapidly dividing cells and because their immune systems have not matured.

At this point, I need to go back for a moment to the NRC's exposure limit. Since the NRC did not set a limit on the number of waste streams and deregulated products and uses, nor would they control where it would go, there is really no set limit to the amount of exposure the NRC will allow.

Once this radiation is scattered into the environment, there would be no way to retrieve it. And background levels of radiation would continue to rise.

The very nature of deregulation leaves the door open to abuse. The reality is that we would depend on self-monitoring. As we all know too well, there never seems to be enough tax dollars to oversee waste disposal practices.

Kansas certainly can't afford additional risks of groundwater contamination. A 1986 KDHE report estimates groundwater cleanup costs ranging from \$100,000 to several million dollars per site.

This NRC policy has already prompted five states (ME, IA, MN, VT, PA) to pass laws and over 15 are reportedly considering action. So as this happens, the ones that do not protect themselves will become ready targets.

Wichita has set a good example by giving interim approval at first reading to a ban written to prevent this deregulated material from their landfill. However, it is beyond the abilities of local governments to protect Kansas. State action is urgently needed.

Thank you for the opportunity to bring these concerns to you today.

\* Information has been provided by Nuclear Information and Resource Service, 1424 16th Street, N.W., Suite 601, Washington, DC 20036 (202) 328-0002

# Kansas Natural Resource Council

February 7, 1991

Testimony to the House Energy and Natural Resources Committee

Re: HB2088 - Concerning Below Regulatory Concern Waste

From: Shaun McGrath, Program Director

My name is Shaun McGrath. I am the Program Director for the Kansas Natural Resource Council, a private, non-profit, organization which advocates sustainable resource policies for the state. Our membership is over 850 statewide. I am also representing the Kansas Audubon Council which has over 5000 members in Kansas.

Just four years ago, the threat of a low level radioactive waste dump coming to Kansas brought thousands of Kansans together in protest. As a result of this strong opposition, the state was able to at least temporarily avoid being host to the Compact's dump. Today, the Below Regulatory Concern (BRC) policy of the U.S. Nuclear Regulatory Commission (NRC) again threatens the state with the possibility of radioactive waste dumps, but this time, without controls or monitoring by the state.

In December, 1985, Congress passed the Low-Level Radioactive Waste Policy Amendments Act of 1985 including a little noticed section directing the NRC to set up a BRC Policy. By August of 1986, NRC had published its general BRC policy for radioactive waste, and sent it to its licensees encouraging them to apply to have their nuclear waste deregulated. Last June, the NRC expanded its BRC policy to deregulate other "practices and products", in addition to waste, permitting radioactive materials to be deliberately used in consumer products and industrial processes, without licensing or regulation. NRC also chose allowable risk levels from BRC, and, plans to use these levels to develop decommissioning regulations.

As a result of the BRC policy, virtually everyone's exposure to highly toxic radiation will be increased. The policy allows for the deregulation of 30% or more of the nation's radioactive waste, making it eligible to be disposed of in ordinary municipal landfills, burned in incinerators, and flushed down sewer systems.

The 1990 BRC policy established explicit radiation dose guidelines, but there are no solid limits for how much radiation exposure would be permissible. Under the NRC's expanded BRC policy, for each case of deregulation of radioactive waste, the guideline for exposure to individual persons is 10 millirem per year, which by NRC estimates would equal 3.5 lifetime fatal cancer deaths in 10,000, or 1 in 2850. The NRC does not give any overall limit for multiple

*E+NR*

*2/7/91*

*Attachment 2*

exposures from different deregulated activities, but the policy claims to give "reasonable assurance" that all activities licensed by the NRC, including BRC waste deregulation, will not exceed 100 mrem. If every person in the U.S. did receive an additional dose of 100 mrem, using the NRC's figures, there could be more than 12,400 additional cancer deaths per year.

The NRC virtually ignores the other effects of radiation and their consequent cost: genetic and fetal effects, including mental retardation, and non-fatal cancers. The rationale, in the NRC's view, is that, relative to fatal effects, non-fatal effects are less understood and not as extreme.

If BRC waste is allowed in Kansas, the potential for being exposed to radioactivity by many Kansas citizens will certainly increase. Since BRC exemptions entail, by definition, a termination of regulatory control over exempted radioactive waste streams, there is no guarantee that the exposure levels actually experienced by the public will not exceed those recommended by the policy. The NRC plans to leave the monitoring of radiation levels to the dumper. And once the NRC allows utilities to ship some radioactive waste as BRC, it will be hard to ensure that waste with more radioactivity is not deliberately or accidentally included.

States and counties are responsible for waste facilities within their jurisdictions. However, it will be practically impossible to know about or monitor BRC wastes being dumped in their respective facilities. To begin with, if the BRC program takes effect, states and localities will not legally be able to stop any of the deregulated nuclear wastes from coming into their areas. Under the commerce clause of the Constitution, no state may prohibit the transportation of materials, including solid wastes, into or through the state. Therefore, a state cannot prohibit the disposal of solid wastes generated in another state. In contrast, states may at present prohibit the disposal of "low-level" radioactive waste within their borders, if wastes do not meet the state's standards. HB2088 is consequently important not only in mandating responsible disposal of radioactive wastes generated in Kansas, but also in prohibiting BRC waste generated out of state from coming into Kansas landfills.

Currently, five states have enacted legislation prohibiting unregulated disposal of radioactive waste within their borders. (Pennsylvania, Minnesota, Vermont, Iowa and Maine) The Virginia general assembly has unanimously condemned the BRC concept, and more than 50 local jurisdictions have now taken a stand against BRC. In December, the National Association of Attorneys General adopted a resolution opposing preemption of state authority to regulate LLRW materials designated BRC by the NRC.

The Kansas Natural Resource Council and the Kansas Audubon Council commend this committee for introducing HB2088, and fully supports its passage making Kansas the next state to protect its citizens from BRC waste.



# SIERRA CLUB

## Kansas Chapter

724 1/2 S. Kansas  
Topeka, KS 66603

### Testimony to House Energy & Natural Resources

#### H.B. 2088 Below Regulatory Concern

I am Scott Andrews representing the Kansas Chapter of the Sierra Club. We are very much in support of H.B. 2088 as a measure to maintain the current level of regulation and protection from low-level radioactive waste.

