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STATE OF ILLINOIS
DEPARTMENT OF NUCLEAR SAFETY

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SPRINGFIELD 62704
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TERRY R. LASH
DIRECTOR

April 19, 1989

B. J. Holt
U.S. NRC Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Dear Ms. Holt:

Enclosed please find a copy of the Department of Nuclear Safety's proposed rules entitled, "Licensing Requirements for Source Material Milling Facilities", 32 Ill. Adm. Code 332.

The Department is proposing this Part to establish procedures, criteria, and conditions applicable to issuance of specific licenses for source material milling and disposal of byproduct material. This Part also establishes specific technical and financial requirement for source material milling facilities including their construction and operation; decontamination; reclamation and ultimate stabilization; postclosure activities; license transfer and termination; and facility ownership and ultimate custody.

Any comments you may have regarding this proposed Part should be forwarded to myself, if possible, by July 30.

Sincerely,

Betsy Salus
Betsy Salus
Staff Attorney

BPS:rm
Encl.

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1) Heading of the Part: LICENSING REQUIREMENTS FOR SOURCE MATERIAL MILLING FACILITIES

2) Code Citation: 32 Ill. Adm. Code 332

<u>Section Number:</u>	<u>Proposed Action:</u>
332.10	New Section
332.20	New Section
332.30	New Section
332.40	New Section
332.50	New Section
332.60	New Section
332.70	New Section
332.80	New Section
332.90	New Section
332.100	New Section
332.110	New Section
332.120	New Section
332.130	New Section
332.140	New Section
332.150	New Section
332.160	New Section
332.170	New Section
332.180	New Section
332.190	New Section
332.200	New Section
332.210	New Section
332.220	New Section
332.230	New Section
332.240	New Section
332.250	New Section
332.260	New Section
332.270	New Section
332.280	New Section
332.290	New Section

4) Statutory Authority: Implementing and authorized by the Radiation Protection Act (Ill. Rev. Stat. 1987, ch. 111 $\frac{1}{2}$, pars. 211 et seq.).

5) A Complete Description of the Subjects and Issues Involved: This rulemaking establishes procedures, criteria, and conditions applicable to issuance of specific licenses for source material milling and disposal of byproduct material by the Department of Nuclear Safety. The requirements are intended to ensure the protection of the public health and the environment during and after source material milling. This Part also establishes specific technical and financial requirements for source

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material milling facilities including their construction and operation; decontamination; reclamation and ultimate stabilization; postclosure activities; license transfer and termination; and facility ownership and ultimate custody. The regulations in this Part do not apply to disposal of licensed material as provided in 32 Ill. Adm. Code 601.

- 6) Will this proposed rule replace an emergency rule currently in effect? No
- 7) Does this rulemaking contain an automatic repeal date? No
- 8) Does this proposed rule contain incorporations by reference? Yes
- 9) Are there any other proposed amendments pending on this Part? No
- 10) Statement of Statewide Policy Objectives: The requirements imposed by the proposed rulemaking will not require local governments to establish, expand, or modify their activities in such a way as to necessitate additional expenditures from local revenues.
- 11) Time, Place and Manner in which interested persons may comment on this proposed rulemaking: Comments on this proposed rulemaking may be submitted in writing for a period of 120 days following publication of this notice. The Department will consider fully all written comments on this proposed rulemaking submitted during the 120 day comment period. Comments should be submitted to:

Betsy Salus
Staff Attorney
Department of Nuclear Safety
1035 Outer Park Drive
Springfield, Illinois 62704
785-9880

- 12) Initial Regulatory Flexibility Analysis:
 - A) Date rule was submitted to the Business Assistance Office of the Department of Commerce and Community Affairs: April 15, 1989
 - B) Types of small businesses affected: None
 - C) Reporting, bookkeeping or other procedures required for compliance: In addition to filing a license application, in order to achieve compliance with the requirements of this Part it may be necessary for mill owners or operators to:
 - 1) Develop and follow procedures necessary for assuming safe operation of milling operators (Section 332.60);

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- 2) Prepare and submit reports describing quality control for measurements (Section 332.60(s));
- 3) Report financial information that would allow the Department to determine whether the owner satisfies financial surety requirements (Section 332.90);
- 4) Notify the Department of filings of bankruptcy (Section 332.110 (g));
- 5) Submit a disposal plan (Section 332.220(a));
- 6) Inspect disposal sites (Section 332.250); and
- 7) Establish financial surety arrangements to assure the availability of funds for the decontamination, decommissioning, reclamation and long-term care of milling facilities (Section 332.260).

