

**Central Midwest Interstate
Low-Level Radioactive Waste Commission**

**Regional
Management
Plan**

Adopted May 1999

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CENTRAL MIDWEST INTERSTATE LOW-LEVEL RADIOACTIVE WASTE COMMISSION REGIONAL MANAGEMENT PLAN

INTRODUCTION

Under the federal Low-Level Radioactive Waste Policy Act of 1980 (Policy Act), each state is responsible, either on its own or in cooperation with other states, for providing the capacity to dispose of the low-level radioactive waste (LLRW) generated within its borders. The State of Illinois and the Commonwealth of Kentucky joined together in 1984 to create the Central Midwest Interstate Low-Level Radioactive Waste Compact (Compact) which was ratified by Congress in 1986. Ten compacts involving 44 states have been formed and ratified since the Policy Act was enacted. There are six unaffiliated states in addition to the District of Columbia and the Commonwealth of Puerto Rico.

The Compact is administered by a three-member Commission, presently consisting of two representatives from Illinois and one from Kentucky. The Commission is required to adopt and amend as appropriate a plan for establishing needed regional LLRW management facilities. Specifically, Article IV of the Compact states:

ARTICLE IV. REGIONAL MANAGEMENT PLAN

The Commission shall adopt a regional management plan designed to ensure the safe and efficient management of waste generated within the region. In adopting a regional waste management plan the Commission shall:

- a) Adopt procedures for determining, consistent with considerations of public health and safety, the type and number of regional facilities which are presently necessary and which are projected to be necessary to manage waste generated within the region.
- b) Develop and adopt policies promoting source and volume reduction of waste generated within the region.
- c) Develop alternative means for the treatment, storage and disposal of waste, other than shallow-land burial or underground injection well.
- d) Prepare a draft regional management plan that shall be made available in a convenient form to the public for comment. The Commission shall conduct one or more public hearings in each party state prior to the adoption of the

regional management plan. The regional management plan shall include the Commission's response to public and party state comment.

The Commission adopted its first Regional Management Plan (Plan) in September 1988. In the decade since its adoption, there have been significant events in the region and in the nation, which caused the Commission to re-evaluate its adopted policies and to adopt an updated Plan. This Plan is a complete statement of the Commission's policy regarding the regional management of LLRW.

This Plan is divided into 3 main sections. The first section provides background information regarding the authority and responsibility of the Commission, the need for and history of the Plan, the description of events since the adoption of the first Plan, and a description of the LLRW generation and management in the Compact.

The second section provides detailed discussion regarding the regional LLRW management policies of the Commission. Specifically addressed are requirements for source and volume reduction, determination of need for regional LLRW management facilities, disposal at facilities other than the regional LLRW disposal facility, management of naturally occurring and accelerator produced radioactive material (NORM and NARM), import and export of LLRW, and tracking shipments of LLRW.

The third section provides a response to public comments received on the draft Plan. Responding to public comment is a requirement of the Compact.

PART I - BACKGROUND INFORMATION

This part provides background information to enable the reader to gain an understanding of the Compact, the responsibilities of the Commission, the requirements of the Plan, the purpose of regional facilities, and LLRW generation and management.

Authority for the Compact

As stated in the introduction, the federal Policy Act made the states responsible for providing for the disposal of LLRW generated within their borders. The Policy Act also encouraged states to join together to form regional compacts to manage LLRW on a regional basis and to limit the overall number of disposal facilities developed. The enticement provided to form a compact is that compacts may prohibit the import or export of LLRW into or out of their regions.

Illinois and the Kentucky joined together in 1984 to form the Central Midwest Interstate Low-Level Radioactive Waste Compact. Congress ratified this compact in 1986. The authorizing statute, known as the Central Midwest Interstate Radioactive Waste Compact Act (Compact Act), in conjunction with the Policy Act establishes the scope and authority of the Compact and the Commission.

Responsibilities of the Commission

The Commission is the body appointed to oversee and implement the Compact. Currently there are three members on the Commission. Two commissioners are from Illinois and one commissioner is from Kentucky. The Commission has numerous responsibilities identified in the Compact Act. The key responsibilities include:

- preparation of a Regional Management Plan;
- identification of the need for regional LLRW facilities; and
- designation of a host state for regional LLRW facilities.

In 1987, the Commission determined that there was a need for a regional LLRW disposal facility and designated Illinois as the host state. The Commission adopted its first Regional Management Plan in 1988.

Requirements for the Regional Management Plan

The Compact requires the Commission to adopt a Regional Management Plan. The goal of the Plan is to ensure the safe and efficient management of LLRW generated in the region. In adopting the Plan the Commission shall:

- adopt procedures for determining the number and type of regional facilities that are necessary;
- develop and adopt policies promoting source and volume reduction;
- develop alternative means for treatment, storage, and disposal of waste, other than shallow land burial or underground injection wells; and
- prepare a draft plan for public comment, conduct at least one hearing in each party state and respond to public comment.

The Plan serves as the basis for the Commission's decisions regarding the use of regional LLRW treatment, storage and disposal facilities for imported LLRW and exports of LLRW from the region.

Regional Facilities

The Compact Act defines "regional facility" as "a parcel of land or site, together with the structures, equipment and improvements on or appurtenant to the land or site, which is used or is being developed for the treatment, storage or disposal of low-level radioactive waste that is (1) located in the region, and (2) established by a party state pursuant to designation of that state as a host state by the Commission."

Host State

In evaluating the need for regional facilities, the Commission considered the currently available LLRW facilities located within and outside of the compact region. If the Commission determines that a LLRW facility is needed and does not currently exist, the Commission will designate a host state to develop that facility. To become a host state, the state must either volunteer to host a specific facility, or must generate more than 10 percent of the region's LLRW based on recorded LLRW manifests during the year the need is determined.

The host state is responsible for the timely development and operation of the regional facility. Designation as host state is for a period of 20 years or the life of the regional facility established under that designation, whichever is shorter. The Commission is not liable for any costs associated with the development, operation and closure of any facility. Article VI of the Compact identifies additional responsibilities of the host state.

History of the Regional Management Plan

The Commission adopted its first Plan in September 1988. The Plan serves as the basis for the Commission's decisions regarding the use of facilities for the treatment, storage and disposal of waste as well as the import and export of LLRW into and out of the region.

Upon designation as host state for the regional LLRW disposal facility, Illinois conducted a siting program that led to the selection of a site near the town of Martinsville. The site was characterized, a disposal facility was designed, a license application was prepared and submitted for review, and an adjudicatory hearing before three-member panel was conducted. The hearing panel found that the site did not meet the statutory requirements. Further consideration of the site was abandoned.

Illinois has started a second siting process. In addition, the Illinois Department of Nuclear Safety (IDNS) evaluated the economic viability of developing a disposal facility for the region. The findings of this study suggests that given declining LLRW volumes the development of a regional disposal facility is not cost effective until the nuclear power stations are decommissioned. This decommissioning will produce large volumes of LLRW. IDNS has restructured the siting process to time the development of the disposal facility with the start of decommissioning. The current projection is that the disposal facility will be operational in the year 2012.

Definition of LLRW

The Compact defines LLRW as "radioactive waste not classified as (1) high-level radioactive waste, (2) transuranic waste (3) spent nuclear fuel, or (4) by-product material as defined in Section 11e(2) of the Atomic Energy Act of 1954. This definition shall apply notwithstanding any declaration by the federal government, a state or any regulatory agency that any radioactive material is exempt from any regulatory control." Because it is defined by what it is not, some LLRW can have high concentrations of radionuclides, irrespective of its name.

Functionally, LLRW is classified into four classes; A, B, C or greater than class C (GTCC). LLRW is classified based on the concentration of key short and long half-life¹ radionuclides present in the waste. Class A has the lowest concentration of these radionuclides. Class B has higher concentrations of the shorter half-life radionuclides. Class C has the highest concentrations of both short and long half-life radionuclides. GTCC contains short and long half-life radionuclides in concentrations that exceed the limits established for Class C. The U.S. Nuclear Regulatory Commission (NRC) has determined that this waste is not suitable for near surface disposal.

The federal Policy Act makes disposal of class A, B and C wastes a responsibility of states and compacts and the disposal of GTCC wastes a federal responsibility. In addition, LLRW that is (1) owned or generated by the U.S. Department of Energy (DOE), (2) owned or generated by the U.S. Navy as a result of decommissioning Navy vessels, (3) resulting from research, development, testing or production of atomic weapons, and (4) identified by the federal government under its program to decontaminate sites used during the Manhattan Project (the Formerly Utilized Site Remedial Action Program) are also federal responsibilities. In 1996 Public Law 104-134 was enacted clarifying that states are not responsible for LLRW originating from the operation, decontamination and decommissioning of uranium enrichment facilities.

Historical Waste Production

LLRW can be quantified based on its volume or its radioactivity. Volume is measured in cubic feet and represents the amount of space the LLRW occupies in the disposal facility. Activity is measured in Curies and represents the level of radioactivity. As can be seen in figure 1, the general trend for LLRW volume production has been decreasing. The spike in volume in 1992 represents the decommissioning LLRW from an industrial generator in Illinois. This amounted to 170,000 cubic feet and less than 3 curies of waste. As can be seen, LLRW volumes decreased 86 percent from 1986 to 1998.

The activity shown in figure 1 does not indicate any discernible trend. The activity in any given year is dependent on the nuclear power stations. The spikes in activity correspond to shipments of activated hardware from the nuclear power stations.

¹ A half-life is the time in which half of the atoms of a particular radioactive substance disintegrate to another nuclear form. Each radionuclide has a specific half-life. Half-lives measure from millionths of a second to billions of years. As a general rule, the passage of ten half-lives is considered sufficient to reduce the radioactivity to a level (0.00097% of the original amount) no longer considered hazardous.