While the federal Department of Energy (DOE) may have decided to de-regulate much of the low-level radioactive waste as "below regulatory concern" (BRC), it is certainly not beneath the concern of many of our members. Under DOE's policy, and without this bill's passage, a significant amount of low-level radioactive waste will be transferred to the solid waste stream for disposal in county landfills. Considering all the problems and concerns these days over solid waste do we really want to add radioactive waste to them? This level of waste is not, by itself, highly dangerous, but with significant amounts dumped in landfills it could concentrate and become a serious health concern. This would require increased monitoring in landfills raising the cost of solid waste disposal.

Another possible problem is with the importation of out-of-state solid waste. Currently five states have regulation for BRC similar to H.B. 2088 and 17 others are considering such legislation. States which regulate this waste could find it less expensive to ship it to state with no such regulation. We are concerned that by not regulating this category of low-level waste we could become a de facto regional depository of it -- in county solid waste landfills.

The Sierra Club urges the members of this committee to support passage of H.B. 2088 and maintain the status quo regulation of low-level radio-active waste in Kansas.

*E+NR*  
*2/7/91*  
*attachment 3*



ROBERT V. EYE  
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700 MASSACHUSETTS  
LAWRENCE, KANSAS 66044  
(913) 749-2131

February 7, 1991

Testimony Concerning House Bill 2088

My name is Robert V. Eye. My law practice includes consultation and litigation related to radioactive waste issues. I appear today in support of House Bill 2088 and urge that this committee refer it to the House of Representatives with the recommendation that it be passed.

In addressing any issue concerning radioactive waste, it is important to recognize the nature and extent of the impact on the public's health due to radiation exposure. In 1975 the United States Nuclear Regulatory Commission concluded as follows:

Exposure to even low levels of radiation, in addition to the natural background of radiation that exists, is generally believed to increase the likelihood of certain diseases and to increase certain genetic defects. Since these effects may be evidenced many years after the exposure, they are classed as long term health effects. These include latent cancer fatalities, genetic defects, and thyroid illness. (NRC, Reactor Safety Study, WASH-1400, NUREG 75/014, 1975, page 73)

In 1989 the Committee on Biological Effects of Ionizing Radiation, National Research Council, National Academy of Sciences published their report entitled Health Effects of Exposure to Low Levels of Ionizing Radiation: BIER V, which concluded, among other things, that low dose and low dose rate radiation exposures cause cancer and other radiation related health effects as much as three to four times more frequently than previously estimated. John W. Gofman, M.D., Ph.D., a world class expert on the health effects of radiation exposure has recently estimated that radiation induced cancers, leukemia and genetic defects may occur up to 30 times more frequently than previously thought. Given these findings by the NRC, National Academy of Sciences and respected authorities on radiation, it is consistent with the public's interests to minimize or prevent exposure to non-natural sources of radiation. Indeed, given the trends of research findings, i.e., that low dose and low

dose rate of radiation pose serious health threats, one would expect responsible government agencies to promulgate regulations geared toward greater, not lesser, protection of the public.

Instead, the NRC has decided to deregulate a large volume of the nation's so-called low level radioactive wastes. This NRC policy, known as Below Regulatory Concern (BRC) would permit generators of radioactive waste to "solve" part of their waste problem by allowing these materials to be placed in municipal landfills, burned in incinerators or dumped in sewers. Obviously, over time such practices would cause radioactivity to contaminate soil, ground water, surface water, air and ultimately cause an increased accumulation of radiation in the food chain.

One may ask why the NRC is allowing a relaxation of radioactive waste standards. In my judgment, and in the estimation of other observers of the nuclear industry and bureaucracy, BRC is a manifestation of a failed low level radioactive waste policy. Low level radioactive waste problems are looming larger as current dump capacity becomes more and more limited. Hence, to stem the tide NRC has waved its regulatory wand and, presto chango, converted 30% of the low level radioactive waste volume from material required to be managed with special care to material eligible for landfills, sewers and incinerators.

The other primary reason for BRC policy appears to be a means to save the nuclear industry money. By eliminating the need for special care, the industry will likely save about \$750,000 per reactor per year. This is an incredibly small percentage of a reactor's total operation and maintenance costs and amounts to only about \$.35 per U.S. citizen per year. However, these savings are not only small but also illusory. As radiation accumulates in the environment and food chain the negative health effects will more than offset any perceived monetary benefits.

Allowing a relaxed regulatory practice pursuant to BRC will, according to the NRC, result in at least one additional cancer death per 100,000 persons. Many believe that even the loss of a single life is too much to simply accommodate the needs of the nuclear industry. There is good reason to believe that the NRC has greatly underestimated the health effects stemming from BRC. The National Academy of Sciences predicts a death rate of 7.6 per 100,000 for men and 8.1 per 100,000 for women if the BRC policy goes into full affect. The enactment of House Bill 2088 can prevent needless death and non-fatal radiation induced cancers and genetic defects that will otherwise result from permitting the BRC policy to go into affect in Kansas.

I have a particular concern for sanitation workers if the BRC policy is allowed to stand in our state. These individuals would be expected to handle radioactive wastes from sources like Wolf Creek with no special precautions or required warnings. These

workers will expose themselves to greater risks of adverse health effects and continue to do society's dirty work so that NRC officials can make their bureaucratic task a bit easier and commercial nuclear profits a bit fatter. Sanitation workers should not have to bear an additional radiation burden to accommodate either the NRC or the nuclear industry.

We should not overlook potential state regulatory costs associated with BRC. Unless our state is willing to assume all imported refuse is within regulatory limits some means would be required to monitor the amounts of radiation present in out-of-state refuse. It is difficult to quantify the potential regulatory costs and it is problematic if such would actually be effective. With Kansas rapidly becoming the dumping ground for out-of-state refuse, this dimension should not be disregarded.

The bill before you today, in effect, maintains the status quo. It requires that radioactive waste, irrespective of its origin, radioactive concentration or hazardous duration be managed consistent with current regulatory requirements. Even current regulatory practices and standards leave much to be desired. However, such are clearly superior to the proposed BRC policy change.

Given what we know about the extreme hazards and adverse health effects related to radiation it should be state policy to prevent exposure whenever possible. Allowing the BRC policy to go into effect in Kansas will raise the background levels of radiation and, thereby condemn some to death or non-fatal cancers and/or genetic defects. BRC is the camel's nose under the tent. The incremental approach to deregulation of radioactive waste taken to its logical conclusion has obvious disastrous implications. This is the time and place to draw the line in our state as it has already been done in Maine, Minnesota, Iowa and Vermont. The BRC policy is inimical to responsible public health and environmental policy. I urge that House Bill 2088 be enacted into law.

