

## Security of Licensed Material

The North Dakota Department of Health is closely scrutinizing the security practices of radioactive material users at all licensed facilities in the state.

All radioactive material licensees and each authorized user are required to comply with the North Dakota Radiological Health Rules, as well as Department of Health policy. The department's current rules require that all radioactive material must be secured from unauthorized use or removal by remaining either under the constant surveillance of an authorized user or locked in a secure location at all times as stated in Section 33-10-04.1-12 of the North Dakota Radiological Health Rules.

If radioactive material is present in an unsecured area (e.g., unlocked laboratory, vehicle, office or field site) and not in a locked storage container or cabinet, "constant surveillance" must be maintained. Constant surveillance means that an authorized user must, at all times, maintain direct supervision over the licensed material or must be in the immediate surrounding area where he or she is in a position to monitor the location in such a way as to prevent unauthorized access to the licensed material.

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## Data Regarding Stolen Portable Gauges

The following information is presented to alert readers to a specific area of safety under review by both the North Dakota Department of Health and the U.S. Nuclear Regulatory Commission. This data was extracted from the events reported in the Nuclear Material Events Database (NMED) that refers to portable gauges stolen from 1996 to 2000.

- One hundred fifty-six reportable events involved stolen portable gauges.
- Most of the thefts occurred when gauges were stored in vehicles parked in areas vulnerable to theft.
- Two of the 156 events involved an attempt to sell the stolen gauge. In both cases, the gauge was returned to the owner.
- In two events, gauges were found in scrap metal when radiation monitors alarmed.
  - In one event, only the source rod (10 mCi <sup>137</sup>Cs source) was found.
  - In the other event, the gauge was found intact.
- There were no reports of personnel exposures resulting from the stolen portable gauges.
- Seventy-one percent of the gauges were stolen from vehicles.

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## Did You Know?

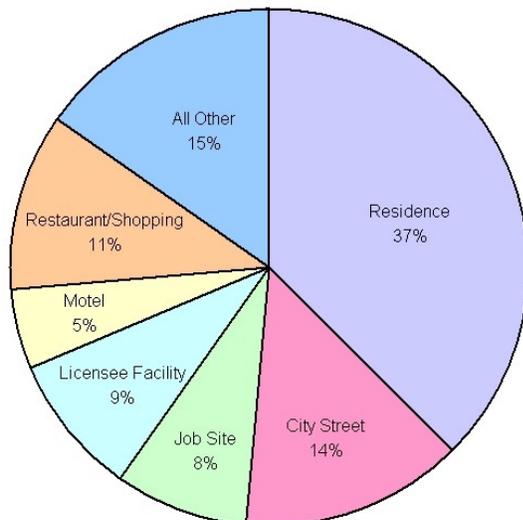
The radiation dose from eating a half-pound of Brazil nuts may be more than the daily dose limit for occupationally exposed individuals.

### Data Regarding Stolen Portable Gauges (cont.)

- In 83 percent of the thefts from vehicles, the vehicle was parked at a location other than the licensee's facility or job site.
- Gauges were most frequently stolen from vehicles parked at private residences (37%).
- Eighty-seven percent of the gauges were locked and secured in a vehicle when stolen.
- Only 40 percent of the stolen gauges were recovered.
- Ninety percent of the events involved theft of the gauges only.
- Ten percent of the events involved the theft of other tools and/or theft of the vehicle.

For those gauges that were stolen while inside a vehicle, the following chart displays the data concerning location of the vehicle when the theft occurred:

Vehicle Location During Theft



### Security of Radioactive Material (cont.)

When constant surveillance is not available, radioactive material must be locked securely in a storage container, cabinet, vehicle, room or other area to prevent unauthorized access. A posted area or room containing any amount of unsecured radioactive material should be locked at all times, except when an authorized user is present to provide constant surveillance.

Licensees must make certain that unauthorized people are not able to obtain access to radioactive material, either accidentally or intentionally. Toward that end, the Radiation Control Program expects that unknown or unauthorized people encountered in the controlled area will be challenged as to their identity and intent. People without justification for being in a controlled area must not be allowed to remain unaccompanied in the vicinity of radioactive material.

Please direct questions about security of your radioactive material to:

Radiation Control Program  
Division of Air Quality  
North Dakota Department of Health  
1200 Missouri Ave., Box 5520  
Bismarck, N.D. 58506-5520

Phone: 701.328.5188

Fax: 701.328.5200

Email: [jkillling@state.nd.us](mailto:jkillling@state.nd.us)

[jgriffin@state.nd.us](mailto:jgriffin@state.nd.us)

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## Which Chapters of the Rules Apply to You?

There are many types of licensed radioactive material users within North Dakota, but only specific chapters of the North Dakota Radiological Health Rules apply to each licensee, as shown in the table below.