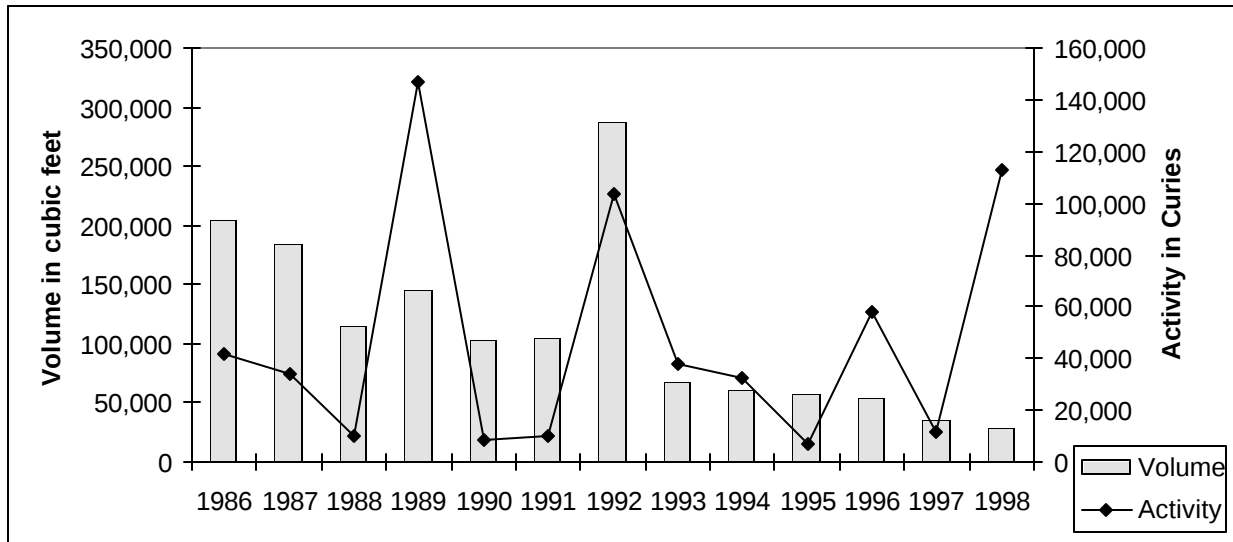


Figure 1 – Historical Waste Volumes

Projected Waste Volumes

Projecting future volume production is speculative and requires making some assumptions regarding the decommissioning of the nuclear power stations. The most accurate long-term LLRW projections were developed during the IDNS's disposal rate forecasting study. In conjunction with the state's largest generator, a projection was made of future LLRW volumes. This projection assumed that the nuclear power stations would be immediately decommissioned upon the termination of the initial operating license and that high-volume, low-activity LLRW would not be disposed in the regional disposal facility.

As can be seen in figure 2, the LLRW volumes remain constant prior to the decommissioning of the first nuclear power station. The two periods of higher LLRW volume production correspond to the two nuclear power station decommissioning periods. Following the decommissioning of the state's nuclear power stations, LLRW volumes are projected to be constant at about 5,000 cubic feet per year.

Waste Processing

LLRW processing is performed in order to reduce the volume requiring disposal or to improve the disposal waste form. These processing services are performed at numerous facilities located both in and out of the region. The treatment techniques include sorting, storage for decay, compaction and super-compaction, incineration, decontamination, steam reformation, thermal desorption, and metal recycling. In addition to treatment facilities,

there are brokers who arrange for the transportation, treatment and disposal of LLRW from small generators.

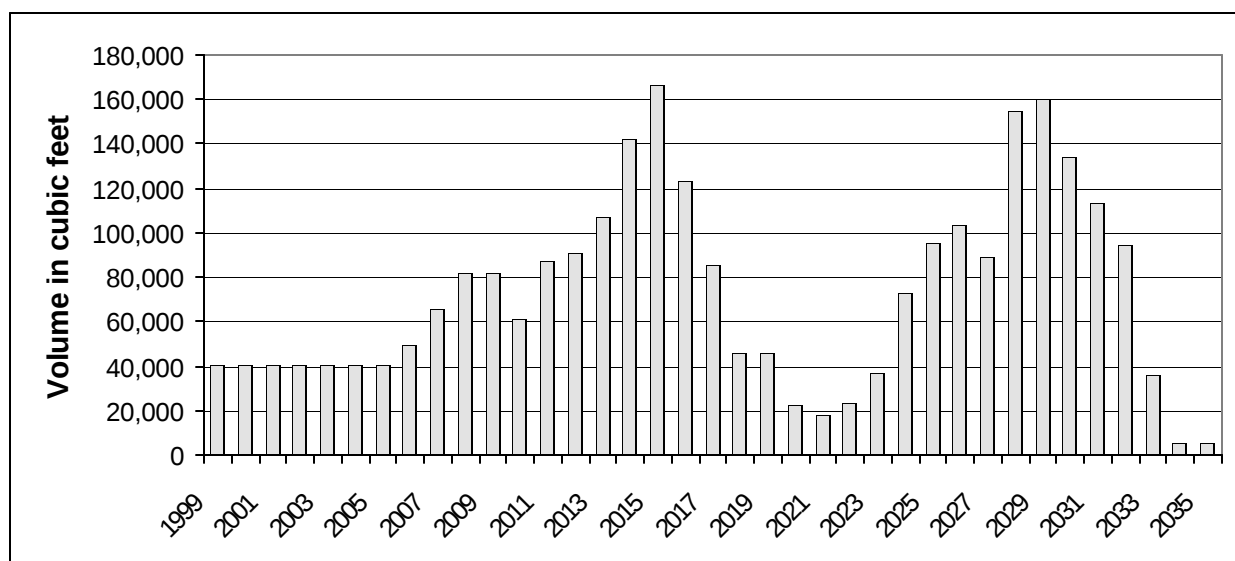


Figure 2 – LLRW Volume Projections

Waste Disposal

At one time, there were six operating disposal facilities capable of taking all classes of LLRW. They were:

- West Valley, New York;
- Maxey Flats, Kentucky;
- Beatty, Nevada;
- Sheffield, Illinois;
- Barnwell, South Carolina; and
- Richland, Washington

The facilities in New York, Illinois and Kentucky all closed by the late 1970's. The Nevada site closed on December 31, 1992, as allowed in the federal Low-Level Radioactive Waste Policy Amendments Act (Amendments Act). The Washington facility serves as the regional disposal facility for the Northwest Compact and receives LLRW from that compact as well as from the Rocky Mountain Compact.

The Barnwell LLRW disposal facility was closed to generators in the Central Midwest region from July 1, 1994 until June 30, 1995. Barnwell reopened on July 1, 1995 and has been available for generators in the Central Midwest region ever since.

In addition to these six facilities, there is a LLRW disposal facility operated by Envirocare of Utah located near Clive, Utah. This facility began operation in 1988 and is

capable of receiving certain high-volume low-activity Class A waste. The Envirocare facility is not a regional facility and only accepts LLRW from generators located outside of the Northwest Compact Region.

PART II - COMMISSION POLICY

SOURCE AND VOLUME REDUCTION

Requirements of Compact

One of the purposes stated in the Compact is “promoting the volume and source reduction of low-level radioactive waste generated in the region.” A requirement for the Plan is to “develop and adopt policies promoting source and volume reduction of waste generated within the region.” Source reduction is defined in the Compact as “those administrative practices that reduce the radionuclide levels in low-level radioactive waste or that prevent the generation of additional low-level radioactive waste.” Specific practices include:

- not allowing unnecessary materials to enter radioactively contaminated areas and thus becoming LLRW;
- reducing defects in reactor fuel rods so radionuclides are better contained within the fuel; and
- substituting procedures or materials that are non-radioactive for ones that contain radionuclides.

The Commission encourages any and all practices that reduce the amount of LLRW produced. These source reduction practices occur at the generator locations and are not achievable at a regional facility.

Volume reduction is defined in the Compact Act as “those methods including, but not limited to, biological, chemical, mechanical and thermal methods used to reduce the amount of space that waste materials occupy and to put them into a form suitable for storage or disposal. Storage for decay, a technique used to treat LLRW containing radionuclides with relatively short half-lives, results in waste not requiring disposal as radioactive LLRW. All other volume reduction techniques result in the increased concentration of radionuclides in the LLRW requiring disposal. The LLRW processing industry has matured since the mid-1980’s. The range of processes offered include:

- sorting;
- compaction and super-compaction;
- incineration;

- decontamination;
- steam reformation;
- thermal desorption; and
- metal recycling.

The LLRW processing industry will likely continue to develop new processes to treat LLRW. The primary impetus for the current processes has been the increase in disposal costs. As disposal costs have risen, LLRW treatment processes have become more cost effective.

The Commission considered several policy options to reduce the volume and activity of LLRW that must be disposed of in the regional disposal facility. These options included:

- economic incentives and disincentives;
- education and information; and
- regulatory measures.

Economic Incentives and Disincentives - Economic incentives and disincentives could include the structure of fees assessed at the regional disposal facility. It is common practice at existing disposal facilities to base the fee structure primarily on the waste volume. Continuation of this practice should encourage generators to reduce their waste volume. Additional volume-related surcharges (offset by volume-unrelated rebates) might also be part of the fee structure, and could encourage generators to treat their LLRW to reduce its volume.

Education and Information - Education and information-related policy options could include providing training or technical assistance on the subject of LLRW reduction. The Commission could provide written material for distribution to LLRW generators. For example it could provide newsletters and special information mailings, audio-visual packages, and workshops at which generators could compare experiences and obtain additional information on volume reduction techniques. The Commission could provide an information service available to all generators within its region. This information service could develop a library and become a clearinghouse for information and evaluations of different LLRW reduction techniques and equipment.

