

## MIDWEST REGIONAL MANAGEMENT PLAN

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### ABSTRACT

In response to the Low-Level Radioactive Waste Policy Act of 1980, the States of Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio and Wisconsin formed the Midwest Interstate Low-Level Radioactive Waste Compact. One of the top priorities of the Compact Commission is the development of a comprehensive regional waste management plan. The plan consists of five major elements: 1) waste inventory; 2) waste stream projections; 3) analysis of waste management and disposal options; 4) development of a regional waste management system; and 5) selection of a host state(s) for future low-level facilities. When completed, the Midwest Management Plan will serve as the framework for future low-level radioactive waste management and disposal decisions.

### INTRODUCTION

The Midwest Low-Level Radioactive Waste Compact is the second largest compact by number of states and third largest compact by volume. The compact region consists of the Upper Mississippi/Great Lakes area that encompasses the States of Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio and Wisconsin. Based on 1984 volume estimates, the Midwest region generated approximately 300,000 cu.ft. of waste annually.

In developing the Midwest Compact, the member states elected to develop a regional waste management plan. The objective for preparing a comprehensive regional management plan was to provide the Compact Commission with the technical background, criteria, procedures and options necessary to satisfy state responsibilities under the Low-Level Radioactive Waste Act.

Specifically, Article IV of the Midwest Compact outlines several principles upon which the regional plan should be based. These include:

- 1) Preservation of public health and safety,
- 2) Promotion of volume/source reduction of waste.
- 3) Selection of a host state(s) in a manner that:
  - a) maintains public health, safety and welfare,
  - b) considers the existence of past regional facilities,
  - c) minimizes transportation,
  - d) provides for regional equity,
  - e) minimizes regional environmental, economic and ecological impacts.
- 4) Develop the concept of a complete waste management "system" and not merely focus on waste disposal.

### REGIONAL WASTE MANAGEMENT PLAN

The development of a regional waste management plan revolves around six key work tasks. These include public involvement, data inventory, waste projections, technologies review, waste management systems and host state identification.

In October 1984, the Commission issued a request for proposal to help prepare the management plan. In March 1985, ERM-Midwest, Inc. was selected to serve as the Commission's technical contractor for the plan.

The technical elements of the plan are scheduled for completion in August 1986.

### Public Involvement Element

Public confidence in the planning process is an important element. Toward this end, opportunities for public input, participation and review must be established. Equally important are the development and dissemination of accurate and unbiased information that will allow individuals to become conversant with the problem of low-level radioactive waste.

In March 1985 the Commission prepared a Public Involvement and Awareness Report. Among the recommendations in the report which have already been implemented are the following; state technical-citizen advisory bodies have been established; a quarterly Commission newsletter has been developed; a slide file has been prepared; and Commission fact sheets are being developed. Throughout the Management Planning process, efforts to improve upon public involvement and awareness will be sought. Finally, upon the completion of the draft management plan, public hearings will be conducted in each party state.

### Inventory of Regional Wastes and Waste Management Practices

Before the Commission can determine the type(s) and number of waste management options to pursue, the existing waste volume generation rates, waste type, waste classification, waste distribution within the region and waste treatment practices must be known.