	<b>N.D. RADIOLOGICAL HEALTH RULES:</b>									
	<b>Chapter Numbers</b>									
	<b>General Requirements</b>					<b>Use-Specific Requirements</b>				
<b>Radioactive Material Licensees:</b>	<b>1</b>	<b>3</b>	<b>4.1</b>	<b>10</b>	<b>11</b>	<b>5</b>	<b>7</b>	<b>12</b>	<b>13</b>	
Industrial Radiography	♦	♦	♦	♦	♦	♦				♦
Laboratory Use of Radioactive Material	♦	♦	♦	♦	♦					♦
Well Logging	♦	♦	♦	♦	♦			♦		♦
Moisture/Density or Portable Gauges	♦	♦	♦	♦	♦					♦
Level Gauges	♦	♦	♦	♦	♦					♦
Medical Use of Radioactive Material	♦	♦	♦	♦	♦		♦			♦
<b>X-Ray Machine Registrants:</b>	<b>1</b>	<b>2</b>	<b>4.1</b>	<b>10</b>	<b>11</b>	<b>5</b>	<b>6</b>	<b>8</b>	<b>9</b>	
Medical Use of X-Ray and/or Accelerators	♦	♦	♦	♦	♦		♦			♦
Dental, Veterinary, Chiropractic, or Podiatric Use of X-Ray	♦	♦	♦	♦	♦		♦			
Industrial, Educational, or Research Use of X-Ray	♦	♦	♦	♦	♦	♦		♦		♦
X-Ray Service Providers	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦

Copies of the North Dakota Radiological Health Rules are available on the Internet at:

<http://www.health.state.nd.us/ndhd/environ/ee/rad/radrules/contents.htm>

Printed copies or copies on CD-ROM also may be obtained for a small fee by contacting the Radiation Control Program:

Printed copies of the full rules:	\$20	
X-ray machine rules only:	\$15	<i>(Check or money order payable to the North Dakota Department of Health. When requesting printed copies, please specify three-hole punched or bound.)</i>
Full rules on CD-ROM	\$10	



*On July 27, 1956, A B-47 bomber crashed at Lakenheath Airbase in Suffolk, England. While the bomber carried no nuclear weapons, it hit a concrete nuclear weapons storage bunker where four U.S. Mark VI nuclear bombs were stored. In the collision, three of the bombs sustained damage that could have resulted in detonation. In explaining the accident, Gen. James Walsh, commanding officer of the 7th Air Division, told Gen. Curtis LeMay, commander of the Strategic Air Command, "...then the aircraft exploded, showering burning fuel over all. Crew perished. Preliminary exam by a bomb disposal officer says it was a miracle that one Mark VI with exposed detonators sheared didn't go."*

# What is Nuclear Medicine?

Nuclear medicine is a medical specialty that uses radioactive material in techniques to both image the body and treat disease. Nuclear medicine imaging is unique in that it documents organ function and structure, in contrast to X-rays, which are based upon anatomy. Nuclear medicine studies are able to gather medical information about the patient's condition that may otherwise be unavailable, require surgery or necessitate more expensive diagnostic tests.

Radiopharmaceuticals used during nuclear medicine studies are radionuclides or compounds labeled with a radionuclide. These radiopharmaceuticals are attracted to specific organs, bones or tissues of the body. The radiopharmaceuticals used in nuclear medicine imaging emit gamma rays that can be detected externally by special types of cameras, called gamma cameras. PET cameras are used to detect positrons, instead of gamma rays, during positron emission tomography (PET) scans. Both of these cameras work in conjunction with computer systems to form images that provide data and information about the area of the body being imaged.

Common nuclear medicine applications include diagnosis of hyperthyroidism, cardiac stress tests to analyze heart function, bone scans for orthopedic injuries, lung scans for blood clots, brain scans for blood flow, and liver and gall bladder procedures to diagnose abnormal function or blockages.

Nuclear medicine offers procedures that are helpful to a broad span of medical specialties. There are about one hundred different nuclear medicine imaging procedures available; all major organ systems are imaged by nuclear medicine.

*The amount of radiation from a nuclear medicine imaging procedure is comparable to that received during a diagnostic X-ray.*

Medical use of radioactive material also includes radiation therapy. The purpose of these therapeutic procedures is to kill cancerous tissue, reduce the size of a tumor or reduce pain. This type of treatment includes teletherapy, brachytherapy and therapeutic nuclear medicine.

An example of teletherapy is the use of collimated gamma rays from a cobalt-60 source to a specific location of the body. These have largely been replaced with linear accelerators.

In brachytherapy, small sealed sources containing radioactive material are placed within or near the cancer tissue inside the patient. These implants may be temporary or permanent.

In therapeutic nuclear medicine, high doses of radiopharmaceuticals are injected into, or ingested by, the patient. An example is the use of radioactive iodine to treat hyperthyroidism or thyroid cancer.

The use of radioactive material for diagnosis or treatment is not called chemotherapy. A common misconception is that chemotherapy patients receive radiopharmaceuticals to fight their cancer.

Chemotherapy is actually the use of non-radioactive chemicals to treat or control diseases such as cancer. Keep in mind, however that patients may receive both chemotherapy and radiation therapy when battling cancer.

*About 9.75 million nuclear medicine imaging procedures and 250,000 therapeutic procedures are performed every year in the United States.*

If you have questions about the use of radioactive material in medical procedures, please contact the Radiation Control Program or your physician.

## Information & Publication Webpage

Information and publications prepared by the Radiation Control Program are available on the internet at:

<http://www.health.state.nd.us/ndhd/enviro/ee/rad/publications.htm>

Items available include past issues of this newsletter, information notices, checklists, shipping information, safety procedures and postings, markings, and labels that may be printed and used by the licensee.

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