Regulatory Measures – The Commission could encourage the regulatory authorities in the party states to require generators to reduce their volumes. One regulatory measure could be to establish a performance standard in the form of a limit on the volume or radioactivity of LLRW that each generator may ship for disposal in a given period of time. Prescriptive standards could be implemented by the regulatory agencies either in a generic rulemaking or through license specific conditions.

Commission's Intent

Ultimately, it is the Commission's intent to encourage the member states to regulate generators and to manage regional facilities in a way that promotes source and volume reduction. Primary reliance will be placed on establishing a fee structure that creates strong incentives for source and volume reduction, because it is the least intrusive and preserves maximum freedom of choice on the part of the generators.

Because the fee structure must be designed to achieve other objectives, such as assuring equity, collecting sufficient revenues to recover capital costs, and building up the long term care and liability fund, it may not be possible to optimize the fee structure for source and volume reduction. If a fee-based policy does not lead to cost-effective LLRW volume and source reductions, the Commission could assume a more active and aggressive role, promoting regulatory or other policies to reduce LLRW generation.

REGIONAL LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT FACILITIES

Article IV of the Compact requires the Commission to adopt a Regional Management Plan, including procedures for determining the type and number of regional facilities necessary to manage the region's LLRW. This section describes the Commission's determinations regarding those regional LLRW facilities.

The Compact specifies that in order to be designated as a host state for a regional LLRW facility, that state must either volunteer, or the state's total volume of LLRW recorded on manifests for any year is greater than 10 percent of the region's total. The host state is responsible for determining the possible locations for the facility within its borders as well as ensuring its timely development. The designation for host state is for a period of 20 years or the life of the facility, whichever is shorter. The Compact, in Article VI, prescribes additional requirements for the host state.

In 1988, the Commission designated Illinois as the host state for the regional disposal facility. This designation was based on the fact that Illinois generators produce in excess of 90 percent of the region's LLRW. Given the types of generators in Illinois and Kentucky, it is highly unlikely that Kentucky will exceed the 10 percent threshold for being designated a host state. In fact, Illinois, in adopting regulations for the regional disposal facility, established the requirement that the regional disposal facility be designed to accept LLRW for disposal for a period of at least 50 years.

Regional Facilities for Disposal of LLRW

The Commission considered what the appropriate number of disposal facilities should be. Based on the declining LLRW volumes cited in this report, the Commission was concerned as to whether more than one facility would be economically viable or even desirable. The Commission also considered their responsibility to limit the number of facilities in the region.

Commission Policy

The Commission's policy is to have only one regional LLRW disposal facility sited and constructed.

Regional Facilities for Treatment of LLRW

Since the mid-1980's, the LLRW processing industry has grown not only in the number of companies offering treatment services but also in the types of services provided. Most of these new services are a direct result of the rising cost of LLRW disposal. The majority of the LLRW processing facilities utilized by the region's generators are located out of the region. Generators in the region have access to these treatment facilities through interregional agreements between the Commission and the compacts that host the facilities.

In developing the policy options for consideration, the Commission considered whether regional LLRW treatment facilities were needed and what services they should provide. Consideration was also given to the role of the private sector in demonstrating the need for these facilities and the likelihood of continued access to facilities located out of the region.

Commission Policy

The Commission's policy is that an undetermined number of LLRW treatment facilities may be desirable, employing various treatment methods; no number or types of such facilities are specified.

Regional Facilities for Storage for Decay of LLRW

Storage for decay is the practice of holding LLRW for a period equal to 10 half-lives of the radionuclide with the longest half-life present in the LLRW. Following this period, the LLRW is then considered no longer radioactive and can be disposed of as non-radioactive. Storage for decay is practiced typically for LLRW containing radionuclides with half-lives of 120 days or less.

Storage for decay can occur at the generator's location or it can be done offsite at a commercial facility. Currently there is one commercial storage for decay facility located in the region and several located outside of the region. In developing options for consideration, the Commission considered whether regional storage for decay facilities were needed and if so, how many.

Commission Policy

The Commission's policy is that an undetermined number of storage for decay facilities may be desirable; no number of such facilities is specified.

Regional Facilities for Interim Storage of LLRW

The Commission is charged with determining the number and types of regional facilities needed to safely and efficiently manage the region's LLRW. The Commission considered whether a regional interim storage facility is needed until the regional disposal facility becomes available.

The IDNS estimates that a regional LLRW disposal facility for the Central Midwest Region will not be operational before the year 2012. At present, there are several LLRW disposal facilities available for use by the region's generators. Although it was not available from July 1, 1994, through June 30, 1995, the disposal facility operated by Chem-Nuclear Systems, in Barnwell, South Carolina, is available for disposal of class A, B, and C LLRW. In addition, a disposal facility operated by Envirocare of Utah, in Clive, Utah, is available for disposal of certain high-volume low-activity LLRW, and some mixed waste. However, the Envirocare facility is not licensed to accept all of the types of LLRW generated in Illinois and Kentucky. Also, the disposal facility in Richland, Washington continues to accept for disposal some of the region's NORM waste.

According to the generators who commented on the Commission's draft amendments to the Plan, upon regaining access to the Barnwell LLRW disposal facility, they no longer found it necessary to store significant quantities of LLRW. Most notably, ComEd, the region's largest generator, indicated that it has no need for interim off-site storage. Additionally, some commentors suggested that, as long as disposal capability is available, public and worker safety considerations argue against interim storage. Interim storage would increase the risk of traffic accidents since LLRW would have to be transported twice. In addition, because LLRW in storage would require monitoring and re-surveying, worker exposure would increase.

It appears clear that at present there is no need for a regional interim storage facility. The Commission notes that none of the generators in the region has expressed any concern regarding storing LLRW, including mixed waste, until the region's disposal facility becomes operational. Thus, the Commission determines at this point that a regional LLRW storage facility is not needed. Further, the Commission notes that designation as a host state for a regional LLRW storage facility would have a significant impact on that state.

Commission Policy

The Commission determines that based on the current availability of LLRW disposal capacity, there is no need to designate a host state responsible for developing an interim storage facility. The Commission will reconsider this determination should access to disposal facilities be restricted, or should a party state identify a need for an interim storage facility.

IMPORT AND EXPORT OF LOW-LEVEL RADIOACTIVE WASTE

In encouraging states to form regional compacts, the Policy Act allows compacts the authority to limit the import or export of LLRW across the compact boundaries. The Commission considered the appropriateness of exercising this authority. Specifically, the Commission considered when to limit the import and export of LLRW and also to what facilities these limits would apply.

Limiting Exports of LLRW Prior to the Opening of the Regional Disposal Facility

In adopting the original Plan in 1988, the Commission evaluated the impacts to the region's generators if export of LLRW were to be prohibited prior to the opening of a regional LLRW disposal facility. The Commission considered the financial impact associated with the increasing surcharges imposed by the sited states. This outflow of money from the region was considered as a source of funding for development of the regional LLRW disposal facility. Also, the Commission considered the operational impacts of requiring the region's generators to store their LLRW for an undetermined period. These impacts included availability of storage space, occupational exposure and licensing related issues.

Commission Policy

The Commission's policy is to allow the unrestricted export of LLRW until the regional LLRW disposal facility begins operation.

Limiting Exports of LLRW for Disposal After the Regional Disposal Facility Becomes Operational

Given the capital-intensive nature of an engineered disposal facility, the more LLRW that the facility receives, the lower the unit cost. In order to protect the economic investment made in the regional disposal facility and to adequately allocate the disposal charges, the Commission considered whether there should be an export prohibition of LLRW for disposal after the regional disposal facility becomes operational.

Commission Policy

The Commission's policy is to prohibit the export of LLRW for disposal after the regional LLRW disposal facility begins operation.

Limiting the Export of LLRW for Treatment After the Regional Disposal Facility Becomes Operational

Prohibiting the export of LLRW for treatment would prevent the generators in the region from securing these services from vendors located outside of the region. This may impose a hardship if those services were not available in the region. Currently, the majority of LLRW processors are located outside of the region.

Commission Policy

The Commission's policy is to allow the export of LLRW for treatment after the regional LLRW disposal facility begins operation, subject to the approvals required in the Compact.

Limiting Access to the Regional Disposal Facility for Imported LLRW

The history of the Policy Act and the authority it gives to the compact commissions to limit the import of LLRW into their regions provide clear evidence that citizens of one state do not generally take a positive view of receiving and disposing of LLRW from another state or region. It is not possible to predict whether these public attitudes will eventually change when new LLRW disposal facilities are developed. For the present, the Commission intends to operate on the assumption that citizens are willing to accept responsibility for LLRW generated within their own region, but not for LLRW generated by others.

Commission Policy

It is the Commission's policy to prohibit access to the regional LLRW disposal facility for imported LLRW.

Limiting Access to Treatment or Storage Facilities for Imported LLRW

Treatment and storage facilities play an important role in the management of LLRW. These facilities provide services reducing the volume of LLRW requiring disposal and to improving the disposal waste form. To ensure the viability of LLRW treatment and storage facilities located in the region and in order to make these facilities available to generators, the Commission considered whether imports of out of region LLRW should be prohibited.

In developing the policy options, the Commission considered the establishment of agreements between the compact commissions that would specify the terms under which

the import of LLRW would be allowed. As mentioned previously, the Commission has entered into interregional agreements that specify the conditions for LLRW import.

Commission Policy

The Commission's policy is to prohibit access to LLRW treatment or storage facilities for imported LLRW, except as authorized under an agreement or contract entered into by the Commission subject to the provisions of the Compact.