Record retention requirements are specified at Section 332.290.

- D) Types of professional skills necessary for compliance: Licensees must have staff skilled in the technical aspects of uranium and thorium milling and radiation safety. Also management and accounting skills are required. In addition, when preparing license applications, it may be necessary for applicants to obtain the skills of persons trained in such disciplines as geology, chemistry, toxicology and demography (See Section 332.50(a) for additional disciplines). When undertaking design and construction of tailings disposal structures, engineering skills will also be necessary.

The full text of the Proposed Rules begins on the next page:

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TITLE 32: ENERGY

CHAPTER II: DEPARTMENT OF NUCLEAR SAFETY

SUBCHAPTER b: RADIATION PROTECTION

PART 332

LICENSING REQUIREMENTS FOR SOURCE MATERIAL MILLING FACILITIES

Section	
332.10	Purpose and Scope
332.20	Definitions
332.30	License Required
332.40	Application Content and Procedure
332.50	General Information
332.60	Technical Information
332.70	Technical Analyses
332.80	Institutional Information
332.90	Financial Information
332.100	Evaluation of License Application and Issuance of a License
332.110	General Conditions of Licenses
332.120	Application for Renewal or Closure
332.130	Contents of Application for Site Closure and Stabilization
332.140	Postclosure Observation and Maintenance
332.150	Termination of Source Material Milling Facility License
332.160	General Requirements
332.170	Protection of the General Population from Radiation
332.180	Protection of Individuals from Inadvertent Access
332.190	Protection of Individuals During Operations
332.200	Stability of the Byproduct Material Disposal Site After Closure
332.210	Technical Criteria for Byproduct Material Disposal Sites - Siting Criteria
332.220	Technical Criteria for Byproduct Material Disposal Sites - Design Criteria
332.230	Technical Criteria for Byproduct Material Disposal Sites - Groundwater Protection
332.240	Technical Criteria for Byproduct Material Disposal Sites - Control of Radiation Hazards
332.250	Technical Criteria - Source Material Milling Operations
332.260	Financial Surety Requirements
332.270	Long-Term Care Fund
332.280	Land Ownership
332.290	Maintenance of Records, Reports, and Transfers

AUTHORITY: Implemented and authorized by the Radiation Protection Act (Ill. Rev. Stat. 1987, ch. 111 $\frac{1}{2}$, pars. 211 et seq.).

SOURCE: Adopted at 13 Ill. Reg. _____, effective _____.

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Section 332.10 Purpose and Scope

- a) The regulations in this Part establish procedures, criteria, and conditions upon which the Department of Nuclear Safety (Department) issues specific licenses for source material milling and disposal of the byproduct material. These procedures are intended to ensure the protection of people and the environment during and after source material milling. The regulations in this Part do not establish procedures and criteria for the issuance of licenses for materials covered under Title I of the Uranium Mill Tailings Radiation Control Act of 1978 (42 U.S.C. 7901).
- b) In addition to the requirements of this Part, unless specified otherwise, all licensees are subject to the requirements of 32 Ill. Adm. Code 310, 320, 330, 331, 340, 341, 400 and 601, and 35 Ill. Adm. Code 302.208, 302.304, 303.202, and 303.203. The regulations in this Part do not apply to disposal of licensed material as provided in 32 Ill. Adm. Code 601.
- c) This Part establishes procedural requirements and technical criteria applicable to any source material milling and to disposal of byproduct material as defined in this Part. It establishes specific technical and financial requirements for source material milling facilities including their construction, operation and decommissioning; decontamination; reclamation and ultimate stabilization; postclosure activities; license transfer and termination; and facility ownership and ultimate custody.

Section 332.20 Definitions

The following definitions are applicable for use in this Part only.

"Active maintenance" means any activity, other than minor custodial activities, needed to preserve isolation of the byproduct material. Active maintenance includes ongoing activities such as the pumping, removal, or treatment of surface water or groundwater or one-time measures such as replacement of a disposal area cover.

"Aquifer" means a geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs. Any saturated zone created by uranium or thorium recovery operations would not be considered an aquifer unless the zone is or potentially is:

hydraulically interconnected to a natural aquifer,
capable of discharge to surface water, or

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reasonably accessible because of migration beyond the vertical projection of the boundary of the land transferred for long-term government ownership and care in accordance with Section 332.280.