Thank you for the opportunity to discuss this issue today and I will attempt to address any questions the committee may have.



# State of Kansas

Joan Finney, Governor

Department of Health and Environment

Division of Health

Acting  
Stanley C. Grant, Ph.D., Secretary

Landon State Office Bldg., Topeka, KS 66612-1290

Reply to: \_\_\_\_\_

FAX (913) 296-6231

Testimony presented to  
House Energy and Natural Resources Committee

by

The Kansas Department of Health and Environment

House Bill 2088

House Bill 2088 would essentially prohibit KDHE from utilizing the Below Regulatory Concern (BRC) policy statement issued by the U. S. Nuclear Regulatory Commission (NRC) on July 3, 1990.

The NRC BRC policy statement is intended to serve as guidance in regulatory and licensing decisions involving materials with levels of radioactivity so low that they do not warrant the same regulatory controls to ensure proper protection of the public and environment as do higher levels of radioactive materials. It provides a broadly applicable risk-based framework to ensure consistency in rulemaking and licensing decisions, guidance for cleanup of contaminated sites, a consistent level of safety for consumer products, and better use of resources for waste management, not only for the NRC, but for all agreement states as well.

Although NRC's formal policy statement is new, the issue of below regulatory concern radioactive material is not. The NRC and agreement states have been wrestling with the issue for decades. As more sensitive radiation detection and measurement instrumentation is developed and utilized, low-level radioactive materials are being discovered in association with more and more of man's activities, particularly naturally occurring radioactive materials (NORM). In making decisions regarding the disposition of these materials, each proposed exemption or variance must be carefully evaluated to ensure that the public and the environment will be properly protected. NRC regulations and all agreement state regulations already allow for exemptions or variances to regulatory requirements if it is determined that the exemption or variance will not result in an undue hazard to public health, property and the environment. Such flexibility is essential in order to deal most effectively with the diversity of problems encountered which involve low-level radioactive materials. The intent of NRC's BRC policy is merely to provide uniform guidance for this decisionmaking.

*E+NR  
2/7/91  
Attachment 5*

It is important to note that what NRC has issued is simply a "policy" statement. It is not a regulation and will not affect agreement states' authority to regulate radioactive material. Agreement states can choose to utilize NRC's BRC "policy" guidance or not. Unless implemented by NRC through specific rulemaking, NRC's BRC policy cannot be made a matter of compatibility for agreement states.

The department is generally supportive of NRC's BRC policy statement. We feel it is important to have broadly applicable guidance for situations where an exemption or variance may be appropriate, as long as the agreement states or compacts have the authority and flexibility to make exemption or variance decisions using the BRC guidance to ensure protection of the public health and safety. We agree that BRC decisions based on health, safety and environmental concerns should take precedence over economic or institutional concerns. In fact, levels of regulatory concern have already been established for most consumer products and radioactive wastes currently generated so NRC's BRC policy should not have a significant impact on manufacturing or the current waste streams in the Central Interstate Compact. Examples of currently exempted materials are smoke detectors and certain low-level medical and research wastes. It may, however, have a significant impact on high volume/low radioactivity wastes generated by the decommissioning of nuclear power plants.

The department feels that this legislation is premature and unnecessary at this time. Our reasons for this position are:

- 1) At this point in time, the NRC has only issued a "policy" statement. No rulemaking is intended in the near future.
- 2) If BRC rulemaking is initiated, the agreement states as well as the public will have an opportunity for input. If BRC regulations are adopted, agreement states will have three years to adopt compatible regulations.
- 3) Even if BRC regulations are promulgated and adopted, agreement states will retain a certain amount of flexibility in applying those regulations and can always be more stringent in exemption or variance decisions. KDHE will continue with its philosophy of maintaining public exposure to radiation as low as reasonably achievable (ALARA).
- 4) It appears likely that the U.S. Congress will be looking at this issue in the near future.
- 5) This legislation would eliminate the option for KDHE to allow an exemption or variance to regulatory requirements in appropriate situations where there would be no undue hazard to public health, property, or the environment. In some cases strict adherence to regulations may not represent the best option for keeping occupational and public exposure to radiation as low as reasonably achievable.

- 6) Because radioactivity has many uses in our society, as written in section 1(b), this bill would prohibit the storage, treatment, recycling or disposal of many commonly exempted materials except at a facility approved by the Hazardous Waste Disposal Facility Approval Board or the Secretary of Health and Environment expressly for the storage, treatment, recycling or disposal of radioactive materials. For example, this bill could prohibit the treatment and/or disposal of municipal water treatment facility wastes, municipal landfill refuse, the temporary storage of nuclear medicine and research isotopes, and even the burial of human bodies.
- 7) Although the NRC does not have regulatory authority over naturally occurring radioactive material (NORM), the State of Kansas does, as do a number of agreement states. Although this bill specifically excludes NORM, BRC policy guidance is badly needed to assist the states in dealing with the growing problem of NORM.
- 8) It is not totally clear whether radioactive materials routinely stored, processed and disposed at federally regulated facilities in Kansas, such as V.A. Hospitals or at Wolf Creek Generating Station (WCGS) would be affected by this bill. It appears that the requirements of this bill would apply to such facilities and could be in direct conflict with NRC's regulation of these facilities since the state would apparently be required to license or permit these facilities. We are not aware of any BRC wastes currently being disposed of by WCGS except at licensed low-level radioactive waste disposal facilities.

Testimony presented by: Harold Spiker  
Public Health Physicist  
Bureau of Environmental Health Services  
February 7, 1991

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

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NUREG/BR-0157

# BELOW REGULATORY CONCERN

A guide to the  
Nuclear Regulatory Commission's  
policy on the exemption of  
very low-level radioactive materials,  
wastes and practices

U.S. NUCLEAR REGULATORY COMMISSION

5-4

The Nuclear Regulatory Commission has published a new policy for determining when radiation levels are so low that they do not warrant further regulatory control. The *Below Regulatory Concern*, or "BRC," policy is needed to ensure consistent NRC decisions on exemptions and to focus resources on the more significant risks posed by nuclear materials.

The policy establishes a framework for making future exemption decisions and for reviewing previous exemptions. However, the BRC policy does not in itself exempt any radiation levels from regulatory control. Instead, the Commission will use the policy in developing new rules or amending existing ones, evaluating petitions for exemptions that may be received from members of the public and taking specific licensing actions involving exemptions of nuclear materials.