DISPOSAL OF LLRW AT FACILITIES IN THE REGION OTHER THAN THE REGIONAL DISPOSAL FACILITY

Article IX(b) of the Compact provides that "Unless authorized by the Commission pursuant to Article III(i), or otherwise provided in this Compact, after January 1, 1986 it is a violation of this compact . . . for any person to dispose of waste at a facility other than a regional facility." The Commission acknowledges that the regulatory agencies of each of the Compact's party states are authorized to allow the disposal of LLRW at facilities not specifically licensed to dispose of such LLRW. The regulations may (1) establish exempt concentrations and quantities of radioactive material, (2) establish limits on the concentration of radionuclides in effluents that may be released into the environment, (3) establish limits below which radionuclides may be released into sanitary sewer systems, (4) authorize disposal of specified LLRW without regard to its radioactivity, and (5) establish a procedure for obtaining approval to dispose of LLRW in a manner not otherwise authorized by the regulations. In addition, it is conceivable that the NRC, the party states, or other states not a party to the Compact might adopt policies declaring some LLRW to be Below Regulatory Concern (BRC). If implemented, such policies would result in these BRC wastes being disposed of without regard to their radioactive characteristics. Each of these provisions, which could result in disposal of LLRW at other than the regional LLRW disposal facility, is discussed below.

LLRW in Concentrations or Quantities Exempt from Licensure (See 32 Ill. Adm. Code 330.30 and 330.40 (Illinois) and 902 KAR 100:045, 080, 085. (Kentucky))

The Illinois and Kentucky radiation control regulations contain provisions exempting a person from the requirements of the regulations "to the extent that the person receives, possesses, uses, transfers, owns or acquires products or materials containing radioactive material" in quantities that do not exceed listed quantities or in concentrations that do not exceed the listed exempt concentration limits. These provisions are applied to persons who possess only exempt quantities or concentrations of radioactive materials from the regulatory requirements pertaining to disposal. Since the possession of such materials is not subject to licensing requirements, persons who possess only unlicensed material are not licensees and are not, therefore, required to comply with the disposal requirements applicable to licensees. It should be noted, however, that an exemption from licensing requirements does not, in itself, relieve a person who possesses LLRW from complying with the provisions of the Compact. The Compact provisions requiring LLRW to be disposed of at a regional LLRW disposal facility unless the Commission has authorized otherwise are equally applicable to licensed and unlicensed LLRW.

In considering whether to authorize the disposal of LLRW containing exempt quantities and concentrations of radioactive materials, the Commission has not been given

any reason to reject the implied findings of the IDNS and the Kentucky Cabinet for Human Resources (KCHR) that public health and safety concerns do not necessitate the regulation or restriction of disposal of such materials. In the absence of an operational regional disposal facility, the Commission does not need to consider the effects on the regional facility of allowing exempt quantities or concentrations of radioactive materials to be disposed of at facilities other than a regional facility.

There still remains a tracking issue with regard to the disposal of exempt concentrations or exempt quantities of radioactive materials. Since disposal of exempt wastes does not raise significant public health and safety issues, the Commission does not need to track these wastes in order to verify that they are properly disposed of.

In developing the policy options for consideration, the Commission considered various reporting requirements, either by the user, the regulatory agencies, or not at all. The Commission also considered whether it is appropriate that this proposed authorization be extended to all persons who possess these materials or only to non-licensees.

Commission Policy

The Commission's policy is to allow LLRW generated within the region and containing exempt quantities or exempt concentrations of radionuclides as specified in the current radiation control regulations of the party states, to be disposed of at facilities other than the regional LLRW disposal facility.

Releases into the Environment of Effluents Containing LLRW (32 Ill. Adm. Code 340.310 and 340.320; 902 KAR 100:019, Section 10 and 902 KAR 100:021, Section 1)

The radiation protection regulations of Illinois and Kentucky specify limits on the concentrations of radionuclides in effluents that are released to unrestricted areas. These regulations prohibit the release to unrestricted areas of air or water effluents containing radioactive material in concentrations exceeding the limits specified in the rules. Conversely, the regulations allow effluents containing radionuclides in concentrations less than those specified to be released into the environment.

The Commission understands that the effluent release limits are generally applicable to all licensees and are really more in the nature of an operational requirement than a LLRW disposal option. The rules require licensees to demonstrate that any release of air or water effluent to unrestricted areas will not cause the licensee to violate the regulatory limits on radiation doses to members of the general public. The Commission recognizes that it would be impractical for many licensees to operate their facilities without releasing air and water effluents. Furthermore, in the absence of an operational regional disposal facility, the Commission is not concerned that authorizing release of radionuclides in

effluents, in accordance with limits specified in state radiation protection regulations, will divert LLRW from the regional LLRW disposal facility. Similarly, because the radiation protection regulations permit release of effluents only in air and water, allowing such releases will not increase the number of facilities necessary for management of LLRW. In developing the policy options for consideration, the Commission considered various reporting requirements, either by the user, the regulatory agencies, or not at all.

Commission Policy

The Commission's policy is to authorize disposal of waste in the region by release of effluents containing radionuclides in to the environment, provided that such releases are in accordance with the applicable regulations of the party states' radiation protection agencies (32 Ill. Adm. Code 340.310 and 340.320 (for releases in Illinois) and 902 KAR 100:019, Section 10 and 902 KAR 100:021, Section 1 (for releases in Kentucky)).

Releases into Sanitary Sewer Systems (32 Ill. Adm. Code 340.1030; 902 KAR 100:021, Section 3)

The radiation protection regulations adopted by Illinois and Kentucky contain a provision that authorizes the release of licensed radioactive material into sanitary sewer systems. These regulations permit licensees to discharge soluble radioactive materials in quantities that would not cause the licensee to exceed the average water concentration limits specified in the rules. The rules also allow excreta from individuals undergoing medical diagnosis or therapy with radioactive material to be discharged to the sanitary sewers. Licensees that dispose of radioactive materials as allowed under this rule are required to maintain records documenting that the discharges do not exceed the allowable concentration limits.

According to the 1988 Annual Survey Report issued by the IDNS, "disposal by dilution into a sanitary drain or another system is most commonly practiced by generators of water-soluble liquid LLRW contaminated with tritium, carbon-14 or other radioisotopes in very low concentrations." Table 3 of that report, "Number of Generators Using Disposal Practices in 1988 by Generator Category", indicates that 89 generators disposed of LLRW by release to sanitary sewers. Of these, 55 were medical institutions, 17 were industrial facilities, 13 were academic facilities and 4 were state government laboratories. The report did not indicate the mass or volume of LLRW or the activity of LLRW disposed of in this manner. Data regarding disposal by release to sanitary sewer systems were not reported in subsequent annual reports. The Commission has no data regarding the number or types of facilities in Kentucky that release licensed radioactive material into sanitary sewer systems.

In developing the policy options for consideration, the Commission considered various reporting requirements, either by the user, the regulatory agencies, or not at all. The Commission also considered whether a release to the sanitary sewers constituted disposal and is subject to the provisions of the Plan.

Commission Policy

The Commission's policy is that releases of radionuclides into sanitary sewer systems in accordance with the applicable regulations of the party states' radiation protection agencies (32 Ill. Adm. Code 340.1030 (for releases in Illinois) and 902 KAR 100:021, Section 3 (for releases in Kentucky)) is not disposal of LLRW and is not subject to the restrictions and requirements established in the Plan.

Disposal of Specific Waste (32 Ill. Adm. Code 340.1050; 902 KAR 100:021, Section 5)

Both Illinois' and Kentucky's regulations allow licensees to dispose of limited quantities of tritium, carbon-14, and iodine-125 used as scintillation media or contained in animal tissue as if these materials were not radioactive. The regulations limit this disposal to scintillation media or tissue that contains no more than 0.05 microcurie per gram of the radionuclide present and specifically prohibits disposal in any manner that would cause the waste to be used as food for humans or animals. The regulations also require the licensee to maintain records of wastes disposed of for inspection by the regulators.

The Commission encourages generators to use nonhazardous liquid scintillation media whenever practical. However, since some scintillation media are chemically hazardous and since animal tissue may be biohazardous, the effect of these radiation protection regulations is to allow scintillation media and animal tissue to be disposed of as hazardous or biomedical waste according to the regulations applicable to the remaining hazard. In most cases, that means the materials are incinerated.

In the absence of this rule, licensees would have to manage these wastes in the same manner that wastes containing higher concentrations of radionuclides are managed, i.e., by either disposing of the waste at a licensed LLRW disposal facility or treating the waste by sending it to an incinerator that is licensed to incinerate mixed (hazardous and radioactive) wastes. Here, where the concentration of the radionuclides is low, and the wastes present a chemical or biological hazard independent of the radiological hazard, the regulatory agencies have determined that the chemical or biological hazards outweigh the radiological hazard and that the public is best protected by managing the waste according to its chemical or biological hazard. The Commission has no reason to question the appropriateness of this determination.

In developing policy options, the Commission considered implementing reporting requirements for the user or the party states. The Commission also considered the appropriateness of regulating issues that are beyond the Commission's jurisdiction.

Commission Policy

The Commission authorizes disposal of waste generated in the region in accordance with the provisions of 32 Ill. Adm. Code 340.1050 and 902 KAR 100:021, Section 5.

Disposal of Wastes in a Manner not Specifically Authorized by Regulation (32 Ill. Adm. Code 340.1020; 902 KAR 100:021, Section 2)

The regulations of each of the party states contain a procedure for obtaining authorization to dispose of radioactive materials in a manner not otherwise authorized by the regulations (32 Ill. Adm. Code 340.1020; 902 KAR 100:021, Section 2). The regulatory provisions require the person seeking the authorization to apply to the regulatory agency for authorization. The application must include a description of the LLRW, a description of the proposed manner and conditions for LLRW disposal, environmental information, and analyses and procedures to ensure that doses will not exceed the regulatory limits for doses to members of the public and will be as low as is reasonably achievable.