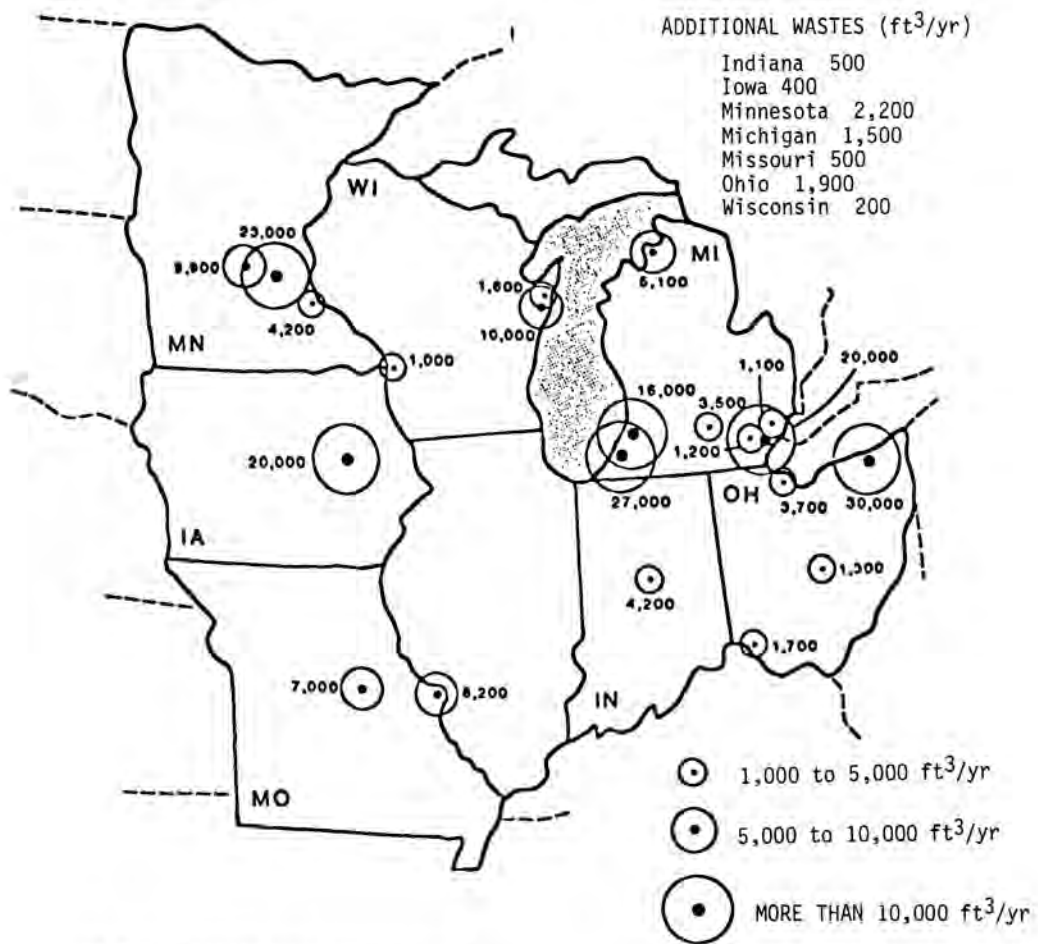
The Midwest Compact has just completed a detailed independent regional waste inventory study. Based upon our work, the 1985 waste volume estimate for the Midwest is approximately 220,000 cu.ft. The contribution of waste varies from a low of 4,700 cu.ft. in Indiana to a high of 75,400 cu.ft. in Michigan (see Fig. 1).

Approximately 75% of the region's wastes are produced by 13 nuclear power reactors and the distribution of waste throughout the region appears to be concentrated in just a few urban areas (see Fig. 2).

The vast majority of wastes in the Midwest are Class A waste (90.5%). Class B wastes constitute only about 9.5% of the waste stream and Class C waste is well under 1%. Cesium 137 and Cobalt 60 constitute the greatest radioactivity levels in curies per

State	Volume (ft <sup>3</sup> /yr)	Percent of Total
Indiana	4,700	2.3
Iowa	20,400	9.9
Michigan	75,400	36.4
Minnesota	39,300	19.0
Missouri	15,700	7.6
Ohio	38,600	18.7
Wisconsin	12,800	6.2
	<u>206,900</u>	

Fig. 1. Estimated Volumes of LLW to be Shipped in the Late 1980's.



SOURCE: MIDWEST DATA BASE 8/23/85

Fig. 2. Major Centers of Waste Generation (1000 ft<sup>3</sup>/or more).

year in the Midwest waste stream. Figure 3 lists average annual nuclide and activity levels in the region's low-level waste.

Waste management practices presently in use in the Midwest generally fall into five categories--compaction, incineration, storage for decay, evaporation/decay and solidification. Through the use of compactors, the region's waste supply is decreased by about 100,000 cu.ft./year below what it would otherwise be. Incineration is not widely used in the region. Only 9 waste generators utilize incineration for a measurable amount of waste. Four of these generators do not ship any ash as they incinerate wastes that are specifically unregulated for nuclide content under 10CFR20.306. Some waste in the region is currently being stored for decay primarily by institutional and medical generators. Storage for decay is generally used only for nuclides with half-lives below 100 days.

#### WASTE PROJECTIONS

The need for future low-level waste facilities depends upon existing and projected volumes of waste. In concert with the Commission's waste inventory, a projection of wastes by state over a 30-year period has been prepared. In preparing the projections, anticipated actions by waste generators, decommissioning schedules for power plants and likely modifications to federal rules were examined. High, low and most probable waste projection scenarios were developed. The low estimate for the year 2000 is approximately 180,000 cu.ft. The high estimate is 269,000 cu.ft. Our most probable estimate is about 210,000 cu.ft./year. The future waste stream is expected to be composed of 72% reactor/utility waste and 28% non-utility waste. A major increase in the Midwest region's waste stream is not anticipated until around 2031. This is around the time several of the region's nuclear reactors will have decommissioning and rehabilitation wastes in need of disposal.