Possible applications of the BRC policy include:

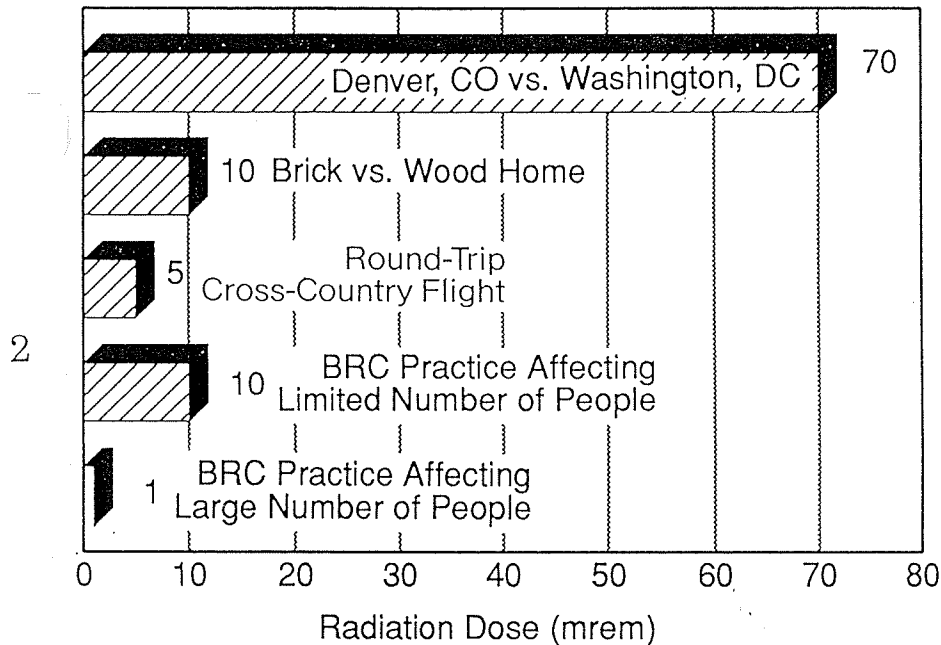
- Cleanup of contaminated sites,
- Distribution of consumer products containing small amounts of nuclear materials,
- Disposal of very low-level radioactive waste and
- Recycle or reuse of slightly contaminated equipment and materials.

This pamphlet summarizes the BRC policy and describes why the policy is needed now, how it will benefit the public, what criteria the NRC will use in making BRC decisions and how the policy will be implemented. The aim of this booklet is to provide information about the BRC policy. NRC believes that the policy will adequately protect the public health and safety and the environment. Indeed, NRC does not expect any measurable adverse impact on the public health and safety as a result of the policy. In the long run, the BRC policy should enhance protection of the public and the environment by allowing society to focus its limited resources on those activities that pose the most significant risks.

Available From:  
Superintendent of Documents  
U.S. Government Printing Office  
Post Office Box 37082  
Washington, DC 20013-7082



## Comparison of below regulatory concern doses to doses from selected other radiation sources



Here is how the dose criteria in the below regulatory concern policy compare with doses from selected other radiation sources. All doses shown except the airline flight are in average millirems per year per individual. The dose shown for flying is from one round-trip flight.

## WHO IS NRC

The Nuclear Regulatory Commission regulates the civilian uses of nuclear materials in the United States to protect the public health and safety, the environment and the common defense and security. This mission is accomplished through: licensing of nuclear facilities and the possession, use and disposal of nuclear materials; the development and implementation of requirements governing licensed activities; and inspection and enforcement activities to ensure compliance with these requirements.

## WHAT IS BELOW REGULATORY CONCERN (BRC)

The "Below Regulatory Concern," or BRC, policy defines radiation levels with such a small health risk that further regulatory efforts to reduce those levels are unwarranted and may detract from our ability to address greater risks.

The BRC policy statement does not represent a decision to exempt any specific consumer products, wastes or other materials or practices from regulatory control. Instead, it establishes the framework within which the Commission will make decisions to exempt from some or all regulatory controls certain products and activities involving radioactive materials that are below regulatory concern.

## WHY A BRC POLICY IS NEEDED NOW

In the past, NRC has exempted certain types, uses and quantities of nuclear materials from regulatory control. As a regulatory agency serving the public, NRC always seeks to ensure adequate protection of the public health and safety and the environment. Beyond this adequate protection threshold, NRC also continually seeks to improve the balance between the risks associated with the use of nuclear materials and the burden of regulations intended to ensure that those risks are adequately controlled. NRC has developed and implemented a comprehensive regulatory framework, the

lower end of which is bounded by exemptions and other decisions that allow release of nuclear materials to the environment. The NRC believes there is a need to ensure that existing and future exemption decisions are consistent and continue to protect the public health and safety and the environment.

Implementation of the BRC policy should benefit the public by allowing State and Federal agencies and others to focus on the activities that pose greater risks to the public. Specifically, the public should benefit through:

- More timely and consistent cleanup of contaminated sites,
- Increased assurance that funds set aside to clean up and decommission nuclear facilities are adequate,
- Reduced costs and overall risks to the public from managing certain types of slightly radioactive wastes in a manner commensurate with their low radiological risk,
- Increased assurance of a consistent level of safety for consumer products containing nuclear materials.

4 A foremost need for the BRC policy is related to NRC's responsibility for regulating the cleanup of contaminated commercial nuclear facilities around the country. This can be broadly categorized as the "decommissioning issue." It arises from NRC's need to ensure that the funds set aside by licensees today will be adequate to clean up and close the facilities at the end of their operating lifetimes. It also arises from the need to ensure that cleanup is performed in a consistent and adequate manner. To accomplish these objectives, NRC needs to determine acceptable levels of residual radioactivity—how clean is clean enough. The BRC policy establishes the framework for developing these levels. It is important to develop these levels now so that the companies responsible for decommissioning the facilities can plan, provide the necessary resources and perform the cleanup needed to satisfy regulatory standards.

The exemption of certain consumer products that contain nuclear materials is another area encompassed by the Commission's BRC policy. We must ensure that current and future exemptions of these products are consistent and continue to provide an adequate level of safety to the people who use them. Implementation of the BRC policy will help achieve this goal.