The Commission considered whether and under what conditions it will allow disposal of LLRW in the region at other than a regional facility, in accordance with such regulatory agency authorizations. At the start of its analysis, the Commission recognized that the regulatory agencies would not grant authorizations to dispose of LLRW in a manner that would pose a threat to the public health and safety or the environment. Accordingly, the Commission did not consider which alternative disposal practices would be suitable, from a radiation safety standpoint, for approval under the regulatory provisions. The Commission nevertheless is required by the Compact to adopt a Plan that ensures the safe and efficient management of all LLRW generated within the region.

In the absence of a regional LLRW disposal facility, the Commission's present primary concern regarding alternative disposal practices is to ensure that LLRW that is disposed of in the region was generated in the region. In the long term, once a regional disposal facility is operational, the Commission must be concerned with any impact that disposal of LLRW pursuant to an authorization will have on the volume of LLRW sent to the regional disposal facility for disposal. The Commission must be assured that allowing LLRW to be disposed of at a facility other than a regional LLRW disposal facility in accordance with authorizations issued by the radiation protection agencies will not adversely affect the economic viability of the regional disposal facility. In addition, in both the short term and the long term, the Commission needs to establish that disposal in

accordance with agency-approved alternative methods will be efficient for the region as a whole and will be consistent with the Compact's expressed purpose of "limiting the number of facilities required to manage low-level radioactive waste generated in the region effectively and efficiently."

On November 16, 1993, in response to requests received from the IDNS and the KCHR, the Commission authorized disposal of LLRW within the region at facilities other than the regional LLRW disposal facility, provided that such disposal is conducted in accordance with regulations issued and approvals granted by the IDNS or the KCHR. The Commission's authorization extended only to LLRW generated within the region and the Commission granted this authorization only until the revisions to the Plan were adopted.

In developing policy options, the Commission considered the role of the party states' regulatory agencies and the appropriate reporting requirements.

Commission Policy

The Commission's policy is to allow LLRW generated within the region to be disposed of at facilities other than the regional LLRW disposal facility provided that such disposal is approved by the party state under the general scope of its radiation control authority and regulations.

Import for Disposal at Facilities Other than the Regional Facility of Below Regulatory Concern Wastes

Article IX(b) of the Compact prohibits any person from depositing at any facility in the region waste from outside the Region or disposing of waste at a facility other than a regional facility, unless authorized by the Commission. In the 1988 Regional Management Plan the Commission adopted a policy prohibiting access to the regional disposal facility for imported waste. In doing so, the Commission noted that "Central Midwest Compact was established precisely because the citizens of Illinois and Kentucky do not wish to take waste from outside the region." The Commission is not aware of any willingness on the part of either party state to encourage or allow disposal within its borders of LLRW from outside the region, regardless of whether another state or the federal government has declared the waste to be below regulatory concern. While the Commission recognizes that such waste presumably poses minimal health risks, the Commission cannot ignore the intent of the Compact and the law and policy of the party states, which is to assume responsibility only for disposal of waste generated within the two state region.

Neither Illinois nor Kentucky has established a general policy or rule declaring LLRW to be "below regulatory concern." In the absence of such state policies, the Commission is not inclined to accept BRC determinations made by other states or by the

federal government. The Commission also notes that the party states have expressed concerns regarding past BRC determinations made by federal agencies. For example in 1988, 1989, and 1990 the IDNS criticized a BRC policy proposed by the U.S. Environmental Protection Agency as well as the BRC policy that was adopted, and later rescinded, by the NRC. In 1992, Illinois expressed outrage at the unilateral determination made by prime contractors of the DOE to consider certain DOE wastes to be below regulatory concern and, accordingly, send the wastes to a hazardous waste incinerator that was not licensed to incinerate radioactive waste.

Since that time, legislation has been enacted in Illinois that provides that the Compact's definition of LLRW shall apply notwithstanding any declaration by the federal government or any state that any radioactive material is exempt from any regulatory control. The Commission respects the reluctance of the party states to allow disposal within the region of LLRW generated outside the region that may be characterized by others as being below regulatory concern.

The Commission also notes that Article III(i) of the Compact provides that Commission agreements allowing waste from outside the Region to be disposed of at facilities within the region must be ratified by the legislature of the receiving state. The obvious intent of this provision is to ensure that the Commission does not authorize, over the objections of the receiving state, the disposal within the region of waste not generated within the region. Accordingly, even if the Commission were inclined to adopt a policy authorizing the import of BRC waste from outside the region for disposal at any facility within the region, that policy should take into account the requirement for legislative approval.

Commission Policy

Except as provided in this Regional Management Plan or as expressly authorized by the Commission, the Compact's prohibition against disposal of waste within the region other than at a regional facility shall apply notwithstanding any declaration by the federal government or any state that any radioactive material is exempt from any regulatory control.

MANAGEMENT OF NORM AND NARM WASTES

Background Information

The Compact defines "low-level radioactive waste" to mean "radioactive waste not classified as (1) high-level radioactive waste, (2) transuranic waste, (3) spent nuclear fuel, or (4) by-product material as defined in section 11e.(2) of the Atomic Energy Act of 1954." [Article II (k)]. This definition does not exclude waste comprised of naturally occurring radioactive material (NORM) or waste comprised of naturally occurring or accelerator-produced radioactive material (NARM). Accordingly, because it does not fall within one of the exclusions, waste containing NORM or NARM is LLRW under the Compact and is subject to the Compact's requirements concerning storage, treatment and disposal of LLRW. The Commission considered whether to authorize managing NORM and NARM in manners otherwise prohibited by the Compact because the federal Amendments Act does not make states responsible for providing disposal capacity for naturally occurring radioactive materials or accelerator produced radioactive materials. For several reasons however, the Commission questions whether this is sufficient to justify excluding NORM and NARM from the operation of the Compact.

Much of the NORM and NARM waste consists of large volumes of waste with low concentrations of radionuclides. However, in some instances, such as some radiopharmaceuticals containing NARM and NORM wastes generated during the cleaning of pipe used in oil and gas production, the concentrations of the radionuclides may be significantly increased. In higher concentrations these wastes present an increased radiation risk, not unlike that resulting from other LLRW.

Naturally occurring radioactive materials are present in the natural environment, in certain building materials, raw products and fertilizers as well as in waste material. Certain rock and soil formations have higher concentrations of the naturally occurring radionuclides in the uranium, thorium and actinium series. Drinking water obtained from these formations may be processed to remove the radionuclides present. This processing can produce NORM contaminated wastes that require proper management. Other NORM contaminated wastes are produced from a variety of industrial processes ranging from oil and gas production to the production of fertilizer to sealed sources used in medical and industrial applications. These wastes will range in radioactivity from low concentration-high volume soils and debris to high concentration-low volume sealed sources. NORM contaminated wastes are sometimes referred to as technologically enhanced NORM or TENORM. This differentiates between NORM present in the natural environment and useful products from TENORM waste produced as a result of a man made process.

TENORM waste, like other wastes, is an item of commerce and subject to the Commerce Clause of the U.S. Constitution. The Compact definition of LLRW includes TENORM as LLRW by virtue that it is not excluded. Therefore, the Commission has the authority to limit the import and export of TENORM waste from the region as well as requiring that TENORM waste be managed according to the provisions of the Compact.

From a regulatory perspective, the disposal requirements will vary depending on the radionuclide(s) present, the concentration and the LLRW form. These factors along with the proposed disposal environment will be considered by the radiation protection regulatory agency in determining whether the proposed action will suitably protect public health and safety. Radium is the most limiting radionuclide contained in TENORM waste.

As mentioned previously, TENORM waste concentrations will vary considerably. At a concentration of 2,000 pico-Curies per gram (pCi/g), TENORM waste is typically disposed at a LLRW disposal facility. This is seen as the transition point from diffuse TENORM waste to discrete TENORM waste. Radiation protection regulatory agencies may require that certain TENORM waste with concentrations less than 2,000 pCi/g be disposed in a LLRW disposal facility based on public health and safety concerns.

REGIONAL MANAGEMENT OF TENORM

The issues that relate to the regional management of LLRW will also apply to the management of TENORM waste. TENORM waste is processed, treated and disposed of at numerous facilities throughout the country. Import and export restrictions on the interregional commerce of TENORM contaminated wastes should parallel those restrictions placed on LLRW. The Commission considered limiting the access of TENORM waste to LLRW facilities in the region for the storage, treatment and disposal (not including sealed sources returned to the manufacturer). The following discussion addresses the issues related to the regional management of TENORM.

Disposal of TENORM Waste at Facilities in the Region other than the Regional LLRW Disposal Facility

The public health and safety hazard presented by TENORM waste is a function of the radionuclides, concentrations and waste form. At a concentration of 5 pCi/g, regulatory agencies will require an analysis of the public health and safety concerns for any proposed waste management activities whether it be disposal in place, disposal in a sanitary landfill, disposal in a licensed TENORM waste site or disposal at a licensed LLRW disposal facility.

In developing the policies associated with the safe management of TENORM waste, the Commission considered the impact of requiring the disposal of large volumes of low

concentration waste at the regional LLRW disposal facility. Rather than requiring all of this material to be disposed at the regional LLRW disposal facility, a more reasoned solution would be to allow the party states' radiation protection regulatory agencies to determine the appropriate disposal requirements for TENORM waste. This would allow the radiation protection regulatory agencies to make the determination based on public health and safety concerns whether a proposed waste disposal methodology would be acceptable. These possible disposal methodologies may include disposal in place, disposal in a sanitary landfill, disposal in a licensed TENORM waste disposal facility or disposal in the regional LLRW disposal facility.

Commission Policy

It is the Commission's policy that TENORM waste with concentrations equal to or greater than 2000 pCi/g shall be disposed at the regional LLRW disposal facility. TENORM waste with concentrations less than 2000 pCi/g shall be disposed in accordance with the method approved by the appropriate party state regulatory agency.