AGENCY NOTE: The determination of "significant" will be based on site specific criteria such as yield of the aquifer in volume per unit time, its degree of use or potential for future use for domestic, industrial, or agricultural purposes, the availability of alternative sources, and capability of users to change to alternative sources in the event groundwater protection standards are exceeded.

"Buffer zone" means the area surrounding the site used for disposal of either byproduct material, or material contaminated with uranium or thorium during or as a consequence of source material milling operations. Use of the buffer zone is limited to those activities that would not be detrimental to containment of the wastes, environmental monitoring, interception and processing of any surface or groundwater effluents.

"Byproduct material" means, for purposes of this Part only, the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content, including discrete surface wastes resulting from uranium solution extraction processes. Underground ore bodies depleted by such solution extraction operations do not constitute byproduct material within this definition.

"Closure" means the activities following operations to decontaminate and decommission the buildings and site used to generate byproduct material, to stabilize or relocate the byproduct material, and to restore the groundwater to the degree necessary to achieve compliance with the groundwater protection requirements of subsection 332.230(a).

"Closure plan" means the plan submitted by the license applicant or licensee, and specified in the license, that describes how the licensed site will be decontaminated, reclaimed and stabilized.

"Commencement of construction" means any clearing of land, excavation, or other development action that would affect the environment of a licensed site. The term does not mean site exploration, construction of necessary roads for site exploration, boring to determine foundation conditions, or other preconstruction monitoring or testing to establish background information related to the suitability of the site or the protection of environmental values.

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"Compliance period" begins when the Department sets specific secondary groundwater protection standards in accordance with Section 332.230 and ends when the owner's or operator's license is terminated and the disposal site is transferred to the State or federal agency for long-term care.

"Control boundary" means a physical barrier that separates a restricted area from an unrestricted area.

"Decommissioning" means to remove (as a facility) safely from service and reduce residual radioactivity to a level that permits release of the property for unrestricted use and termination of the license.

AGENCY NOTE: The byproduct material disposal site is not decommissioned because it will neither be released for unrestricted use nor be unlicensed. Land ownership and custody will be maintained by the State or the federal government as required by Section 332.280. However, portions of the licensed site other than the actual byproduct material disposal area are decommissioned.

"Dike" means an embankment or ridge of either natural or man-made materials used to prevent the movement of liquids, sludges, solids, or other materials.

"Disposal area" means the area containing byproduct material to which the requirements of Sections 332.170(c) and 332.240 apply.

AGENCY NOTE: The disposal area includes only the surface area of the land immediately underlain by byproduct material and does not include any embankments, dams, or other supporting structures which surround the byproduct material.

"Disposal site" means the land transferred to the State or federal government under Section 332.280. This land includes the disposal area, any surrounding embankments, or dams that contain the byproduct material, and any buffer zones.

"Existing portion" means that land surface area of an existing surface impoundment or disposal area on which significant quantities of byproduct material have been placed prior to September 30, 1983.

"Fund" means the "The Radiation Protection Fund", Ill. Rev. Stat. 1987, ch. 111 $\frac{1}{2}$, par. 218(c).

"Groundwater" means water below the land surface in a zone of saturation. For purposes of this Part, groundwater is the water contained within an aquifer as defined above.

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"Leachate" means any liquid, including any suspended or dissolved components in the liquid, that has percolated through or drained from the byproduct material.

"Licensed site" means the area contained within the boundary of a location under the control of persons generating or storing byproduct material under a Department license.

AGENCY NOTE: The licensed site would include, at a minimum, any actual or proposed disposal areas and sites, any buffer zones, and any additional land used by the licensee for the generation and storage of byproduct material. Normally, this latter land area will be decommissioned and reclaimed, and not subject to land transfer under Section 332.280.

"Liner" means a continuous layer of natural or man-made material, beneath or on the sides of a surface impoundment which restricts the downward or lateral escape of byproduct material, hazardous constituents, or leachate.

"Minor custodial activities" means maintenance activities not necessary to preserve the isolation of the byproduct material. Such activities could include repair of fencing, repair or replacement of monitoring equipment, minor additions to or repair of disposal area cover, and general disposal site upkeep such as mowing grass.

"Monitoring" means observing and making measurements to provide data to evaluate the performance and characteristics of a licensed or disposal site.

"Point of compliance" means the site specific location in the uppermost aquifer where the groundwater protection standard must be met.

"Postclosure" means the period of time from completion of the closure plan for decontamination, reclamation, and stabilization of the source material milling facility, byproduct material surface impoundment and disposal area, but prior to the termination of the license.