5-7  
5  
Another issue involved in the BRC policy is the management of wastes that contain very low levels of radioactivity and that may not need to be disposed of in licensed disposal facilities. In the Low-Level Radioactive Waste Policy Amendments Act of 1985, Congress directed the NRC to consider the merits of "... (exempting) specific radioactive waste streams from regulation... due to the presence of radionuclides... in sufficiently low concentration or quantities as to be below regulatory concern." NRC responded to this direction in 1986 with a specific policy statement on procedures for exempting BRC waste streams. The 1985 law and the 1986 policy statement laid the foundation for developing the framework reflected in today's comprehensive BRC policy, which applies the same yardstick in all cases. Together with the 1986 policy, the new BRC policy is needed now to help resolve issues associated with low-level waste management in order to minimize impacts on low-level waste disposal facilities in the States, which Congress required to be operational by the mid-1990's.

In all of these areas, the NRC's principal goal is to ensure that the public health and safety and the environment are adequately protected. The NRC has selected criteria for the BRC policy, based on the latest scientific research and recommendations, to establish the level at which nuclear materials may be safely exempted from regulatory control.

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## RADIATION: SOME BACKGROUND AND PERSPECTIVE

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Everyone is continually exposed to low levels of naturally occurring radiation. The earth is continually bathed in radiation from the sun and space.

The earth itself is also a source of radiation; radioactive materials exist naturally in its soil, rock and water. There are a great many of these radioactive materials, the most common being uranium, thorium, radium and the radioactive forms of carbon and potassium. Also common in nature is radon gas, a radioactive byproduct of the small amounts of uranium found in the soil and rock of many parts of the country.

Radiation consists of x-rays, alpha and beta particles, gamma rays and other components. When they pass through

the human body, they may damage some cells in the body. If damaged, some cells may not survive or reproduce normally. Other damaged cells may survive, but in a modified form, which may later result in a cancer. Other health effects from radiation include birth defects and inherited diseases. Very large doses of radiation over short periods may cause organ damage and, if high enough, death. Doses associated with natural background radiation and the BRC criteria are thousands of times lower than the high doses that are so destructive. At low doses, the principal concern is the possible appearance of cancer years after the exposure to radiation. Other effects such as birth defects and inherited diseases are less likely.

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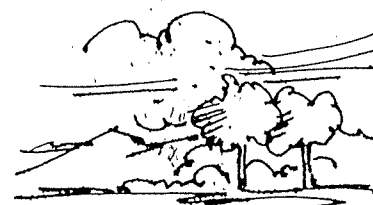
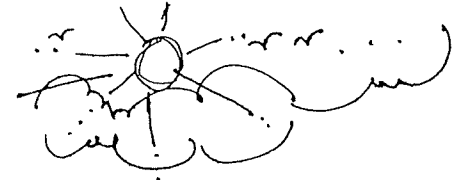
A unit of radiation dose is called a "rem." A "millirem" (abbreviated mrem) is one-thousandth of a rem. Evidence from high doses (from tens of rem) delivered quickly (in seconds to hours) indicates that the probability of causing cancer from radiation increases with the dose received. For doses in the range produced by natural background radiation, however, the probability of producing cancer has not been directly established, because it is impossible to distinguish cancers produced by such low levels of radiation from cancers produced by other phenomena. Therefore, in estimating the consequences of any exposure to radiation, it is assumed that the chance of developing cancer is linearly proportional to dose and that there is no threshold below which there is no chance of cancer. This chance, or risk, is expressed in terms of probability because a given dose of radiation does not produce a cancer in all cases. The International Commission on Radiological Protection (ICRP) and the U.S. National Council on Radiation Protection and Measurements (NCRP) have both endorsed the "linear, no-threshold" approach and the philosophy that radiation exposure should be kept as low as reasonably achievable. The U.S. Nuclear Regulatory Commission used these principles in developing its BRC policy.

We all receive doses of naturally occurring radiation every day. It comes from space, the air we breath, the water we drink, the food we eat, the buildings we live and work in, and even our own bodies and the people we live and work with. Such sources contribute about 80 percent of the average annual radiation dose received by the U.S. population.

The remaining 20 percent or so comes from man-made sources of radiation, including medical x-rays and nuclear medicine technologies, which together account for about 15 percent, and consumer products, occupational exposures and various other sources, which account for the remaining percentage.

### Examples of natural radiation exposure

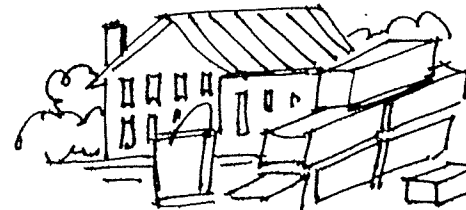
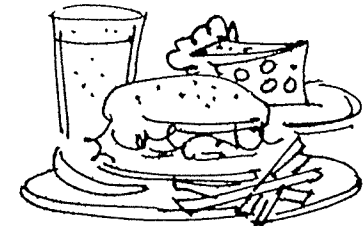
FROM THE SKY—About 30 millirem per year from cosmic radiation.



FROM THE AIR THAT WE BREATHE—About 200 millirem per year, including radon.

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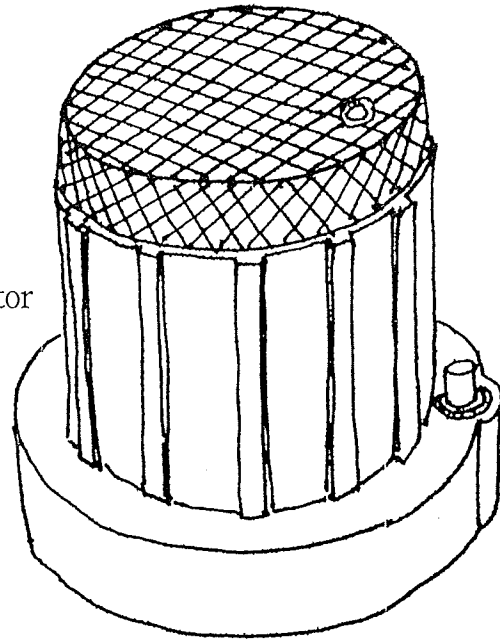
FROM OUR FOOD AND DRINK—About 40 millirem per year from natural radioactive materials such as potassium-40.