Limiting the Export of TENORM Waste from the Region for Disposal Prior to the Opening of the Regional Disposal Facility

Based on the determination made by the Commission in regards to limiting the export of LLRW there is no reason to limit the export of TENORM waste from the region for disposal prior to the opening of the regional LLRW disposal facility.

Commission Policy

It is the Commission's policy to allow the unrestricted export of TENORM waste.

Limiting the Export of TENORM Waste from the Region for Disposal After the Opening of the Regional LLRW Disposal Facility

In considering the export of LLRW from the region for disposal after the opening of the regional LLRW disposal facility, the Plan presents a discussion of the economics of LLRW disposal being dependent on the volume of wastes received and the need to ensure that wastes generated in the region that are destined for disposal end up at the regional LLRW disposal facility. To "maximize" the volume of wastes received at the regional LLRW disposal facility, the Commission considered the appropriateness of prohibiting the export from the region of TENORM waste that requires disposal in a LLRW disposal facility.

Commission Policy

The Commission's policy is to prohibit the export of TENORM waste in concentrations equal to or greater than 2,000 pCi/g for disposal after the regional LLRW disposal facility begins operation.

Limiting the Export of TENORM Waste from the Region for Treatment

The Plan adopted the policy allowing the export of LLRW for treatment and storage subject to the approvals required in the Compact. The treatment and storage of TENORM waste is functionally no different and as such, export from the region for treatment and storage should be allowed subject to the same requirements placed on LLRW.

Commission Policy

The Commission's policy is to allow the export of TENORM waste for treatment after the regional LLRW disposal facility begins operation, subject to the provisions of the Compact.

Limiting the Import of TENORM Waste into the Region for Disposal

The Commission adopted the policy to prohibit access to the regional LLRW disposal facility for imported waste. There is no apparent reason that the policy should be different for TENORM waste. By adopting a policy that allows the party states' regulatory agencies to authorize disposal of TENORM waste with concentrations greater than 5 pCi/g at facilities other than a licensed LLRW disposal facility, there exists the possibility that TENORM waste might be imported for disposal at non-LLRW disposal facilities located in the region. This is contrary to the intent of the Compact as well as past positions taken by the Commission. Therefore, the Commission considered adopting a policy that prohibits the import of TENORM waste with concentrations of 5 pCi/g or greater for disposal. This will prevent the potential importation of large volumes of TENORM wastes into the sanitary landfills of the region.

Commission Policy

It is the Commission's policy to prohibit the import of TENORM waste with concentrations equal to or greater than 5 pCi/g into the region for disposal.

Limiting the Import of TENORM Waste into the Region for Treatment

There are several facilities in the region which receive items or wastes that are contaminated with TENORM. An example of these facilities are those that receive equipment, such as pumps and pipes, utilized in the exploration and production of oil and gas. These facilities are not considered “regional” for purposes of the Compact nor are they listed on any of the current interregional agreements. These facilities receive these items from persons located both in and out of the region. During the treatment or storage of these items or wastes, TENORM waste requiring disposal may be produced.

To prevent TENORM waste originating outside of the region from being disposed in the region, the Commission considered the adoption of a policy requiring that all LLRW generated during treatment or storage that can be allocated back to the generator be returned to the generator or otherwise allocated to the generator for purposes of disposal. Wastes generated during treatment or storage that can not be allocated to a specific generator be attributed to the facility where the treatment or storage occurred.

Commission Policy

It is the Commission’s policy to prohibit access to treatment facilities for imported TENORM wastes, except as authorized under an agreement or contract entered into by the Commission subject to the provisions of the Compact.

Tracking Shipments of TENORM Waste

In determining the proper disposal of certain TENORM waste, the regulatory agencies may require that the wastes be disposed at a licensed LLRW disposal facility. In order to assure proper allocation of these wastes and to provide a mechanism for estimating future wastes of these types, shipments of TENORM waste destined for disposal at a licensed LLRW disposal facility should be tracked.

Commission Policy

The Commission’s policy is to track shipments of TENORM waste destined for disposal at a licensed LLRW disposal facility.

TRACKING SHIPMENTS OF LOW-LEVEL RADIOACTIVE WASTE

The Commission is authorized under the Compact to approve the import of LLRW from outside the Central Midwest Region to a facility in the region and the export of LLRW from the region. Until and unless the Commission grants its approval, such import or export is a violation of the Compact. However, it is possible that continued treatment or storage of LLRW in Illinois or Kentucky from outside the region can be of overall benefit to the Central Midwest Region. Treatment of LLRW can result in a LLRW form that is safer for transport, storage, or disposal, or can reduce the volume of LLRW that ultimately would require disposal. Economic factors may prevent every state or region in the country from establishing the full complement of treatment and storage facilities, and some form of interregional access to these facilities is desirable.

The Compact requires the Commission to actively exercise its authority over the import of low-level radioactive LLRW to facilities in the Central Midwest Region and export of LLRW from the region. A system that provides for tracking and accounting for LLRW will assist the Commission in making these required determinations regarding approval of import and export and assuring that neither Illinois nor Kentucky becomes responsible for disposal of LLRW from outside the region.

To assure that the provisions of the Compact are enforced, the generation, treatment, storage and disposal of LLRW within the region and the export of LLRW from the region must be monitored. Without adequate monitoring, the Commission will be unable to plan for sufficient LLRW facilities to manage the region's LLRW and limit the number of such facilities. The Commission will be unable to identify and take such actions as may be necessary to protect the health and safety of the citizens of Illinois and Kentucky, or to accomplish the other purposes for which the Compact was created. The Commission will be unable to assure, as required by the Compact, that LLRW generated in the region is managed at regional LLRW facilities and that LLRW from outside the region is not brought to facilities in the region in violation of the Compact.

The Commission has already entered into bi-lateral agreements with the Commonwealth of Massachusetts, and the Midwest, Northeast, Rocky Mountain, Southeast and Southwestern Compacts regarding access to treatment and storage facilities. In addition, the Commission has signed a national agreement for access to treatment and storage facilities, which includes most of the remaining states and regions. The Commission needs to be able to monitor activities conducted under those agreements and must assure itself that LLRW generators who choose to take advantage of these agreements act in compliance with the agreements and the Compact.

The Commission has reviewed the tracking and reporting mechanisms currently in place in each of its party states. A significant amount of information about the generation,

treatment, storage and disposal of LLRW in the region is now being collected, or could be collected under existing regulations. Further, the party states have enacted enforcement legislation, establishing penalties for violating the Compact's prohibitions.

In developing policy options, the Commission considered whether to implement its own tracking system or to require each of its party states to implement such a system. The Commission determined that each party state, rather than the Commission, should establish a tracking system suitable for the Compact's purposes.

In response, the IDNS has developed both the technical and regulatory components of such a system. The Commission was advised at its 1996 Annual Meeting that the appropriate regulations are presently in place in Illinois. In light of this successful practical experience, the Commission adopted the following policy.

Commission Policy

The Commission encourages the party states to establish and implement, either individually or jointly, a system of LLRW tracking to facilitate enforcement of provisions of the Compact and to provide information to the Commission on LLRW tracking and enforcement. The Commission supports the Illinois Department of Nuclear Safety's efforts to enforce the Compact, including compliance with the tracking system by entities outside the Compact region that either send LLRW into the region or receive LLRW from the region. In addition, in the event that entities outside the Compact region fail to comply with requirements of the tracking regulations after receiving reasonable notice of those requirements, the Commission may reconsider the approvals it has given which allow those entities to make or receive shipments of LLRW that would be prohibited under the Compact without the Commission's approval.

PART III - PUBLIC COMMENT

The Regional Management Plan has been revised to incorporate comments collected recently from the public and interested organizations. Comments were presented orally to the Commission during regular meetings and hearings conducted by the Commission. Additionally, written comments were received from members of the public and interested organizations. The Commission evaluated all of the comments received. Several of these comments were directed to topics that were not within the scope of the Plan and have, therefore, not been incorporated. Additionally, several comments received were counter to other comments received. In cases such as these, the Commission evaluated both comments and incorporated the comment that was found to improve the content and be within the legal framework of the Plan. This document provides a summarization of the comments received and a general disposition of those comments.

I. General

Several comments were received relating to suggested improvements in the readability and organization of the Plan. Based on these comments, the Plan has been reformatted to make the document more reader-friendly. The Commission believes that this revision is presented in a manner that presents the statutory requirements of the Plan in a more succinct and logical manner.

Several comments addressed issues that go beyond the purpose of the Plan. To clarify the purpose of the Plan, the statutorily defined purpose of the Plan is clearly identified in the Introduction. The Commission believes that it is inappropriate to address comments that go beyond the scope of this purpose. The revised Plan provides information only on issues that are statutorily required by the Compact.

Comments were received regarding the designation of a host state for the proposed LLRW disposal facility, the possibility of Kentucky being designated as a host state, and the operational life of the proposed facility. It is clearly indicated in the Plan that in 1988, Illinois was designated as the host state for the Compact. The Plan also states that the designation as a host state is for a period of 20 years. As a result of comments received, the Plan has been revised to clearly point out that Illinois has adopted a regulatory framework designed to accept LLRW for disposal at the Illinois LLRW disposal facility for an operational period of at least 50 years.

Comments were received regarding the issue of agreements with other states and/or compacts for the exportation of certain types of LLRW for disposal. The Plan has been clarified to indicate the Commission's position regarding both importation and exportation of LLRW, from Illinois and Kentucky, for treatment and disposal both prior to the

operation of a LLRW disposal facility in the Compact as well as after the opening of such a facility.

II. Projected Waste Volumes

A significant number of comments received on the Plan were directed to the issue of current and projected LLRW volumes, including NORM, NARM, and TENORM. The Commission recognizes the concerns raised in these comments regarding the accuracy of projections and the issue of economic viability of a regional LLRW disposal facility based on declining LLRW volumes.