#### REVIEW AND CHARACTERIZATION OF ALTERNATIVE WASTE MANAGEMENT TECHNOLOGIES

A variety of low-level radioactive waste management technologies and options exist. The Midwest Compact's Management Plan is examining the advantages and limitations of various disposal options given the present and projected waste streams for the Midwest region. Disposal options reviewed included: shallow land burial, "improved" shallow land burial, above ground vaults, below ground vaults, modular concrete canisters, earth mounded concrete bunkers, mined cavities and augered holes (lined and unlined). Having examined the various options to above ground vaults, below ground vaults, earth mounded bunker system and modular concrete canisters.

Under treatment technologies, the Commission has examined regional compaction, incineration and storage for decay concepts. Based upon the Commission's support studies, it was estimated that if an ordinary regional compactor is developed, the region could expect to reduce its annual volume by 3,000 to 17,000 cu.ft. The volume reduction achieved would depend upon whether waste generators presently doing their own compacting of waste would continue to do so, or if they would send their compactable waste to a regional facility for treatment. If a super compactor is developed as a regional facility, the estimated volume reductions could range from 44,000 cu.ft. to 56,000 cu.ft. Based upon these findings, further analysis of the Commission developing a regional compaction program is focusing on the use of super compactors.

Based upon the Commission's waste stream, the use of a regional incinerator could reduce the annual waste volumes by 66,000 cu.ft. to 95,000 cu.ft. The actual figure would depend on whether waste generators in the region that currently treat incinerable wastes (primarily by compacting it) would continue to do so or ship those wastes to a regional incinerator instead.

<u>Nuclide</u>	<u>Estimated Activity (Ci/yr)</u>	<u>Half-Life</u>
Cobalt-58	75	71 days
Cobalt-60*	3,000	5.3 years
Cesium-134	440	2.1 years
Cesium-137*	3,600	30 years
Tritium (H-3)*	160	12 years
Iodine-125	14	60 days
Krypton-85	16	11 years
Nickel-63*	90	100 years
Phosphorus-32	410	14 days
Polonium-210	600	138 days
Plutonium-239*	31	24,000 years
Plutonium-241	20	14 years
Sulphur-35	31	87 days
Strontium-90*	11	29 years

\* This nuclide is used in the NRC's classification system for LLW.

Fig. 3. Nuclides and Annual Activities in the Region's Low-Level Waste.

While incineration presents a major volume reduction benefit, several public opinion and air quality problems exist.

Storage for decay, as a means for waste management, will likely continue on-site. The establishment of a regional storage facility is unlikely. The Midwest waste stream inventory indicates that only about 17,000 cu.ft./year would be likely candidates for a regional storage for decay facility. Over 70% of the non-utility wastes with half-lives under 5 years are produced by 4 generators. These generators indicated a strong preference to use on-site storage facilities as opposed to a regional facility. The regional storage for decay concept could, however, be very attractive to the smaller waste generators. If problems persist in siting and developing a new regional disposal facility, a regional storage facility may be needed as an interim management facility.

#### Identification of an Integrated Regional Waste Management System

A variety of combinations of disposal, long-term storage and waste management practices are being explored. In evaluating the various systems, consideration will be given to the system's environmental, institutional, economic and long-term care requirements. Further, a schedule for implementing the system and its various parts is being developed. A systems plan is scheduled for completion in the summer of 1986.

#### Host State Selection Process

One of the most difficult tasks of the Commission's Management Plan will be the development

of a host state(s) selection process. Unlike many of the other compact regions, the Midwest has no one state that generates a major portion of the region's waste. Most of the states have similar waste volumes and characteristics.

As such, the selection of a state (or states) to serve as a "host" for future low-level radioactive waste facilities must be based on a sound and trackable program. Further, the selection of a host state should work to equitably distribute perceived burdens and benefits of a disposal facility as much as possible. To aid in this effort, a siting incentive program is being considered.

Six selection processes are being investigated. These include the following:

- 1) A negative screening of unfavorable areas;
- 2) A positive screening of desirable areas;
- 3) Development of an incentive package;
- 4) development of a "pool of sites;"
- 5) development of a request for commercial operators approach, and;
- 6) a lottery.

The advantages and constraints of those processes are being explored and a process or combination of processes that satisfies the requirements of the Compact and adopted Commission policies will be proposed later in September.

Regardless of the final host state selection process chosen, the selection of a disposal site will remain the responsibility of the selected host state.