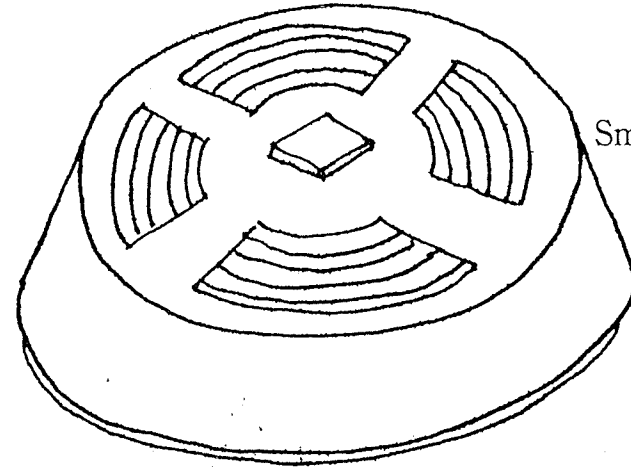
FROM SOILS AND BUILDING MATERIALS—About 30 millirem per year from natural radio-nuclides such as uranium.

Naturally occurring sources of radiation are all around us. This chart shows the average annual radiation dose from natural background sources.

Commercial  
Smoke Detector

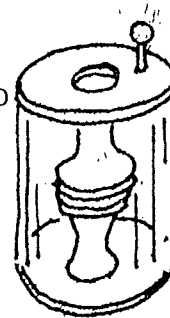


Smoke Detector

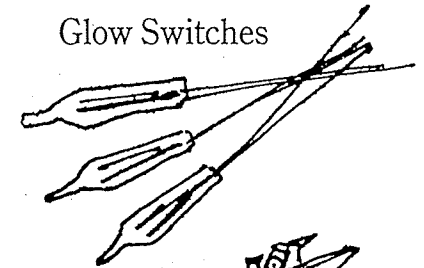


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Spark Gap  
Irradiator

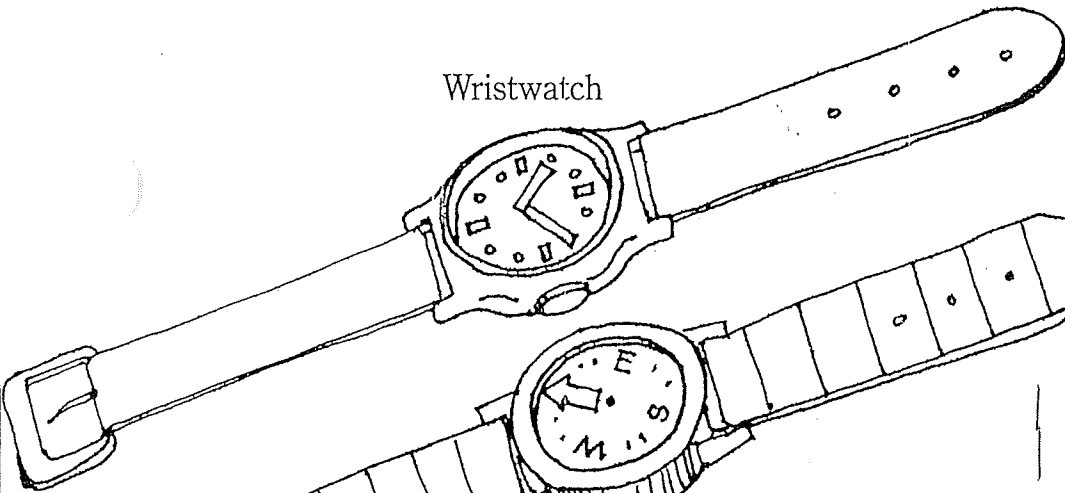


Glow Switches

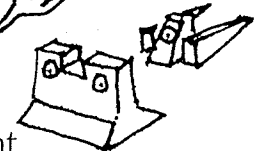


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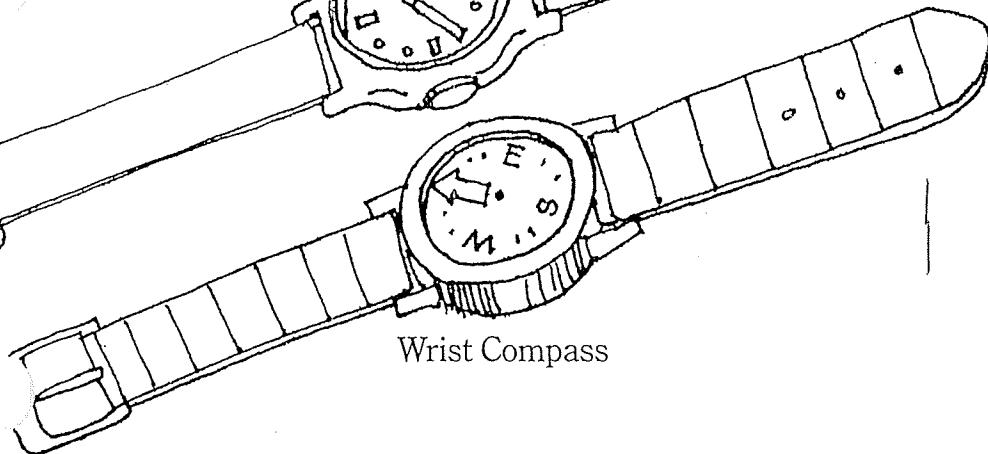
Wristwatch