The historical LLRW information provided in this revision to the Plan is current to the latest IDNS Annual Survey Report. The information provided in the Plan merely provides a snapshot of waste generation rates for previous years and is intended to only indicate general trends in LLRW generation rates. It is not the intent of the Plan to reproduce information readily available and easily accessible in other documents. Persons desiring more information or additional data from previous years should consult the IDNS Annual Survey Report.

Projections of future LLRW generation rates, volumes, or activities are difficult to establish. The issue of LLRW projections is addressed in the Plan in a general summary manner. It has been updated to reflect the latest information available to the Commission. The information provided in the Plan is derived from economic rate forecasting work that IDNS conducted in 1998. Additional detailed information regarding future LLRW generation rates is available from the IDNS.

The Commission also recognizes that, in the field of LLRW generation, projections of future generation rates are dependent on numerous market place forces as well as operational practices and policies of generators. These market forces, practices, and policies change periodically. Because of these factors, the Commission is not in a position to precisely predict future LLRW generation rates or volumes. However, based on the information available to the Commission at the time of publication of the Plan, the Commission's policy is that the Compact will, in the future, require one LLRW disposal facility for the disposal of LLRW generated within the Compact.

Several commentators submitted comments questioning the economic viability of a regional LLRW disposal facility in the Compact. A basis for several of the comments was that with the decrease in the volume of LLRW requiring disposal, the economic viability of a disposal facility becomes questionable. While the Commission realizes that the economic market place must be considered in the development of a regional disposal facility, the Commission believes that it is inappropriate to base the development of a facility solely on current volume projections and market conditions.

III. Waste Disposal

Several comments were received that addressed the fact that the LLRW disposal facility located in Barnwell, South Carolina, has reopened and is accepting LLRW for disposal from generators located in the Compact. In response to these comments, the Plan has been revised to reflect that re-opening. The Plan has been revised to reflect the availability of an additional disposal option to generators of certain types of Class A LLRW at the Envirocare disposal facility located in Clive, Utah.

The Commission recognizes that the availability of operational disposal facilities to generators in the Compact has changed in recent years. The Commission also recognizes that the continued operation of these disposal facilities is not a certainty. The Commission is also aware that additional disposal options outside of the Compact may be on the horizon. However, more importantly, the Commission recognizes the precarious nature of continued dependence on out-of-state disposal capacity and realizes that this disposal capacity could be withdrawn at any time. Based on this, it is the position of the Commission that the Compact will, at some time in the future, require a regional disposal facility located in the Compact.

IV. Regional Facility for Disposal

Several commentators strongly recommended that the Compact does not need more than one regional LLRW disposal facility. These comments have been incorporated in the Plan. The Commission's policy is to have only one regional LLRW disposal facility. Illinois has been designated as the host state for the regional disposal facility.

Contradictory comments were submitted regarding the need to consider the disposal of mixed waste at the regional disposal facility. The Commission's position regarding mixed waste is that there are several mixed waste treatment facilities located outside of the Compact. Generators of mixed waste are encouraged to take advantage of these services to eliminate the need for disposal.

V. Regional Facility for Interim Storage

As with the positions taken by commentators regarding the disposal of mixed waste, conflicting comments were received regarding the development of a regional interim storage facility. However, based on the current availability of disposal capacity outside of the Compact, the Commission believes that there is currently no need for interim storage. This policy position is based on current disposal capacity availability and may be reconsidered should one of the Compact states determine that a regional facility for interim storage is needed. The Plan has been revised to reflect this position.

VI. Limiting the Export of Waste Prior to the Opening of the Regional Disposal Facility

One comment was received regarding formalizing the Commission's position regarding access to LLRW disposal facilities located outside of the Compact. The Plan has been revised to reflect the Commission's policy. The Commission's policy is to allow unrestricted export of LLRW for storage, treatment, or disposal until the regional disposal facility begins operation.

VII. Disposal of LLRW at Facilities in the Region other than the Regional Disposal Facility

A comment was received that proposed to allow generators of exempt quantities of LLRW to dispose of these exempted quantities at facilities other than the regional disposal facility. After careful review of issues raised in the proposal regarding the characterization, tracking, and reporting the disposal of these exempted quantities, the Commission established a policy governing the disposal of these wastes. The Commission's policy is to allow the disposal of exempt quantities of LLRW in disposal facilities other than the regional disposal facility. The disposal of these exempted quantities shall be performed as specified in the current radiation control regulations of each of the party states. The Plan has been revised to reflect this policy.

VIII. Releases into the Environment of Effluents Containing Low-Level Radioactive Waste

Several comments were received regarding the collection and reporting of releases of radioactive materials to the environment. The policy adopted by the Commission states that the Commission will authorize the release of effluents containing radionuclides to the environment provided that such releases are in accordance with all applicable regulations of the party states' radiation protection programs. The Plan has been revised to reflect this policy.

IX. Limiting Access to Treatment or Storage Facilities for Imported Waste

One comment was received regarding access to treatment and storage facilities of imported LLRW. The policy of the Commission is to prohibit access to treatment or storage facilities for imported LLRW, except as authorized under an agreement or contract entered into by the Commission subject to the provisions of the Compact Act.

X. Naturally Occurring Radioactive Materials

Numerous comments were received regarding various aspects of the generation, treatment, and disposal of NORM, NARM, and TENORM. Many of the comments that

were received discuss the perceived problems with the estimated generation rates for these wastes. These comments are addressed in Section II above.

The Commission received contradictory comments regarding the issue of oversight of NORM and NARM wastes. The Commission has evaluated these comments and has determined that, based on the provisions of the Compact Act, the Commission is required to include NORM, NARM, and TENORM wastes in the provisions of the Plan. In its definition of LLRW, the Compact Act does not exclude NORM, NARM, or TENORM wastes. Therefore, the Commission classifies NORM, NARM, and TENORM wastes as LLRW and, as such, these wastes are subject to the LLRW policies enumerated in the Plan.

XI. Waste Tracking

The Commission received numerous comments regarding the waste tracking system, including a recommendation that the Compact Commission should encourage the rapid adoption of a waste tracking system by the party states and that the system currently in place should be used. In response to these comments, the Commission endorses the IDNS' efforts to enforce the Commission's LLRW policies through the implementation of its Waste Tracking System. The Commission reinforces the policy that failure to comply with the IDNS waste tracking system may result in the revocation of approvals given by the Commission to organizations making or receiving shipments of LLRW that would be prohibited under the Compact without the Commission's approval.

The Commission received contradictory comments regarding the issue of tracking the exempt quantities of LLRW through the use of the waste tracking system. After careful review of the issue, the Commission adopted a policy of encouraging the party states to establish and implement a system of LLRW tracking to facilitate enforcement of the Compact.

One comment was received that stated that the implementation of a waste tracking system would be a useful tool in helping to determine the quantities of long-lived radioisotopes generated in the party states. The Commission endorses this position.

XII. Facility Design

One comment was received relating to the imposition of design restriction based on dose or risk considerations. The recommendation was for these restrictions to be based on relevant recommendations of the National Council of Radiation Protection and the International Council of Radiation Protection. The comment went on to recommend that any design restrictions based on dose or risk considerations also be based on a cost benefit analysis. The host state rather than the Compact Commission is responsible for the design, licensing, construction, operation and closure of the regional disposal facility. Dose-based

or risk-based design considerations will be evaluated, controlled, and implemented by the appropriate host state licensing agency.

XIII. Below Regulatory Concern

One comment was received on the Commission's policy regarding the disposal of BRC waste. The comment stated that the Commission's BRC policy is redundant with state law and, therefore, recommended that the policy be withdrawn. The Commission reviewed this comment and determined that it was in the best interest of the Compact to retain its policy on BRC wastes as defined in the Plan.

APPENDIX A

DOSE LIMITS FOR MEMBERS OF THE PUBLIC

32 Ill. Adm. Code 340.310

Section 340.310 Dose Limits for Individual Members of the Public

- a) Each licensee or registrant shall conduct operations so that:
 - 1) The dose in any unrestricted area from external sources does not exceed 0.02 mSv (0.002 rem) in any one hour; and
 - 2) The total effective dose equivalent to individual members of the public from the licensed or registered operation, exclusive of the dose contribution from the licensee's disposal of radioactive material into sanitary sewerage in accordance with Section 340.1030, does not exceed:
 - A) 5 mSv (0.5 rem) in any year at locations within facilities where sources of radiation were installed before January 1, 1994, and the use of the source of radiation does not change on or after January 1, 1994; or
 - B) 1 mSv (0.1 rem) in any year at locations within facilities where sources of radiation are installed or where the source of radiation or its use changes on or after January 1, 1994.
- AGENCY NOTE: It is the Department's intent to allow facilities designed to the 5 mSv (0.5 rem) limit to continue to use the 5 mSv (0.5 rem) total effective dose equivalent limit for a member of the public. This includes locations where the intensity of a source of radiation is not increased beyond the design basis, the type of radiation use is not changed, and the type of facility use is not changed.
- b) A registrant, a licensee or an applicant for a license may apply for prior Department authorization to operate up to an annual dose limit for an individual member of the public of 5 mSv (0.5 rem). This application shall include the following information:
 - 1) Demonstration of the need for and the expected duration of operations in excess of the limit in subsection (a)(2)(B) above;
 - 2) The licensee's or registrant's program to assess and control dose within the 5 mSv (0.5 rem) annual limit; and

- 3) The procedures to be followed to maintain the dose ALARA.
- c) Prior to allowing a member of the public to enter a restricted area, the licensee or registrant shall give instructions on radiation hazards and protective measures to that individual.