"Reclamation" means the following activities performed at a licensed site as a part of closure:

stabilize and isolate byproduct material contained within a disposal site;

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backfill with uncontaminated soil any disturbed areas to achieve a topography compatible with surrounding terrain;

recontour land to support surface drainage; and

revegetate as necessary.

"Restricted area" means any area access to which is controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive material. The restricted area shall not include any areas used for residential quarters, although a separate room or rooms in a residential building may be set apart as a restricted area.

"Source material" means:

uranium or thorium, or any combination thereof, in any physical or chemical form, or

ores which contain by weight one-twentieth of one percent (0.05%) or more of uranium, thorium, or any combination of uranium or thorium. Source material does not include special nuclear material.

"Source material milling" means any operation in which uranium or thorium is extracted and concentrated from ore processed primarily for its source material content. This includes solution mining and heap leaching and any other operation which generates byproduct material as defined in this Part.

"Special nuclear material" means:

plutonium, uranium-233, uranium enriched in the isotope 233 or in the isotope 235, and any other material which the U.S. Nuclear Regulatory Commission determines to be special nuclear material, or

any material artificially enriched by any of the foregoing.

"Surface impoundment" means a natural topographic depression, man-made excavation, or diked area, which is designed to hold an accumulation of liquid wastes or wastes containing free liquids, and which is not an injection well.

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"Surveillance" means monitoring and observation of the disposal site for the purposes of visual detection of the need for maintenance, custodial care, evidence of unauthorized access, and compliance with other license and regulatory requirements.

"Uppermost aquifer" means the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary.

Section 332.30 License Required

- a) No person shall operate a source material milling facility or byproduct material surface impoundment or disposal area, or receive, possess, dispose, or transfer source or byproduct material associated with such facilities, unless authorized by a license issued by the Department pursuant to this Part and 32 Ill. Adm. Code 330.
- b) Each person shall file an application with the Department pursuant to 32 Ill. Adm. Code 330.240 and obtain a license as provided in this Part before commencement of construction of a source material milling facility, or byproduct material surface impoundment or disposal area. Failure to comply with this requirement shall be grounds for denial of a license.

Section 332.40 Application Content and Procedure

- a) In addition to the requirements set forth in 32 Ill. Adm. Code 330.250, an application filed pursuant to this Part shall contain the required information as set forth in Sections 332.50 through 332.90.
- b) The Department will review the application for completeness within sixty (60) days after receipt of the application and will notify the applicant whether or not the application is acceptable for filing. This review of the application shall not constitute the Department's approval of the adequacy of the information and data contained in the application.
- c) The Department may at any time after the filing of the original application, and before the expiration of the license, require further statements or data to enable the Department to determine whether the application should be denied or whether a license should be granted, modified, or revoked.

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- d) A license application may include a request for a license to engage in one or more activities, provided that the application specifies the additional activities for which licenses are requested and complies with regulations of the Department as to application for such licenses.
- e) In any application, the applicant may incorporate by reference information contained in previous applications, statements, or reports filed by the applicant with the Department. Such reference shall identify the document being referenced by subject, date and page number.
- f) All materials considered to be proprietary in nature shall be separated, marked confidential and sealed in an envelope or package. These materials shall be referenced in the license application.
- g) Ten copies of an application for a specific license, or amendment thereto, shall be filed with the Department.
- h) Each application for a specific license, or amendment thereto, shall be accompanied by the fee prescribed in 32 Ill. Adm. Code 331, Appendix A.

Section 332.50 General Information

The general information shall include each of the following:

- a) Identity of the applicant, including:
 - 1) The full name, address, telephone number, and description of the business or occupation of the applicant;
 - 2) If the applicant is a partnership, the name and address of each partner and the principal location where the partnership does business;
 - 3) If the applicant is a corporation or an unincorporated association, the state where it is incorporated or organized, the principal location where it does business, and the names and addresses of its directors and principal officers; and
 - 4) If the applicant is acting as an agent or representative of another person in filing the application, all information required under this subsection shall be supplied with respect to the other person.