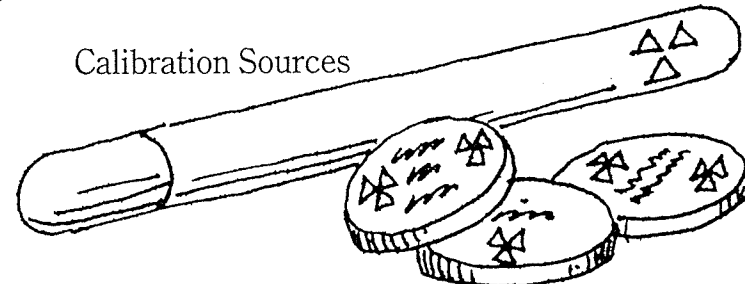
Gunsight



Wrist Compass



Calibration Sources

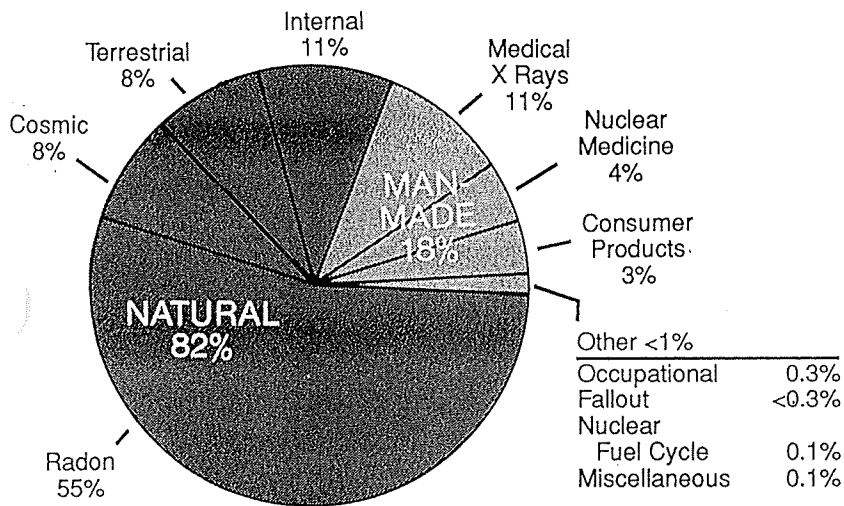


Some versions of these products contain radioactive material and have already been exempted from regulatory control by the NRC.

Our lifestyles and daily activities vary these amounts to some extent. For example, if you live in Denver, "the Mile High City," rather than a sea-level city such as Washington, D.C., you receive an additional average annual exposure of some 70 millirem, because the dose from cosmic radiation essentially doubles with each 6,600 feet of altitude and the soil of the Rocky Mountains contains higher concentrations of natural radioactive materials. By the same token, a flight on a commercial airliner increases your exposure to cosmic rays at the rate of about 5 millirem for the time spent in a single round-trip cross-country flight.

Also, if you choose to live in a brick home instead of one made of wood you may add up to 10 millirem per year to your annual radiation exposure due to the naturally occurring thorium, uranium and radium found in the clays of which

### Contribution of various radiation sources to the average radiation dose in the U.S. population



About 82% of the average radiation dose in the U.S. population comes from natural sources. Of the remaining 18%, representing man-made radiation sources, the largest percentage is attributable to medical x-rays. (Used with permission of the National Council on Radiation Protection and Measurements.)

bricks are made. In addition, should your home be in a certain area of the country where there is more uranium or radium in the soil you may have a high concentration of radon in your house. The dose from radon in the home averages 200 millirem per year in the United States, but can range up to several thousand millirem per year.

The NRC has created the framework for its new policy at a level of individual radiation dosage well below these variations resulting from natural sources. It is at these very low levels, involving correspondingly low risks, that the NRC would consider exemptions from regulation and deem certain practices "below regulatory concern."

With this as background, let's turn to the specific principles and criteria that the NRC used in establishing a BRC policy and how it plans to implement that policy.

## BRC CRITERIA

What levels of radiation and risk place products and activities in the category considered below regulatory concern? And how did the NRC arrive at its new criteria, along with its principles of exemption, for a formal BRC policy?

First the principles: A major consideration in exempting any practice from regulatory control hinges on the question of whether the control is necessary for protecting the public health and safety and the environment. The need for regulatory control decreases as the dose and its risks to the exposed population decrease. The NRC believes that the granting of specific exemptions from regulatory controls should depend essentially on an evaluation of whether the risks are sufficiently small and whether further reductions in dose justify the effort to achieve them. Therefore, the NRC believes that radiation dose criteria for both individuals and the exposed population should be basic features of its overall policy. That policy should define the region where efforts to further reduce exposures are no longer warranted.

The question then is: How low is low enough when it comes to risks and dose? At what point is it clearly unnecessary to further reduce the risk or dose?

In selecting the BRC dose criteria, the Commission noted that, even though there is significant uncertainty in calcula-

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tions of risks from low-level radiation, in general these risks are better understood than the risks from other hazards, such as toxic chemicals. In addition, radiation from natural background is a fact of life and poses involuntary risks that are the same as the kinds of risks posed by nuclear materials under the NRC's jurisdiction.

The Commission believes that if the risk to individuals from a product or activity under consideration for exemption is comparable to other risks, knowingly or unknowingly tolerated by individuals because of factors such as their lifestyle or where they live, then the level of protection from that activity should be adequate. Related to this, variations in natural background radiation, such as the 70 millirem per year difference between average annual doses received in Denver versus Washington, D.C., apparently play no role in individuals' decisions on where to live or work. Nor do people seem to be concerned about the difference in doses between living in a brick or frame house, the 5 millirem dose from a round-trip coast-to-coast air flight, or the dose from other activities involving a small fraction of background radiation.

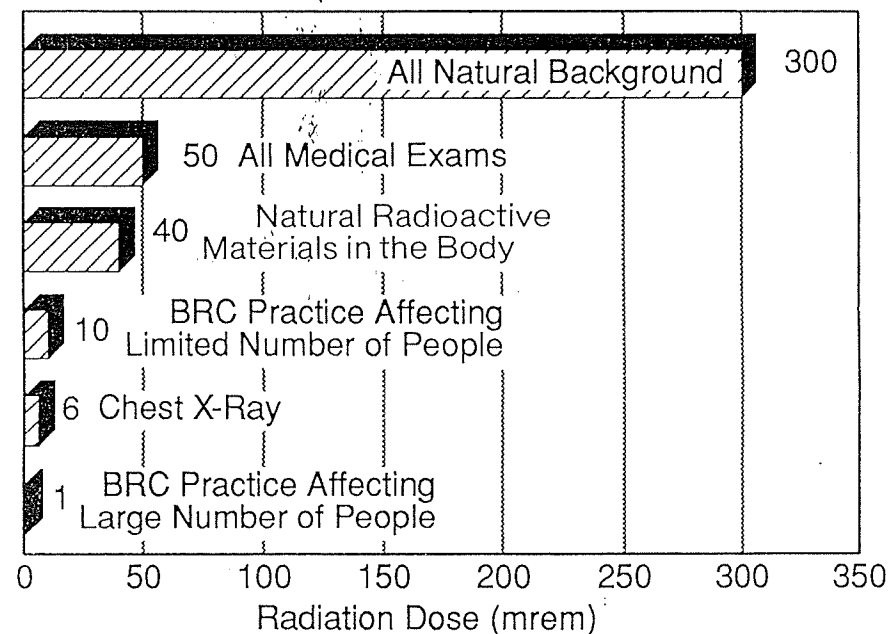
Consideration of the magnitude and variation in natural background doses suggests that individual doses in the range of 10 millirem and below would be appropriate for use as an individual dose criterion. However, the dose criteria must also be selected so that they are consistent with technological capabilities to monitor and assess doses. In addition, dose criteria below those selected by the NRC could unnecessarily divert attention and resources from more significant health and safety programs.