32 Ill. Adm. Code 340.320

Section 340.320 Compliance with Dose Limits for Individual Members of the Public

- a) The licensee or registrant shall make or cause to be made surveys of radiation levels in unrestricted areas. In addition, licensees shall survey radioactive materials in effluents released to unrestricted areas. These surveys are to demonstrate compliance with the dose limits for individual members of the public in Section 340.310.
- b) A licensee or registrant shall show compliance with the annual dose limit in Section 340.310 by:
 - 1) Demonstrating by measurement or calculation that the total effective dose equivalent to the individual likely to receive the highest dose from the licensed or registered operation does not exceed the annual dose limit; or
 - 2) Demonstrating that:
 - A) The annual average concentrations of radioactive material released in gaseous and liquid effluents at the boundary of the unrestricted area do not exceed the values specified in Table 2 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions; and
 - B) If an individual were continuously present in an unrestricted area, the dose from external sources would not exceed 0.02 mSv (0.002 rem) in an hour and 0.5 mSv (0.05 rem) in a year.
- c) Upon approval from the Department, the licensee may adjust the effluent concentration values in Table 2 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions, for members of the public, to take into account the actual physical and chemical characteristics of the effluents (e.g., aerosol size distribution, solubility, density, radioactive decay equilibrium and chemical form).

902 KAR 100:021, Section 1

Section 1. General Requirements

- (1) A person or licensee shall dispose of radioactive material or waste only:
 - (a) By transfer to an authorized recipient as provided in 902 KAR 100:040, Section 13, or 902 KAR 100:022;
 - (b) By decay in storage;
 - (c) By release in effluents within the limits in 902 KAR 100:019, Section 10; or
 - (d) As authorized under Sections 2, 3, 4, or 5 of this administrative regulation.
- (2) A person shall be specifically licensed to receive waste containing radioactive material or waste from other persons for:
 - (a) Treatment prior to disposal;
 - (b) Treatment or disposal by incineration;
 - (c) Decay in storage; or
 - (d) Disposal at a land disposal facility licensed under 902 KAR 100:022.

902 KAR 100:019, Section 10

Section 10. Radiation Dose Limits for Individual Members of the Public.

- (1) A licensee or registrant shall conduct operations to ensure:
 - (a) The total effective dose equivalent to individual members of the public from the licensed, registered, and other operations shall not exceed 0.1 rem (1 mSv) in a year, exclusive of the dose contribution from the licensee's or registrant's disposal of radioactive material into sanitary sewerage under 902 KAR 100:021, Section 3; and
 - (b) The dose in an unrestricted area from external sources shall not exceed 0.002 rem (0.02 mSv) in one (1) hour.
- (2) If a licensee or registrant permits members of the public to have access to controlled areas, the limits for members of the public shall continue to apply to those individuals.
- (3) A licensee or registrant applicant for a license or registration may apply for prior authorization to operate up to an annual dose limit for an individual member of the public of 0.5 rem (5 mSv). The application shall include the following information:

- (a) Demonstration of the need for, and the expected duration of, operations in excess of the limit in subsection (1) of this section;
 - (b) A licensee's or registrant's program to assess and control dose within the 0.5 rem (5 mSv) annual limit; and
 - (c) The procedures to be followed to maintain the dose ALARA.
- (4) In addition to the provisions of this administrative regulation, a person, licensee, or registrant subject to the provisions of U.S. Environmental Protection Agency's applicable environmental radiation standards in 40 CFR 190 shall comply with those standards.
 - (5) The Cabinet may impose additional restrictions on radiation levels in unrestricted areas and on the total quantity of radionuclides that a licensee or registrant may release in effluents in order to restrict the collective dose.

DISPOSAL BY RELEASE INTO SANITARY SEWERAGE

32 Ill. Adm. Code 340.1030

Section 340.1030 Disposal by Release into Sanitary Sewerage

- a) A licensee may discharge licensed material into sanitary sewerage if each of the following conditions is satisfied:
 - 1) The material is readily soluble, or is readily dispersible biological material, in water;
 - 2) The quantity of licensed radioactive material that the licensee releases into the sewer in 1 month divided by the average monthly volume of water released into the sewer by the licensee does not exceed the concentration listed in Table 3 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions;
 - 3) If more than one radionuclide is released, the following conditions must also be satisfied:
 - A) The licensee shall determine the fraction of the limit in Table 3 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions, represented by discharges into sanitary sewerage by dividing the actual monthly average concentration of each radionuclide released by the licensee into the sewer by the concentration of

that radionuclide listed in Table 3 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions; and

- B) The sum of the fractions for each radionuclide required by subsection (a)(3)(A) above does not exceed unity;
 - 4) The total quantity of licensed radioactive material that the licensee releases into sanitary sewerage in a year does not exceed 185 GBq (5 Ci) of hydrogen-3, 37 GBq (1 Ci) of carbon-14, and 37 GBq (1 Ci) of all other radioactive materials combined; and
 - 5) In determining compliance with subsections (a)(1), (a)(2), (a)(3) and (a)(4) above, the licensee shall not include the activity from radioactive material excluded by subsection (b) below.
- b) Excreta from individuals undergoing medical diagnosis or therapy with radioactive material are not subject to the limitations contained in subsection (a) above.

902 KAR 100:021, Section 3

Section 3. Disposal by Release into Sanitary Sewerage

- (1) A person or licensee may discharge licensed material into sanitary sewerage if the following conditions are satisfied:
 - (a) The material is readily soluble, or is readily dispersible biological material, in water;
 - (b) The quantity of licensed or other radioactive material that the licensee released into the sewer in one (1) month, divided by the average monthly volume of water released into the sewer by the licensee, shall not exceed the concentration listed in 902 KAR 100:019, Section 44, Table III;
 - (c) If more than one (1) radionuclide is released, the following conditions shall be satisfied:
 - 1. The licensee shall determine the fraction of the limit in 902 KAR 100:019, Section 44, Table III, represented by discharges into the sanitary sewerage by dividing the actual monthly average concentration of each radionuclide released by the licensee into the sewer by the concentration of that radionuclide listed in 902 KAR 100:019, Section 44, Table III; and
 - 2. The sum of the fractions for each radionuclide required by subsection (1)(c)1 of this section does not exceed unity; and

- (d) The total quantity of licensed and other radioactive material that the licensee releases into the sewerage system in a year shall not exceed five (5) curies (185 GBq) of hydrogen-3, one (1) curie (37 GBq) of carbon-14, and one (1) curie of other radioactive materials combined.
- (2) Excreta from individuals undergoing medical diagnosis or therapy with radioactive material shall not be subject to the limitations contained in subsection (1) of this section.

DISPOSAL OF SPECIFIC WASTES

32 Ill. Adm. Code 340.1050

Section 340.1050 Disposal of Specific Wastes

- a) A licensee may dispose of the following licensed material as if it were not radioactive:
 - 1) 1.85 kBq (0.05 uCi), or less, of hydrogen-3, carbon-14 or iodine-125 per gram of medium used for scintillation counting; and
 - 2) 1.85 kBq (0.05 uCi), or less, of hydrogen-3, carbon-14 or iodine-125 per gram of animal tissue, averaged over the weight of the entire animal.
- b) A licensee shall not dispose of tissue pursuant to subsection (a)(2) above in a manner that would permit its use either as food for humans or as animal feed.
- c) The licensee shall maintain records in accordance with Section 340.1180.

902 KAR 100:021, Section 5

Section 5. Disposal of Specific De Minimis Waste.

- (1) A person or licensee may dispose of the following radioactive material without regard to its radioactivity:
 - (a) 0.05 microcurie or less of hydrogen-3 (tritium), carbon-14, or iodine-125 per gram of medium used for liquid scintillation counting or in vitro clinical or in vivo laboratory testing; and
 - (b) 0.05 microcurie (1.85 kBq) or less of hydrogen-3, carbon-14, or iodine-125 per gram of animal tissue, averaged over the weight of the entire animal.

- (2) A licensee shall not dispose of tissue pursuant to subsection (1)(b) of this section in a manner that may permit its use as food for humans or as animal feed.
- (3) A licensee shall maintain records pursuant to Section 11 of this administrative regulation.
- (4) A licensee shall comply with other applicable federal, state, and local regulations governing other toxic or hazardous properties of these materials.

METHOD FOR OBTAINING APPROVAL OF PROPOSED DISPOSAL PROCEDURES

32 Ill. Adm. Code 340.1020

Section 340.1020 Method for Obtaining Approval of Proposed Disposal Procedures

A licensee or applicant for a license may apply to the Department for approval of proposed procedures, not otherwise authorized in 32 Ill. Adm. Code: Chapter II, Subchapters b and d, to dispose of licensed material generated in the licensee's operations. Each application shall include:

- a) A description of the waste containing licensed material to be disposed of, including the physical and chemical properties that have an impact on risk evaluation, and the proposed manner and conditions of waste disposal;
- b) An analysis and evaluation of pertinent information on the nature of the environment;
- c) The nature and location of other potentially affected facilities; and
- d) Analyses and procedures to ensure that doses are maintained ALARA and within the dose limits in this Part.

KAR 100:021, Section 2

Section 2. Method for Obtaining Approval of Proposed Disposal Procedures

A person, licensee, or applicant for a license may apply to the Cabinet for approval of proposed procedures, not otherwise authorized in 902 KAR 100:020, 100:021, 100:022, 100:050, and 100:073, to dispose of radioactive material or waste generated by their activities. An application shall include:

- (1) A description of the waste containing radioactive material to be disposed of, including the:
 - (a) Physical and chemical properties important to risk evaluation; and
 - (b) Proposed manner and conditions of waste disposal.
- (2) An analysis and evaluation of pertinent information on the nature of the environment.
- (3) The nature and location of other potentially affected licensed and unlicensed facilities.
- (4) Analyses and procedures to ensure that doses are maintained ALARA and within the dose limits in 902 KAR 100:019, Sections 3, 8, 9, and 10.