Taking all this into consideration, NRC decided that *an individual dose of 10 millirem per year* would be appropriate for use as the Commission's BRC individual dose criterion. However, until more experience is gained with the potential for individual exposure from multiple sources, the Commission decided that *an interim individual dose criterion of 1 millirem per year* would be applied to those practices involving widespread distribution of material containing radioactive substances, such as consumer products or recycled material and equipment. The interim criterion provides additional assurance that public doses will remain a small fraction of background radiation and of generally recognized dose limits for members of the public.

How do these dose levels translate into risks? The 10 millirem per year corresponds to an annual risk of death from a radiation-induced cancer of about 5 in 1 million. The 1 millirem per year dose corresponds to a risk of about 5 in 10 million.

In addition to the individual dose criteria, NRC will also ensure that the total impact of an exemption is appropriately minimized through a collective dose criterion. The "collective" dose is a measure of the impact of the practice on society as a whole. It is the sum of the individual doses. The Commission believes that if the collective dose resulting from a given practice is less than 1,000 person-rem per year (equivalent to 1,000,000 individuals receiving 1 millirem per year),

Comparison of below regulatory concern doses to doses from natural background and medical exposures



This chart compares levels of radiation exposure established by the Commission as below regulatory concern (BRC) to levels of radiation exposure in natural background and to medical exposures. All doses shown except the chest x-ray are in average millirem per year per individual. The 6-millirem chest x-ray dose is for one single x-ray for an individual.

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resources would be better spent addressing more significant health and safety issues. At this collective dose level, the annual number of health effects for an exempted practice is calculated at less than one and could be zero.

These values will provide a consistent risk basis for future rulemaking or licensing decisions, making such implementation a practical undertaking. NRC believes that regulatory exemptions using the individual and collective dose criteria will provide reasonable assurance that individual exposures to the public from all licensed activities and exempted practices will not exceed the generally recognized dose criterion for members of the public of 100 mrem per year, given the Commission's intent to:

- Impose both individual and collective dose criteria,
- Consider the total impact of a proposed activity (not just a portion of a practice),
- Evaluate the potential that people may be exposed to more than one exempted practice,
- Evaluate potential exposures over the lifetime of the practice,
- Monitor and verify how exemptions are implemented under this policy,
- Verify dose calculations through licensing reviews and rulemakings with full benefit of public review and comment and
- Inspect and enforce licensee adherence to specific conditions and constraints imposed by NRC on exempted practices.

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## BRC POLICY IMPLEMENTATION

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With these criteria for both individual and collective exposures, the NRC will have a framework for reviewing requested exemptions from regulatory control for certain products or activities. However, other specified conditions will also have to be met, such as determining that the risk from an accident or from misuse would be very low. The Commission also may place certain conditions or constraints on the activity that generates or manufactures the exempt material, such as limits on the total quantity of radioactivity and restrictions on the transfer of materials to exempt status.

In addition, NRC would continue its comprehensive program of licensing, inspection and enforcement for that process.

Issuance of the BRC policy statement does not represent a decision to exempt any specific consumer products, wastes or other materials or practices from regulatory control. Rather the policy statement is a framework for making exemption decisions.

The policy will be implemented principally through the NRC's rulemaking process. Exemption decisions could also be made through specific licensing actions.

In the case of rulemaking, a proposal for exemption, whether initiated by the NRC or requested by outside parties in a petition for rulemaking, would have to be supported by an adequate technical basis. The Commission would review this basis in determining whether the basic policy conditions have been satisfied in its decision. Such a proposal would generally have to address the individual and societal impact that could result if the exemption were granted. To do this the proposal would have to consider the uses of the radioactive materials, their pathways of exposure and their levels of radioactivity. It would also have to consider appropriate methods and constraints for ensuring that the doses from the exempt practice remain sufficiently low.

Proposed rules will be published in the Federal Register to solicit public comments. The rulemaking action would also include an appropriate level of environmental review under the National Environmental Policy Act to ensure that environmental impacts are adequately considered.

The second means of implementing the BRC policy would involve exemptions granted through licensing actions. The public will be invited to comment on new licensing actions on exemptions under the BRC policy if they differ from previous generic exemption decisions.

If a product or practice goes through all the necessary procedures and receives an exemption, is it then free of further surveillance? No. The NRC will verify that licensees adhere to exemption constraints and conditions through the agency's licensing, inspection and enforcement programs. As an example of a condition that may be imposed on a consumer product, the Commission may require some type of labeling so that consumers can make informed decisions about the purchase of a product containing exempted materials. Such

labeling is presently required by the Commission for smoke detectors containing radioactive material.

The NRC may determine on the basis of risk estimates and associated uncertainties that specific practices should not be considered candidates for exemption. A prime example would be the introduction of radioactive materials into products to be used primarily by children. Such practices would be specifically evaluated to determine if they could result in greater risk levels to exposed members of the public than those found acceptable by the Commission in formulating its BRC policy.

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## BRC—A FINAL THOUGHT

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NRC believes that implementation of this policy will adequately protect public health and safety and the environment. Also, its implementation will allow the NRC, States and licensees to devote more of their limited time, trained personnel and funds to nuclear-related matters that are associated with potentially higher public health risks. It may also allow other organizations, in such fields as health care, scientific research and the development of new and useful products and services, to devote more of their resources to activities that contribute to greater health and safety protection in addition to better serving the public.

But the success of any public policy depends largely on its understanding and acceptance by the public.

We hope that this booklet and its explanation of our new below regulatory concern policy contribute toward these ends.

(Radiation dose data in the charts in this pamphlet are taken directly or derived from reports of the National Council on Radiation Protection and Measurements (NCRP), Bethesda, MD. The figure of 10 millirem additional dose from living in a brick rather than a frame home is derived from NCRP Report No. 94, "Exposure of the Population in the United States and Canada from Natural Background Radiation," 1987. All other data are from NCRP Report No. 93, "Ionizing Radiation Exposure of the Population of the United States," 1987.)

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Public Affairs, Washington, DC 20555.

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