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b) Qualifications of the applicant:

- 1) The organizational structure of the applicant, both offsite and onsite, including a description of lines of authority and assignments of responsibilities, whether in the form of administrative directives, contract provisions, or otherwise;
- 2) The technical qualifications, including training and experience, of the applicant and members of the applicant's staff to engage in the proposed activities. Minimum training and experience requirements for personnel filling positions described in response to the requirements of subsection (b)(1) shall be provided;
- 3) A description of the applicant's program for training personnel to execute job functions in a manner consistent with the requirements of this Part and 32 Ill. Adm. Code 310, 320, 330, 340, 341, and 400.
- 4) The plan to maintain trained personnel to carry out:
 - A) Receipt, possession and transfer of source and byproduct material;
 - B) Source material milling;
 - C) Disposition of byproduct material; and
 - D) Reclamation, decontamination, and stabilization of the licensed site, surface impoundments, and disposal areas.

c) A description of:

- 1) The location of the proposed source material milling facility, and byproduct material surface impoundments and disposal areas;
- 2) The general character of the proposed activities;
- 3) The types and quantities of ores and product to be received, possessed, stored, transferred, or disposed of;
- 4) The plans for use of the source material milling facility, and byproduct material surface impoundments, and disposal areas for purposes other than source material milling and the disposal of byproduct material as defined in this Part; and

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- 5) The proposed milling facilities, equipment, surface impoundment and disposal area conceptual design, and size of the licensed site through closure.
- 6) The proposed schedules for construction, receipt of ores, the first processing of ores, expansion or increased capacity potential over and above the planned facilities, and the anticipated operational lifetime of the source material milling facility and surface impoundments.

Section 332.60 Technical Information

The application shall contain technical information demonstrating that the technical criteria of this Part will be met. Specifically, the application shall contain:

- a) A description of the characteristics of the proposed licensed site as determined by selection and characterization activities. The description shall include, but need not be limited to, the following:
 - 1) Topography, geology, geochemistry, geotechnology, seismology, hydrology, climatology, meteorology, radioactivity, toxicology, ecology;
 - 2) History, archaeology, and demography;
 - 3) Local economy and land usage;
 - 4) Known natural and mineral resources;
 - 5) Proposed and available modes of transportation; and
 - 6) A list of all endangered plant and animal species on the site and within 10 km.
- b) A description of the design features of the source material milling facility and byproduct material surface impoundment and disposal area. The description shall include the following:
 - 1) Surface and groundwater management;
 - 2) Effluent discharges and monitoring;
 - 3) Licensed site access protection;
 - 4) Occupational exposure control;

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- 5) Licensed site monitoring, closure and maintenance; and
 - 6) Buffer zone adequacy for monitoring and potential mitigative measures.
- c) A description of the design criteria and their relationship to the technical criteria.
 - d) A description of the natural events or phenomena, such as winds and rainstorms, tornados, earthquakes and extreme temperatures, used for the design and their relationship to the design criteria.
 - e) A description of codes and standards which the applicant has applied to the design and which will apply to construction of the source material milling facility, and any byproduct material surface impoundment and disposal area.
 - f) A description of the construction and operation of any byproduct material surface impoundment and disposal area. The description shall include as a minimum:
 - 1) Method of construction;
 - 2) Method for emplacement of byproduct material within a surface impoundment or disposal area;
 - 3) Procedures for and areas of waste segregation;
 - 4) Types of access control barriers;
 - 5) Engineering quality control program;
 - 6) Construction quality assurance program;
 - 7) Methods and areas of waste storage;
 - 8) Onsite traffic and drainage systems; and
 - 9) Methods to control surface water and groundwater and precipitation access to the byproduct material.
 - g) A description of methods to be employed in the handling and disposal of the byproduct material including dewatering and neutralizing such materials that, because of physical or chemical properties, might affect meeting the technical criteria of this Part.

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- h) A description of the licensed site closure plan, including those design features which are intended to facilitate closure and to eliminate the need for active maintenance.
- i) A description of the kind, amount, source, classification and specifications of the radioactive material proposed to be received, possessed, processed, and disposed of at the source material milling facility, any byproduct material surface impoundment, and any disposal area.
- j) A description of the quality assurance program for the determination of natural characteristics of the licensed site and for the maintenance of quality control during the design, construction, operation, reclamation, decontamination, stabilization, and closure of the licensed site. Audits and managerial controls including criteria and standards shall be incorporated in this program.
- k) A description of the radiation safety program for controlling and monitoring radioactive effluents to ensure compliance with the technical criteria in Section 332.170; occupational radiation exposure to ensure compliance with the requirements of 32 Ill. Adm. Code 340; and to control contamination of personnel, vehicles, equipment, buildings, and the site. Both routine operations and accidents shall be addressed. The program description shall include procedures, instrumentation, facilities, and equipment.
- l) A description of the environmental monitoring program designed to provide data to evaluate potential health and environmental impacts and the plan for taking corrective measures if migration is indicated. Components of an environmental monitoring program generally include:
 - 1) the sampling of air, for particulate and gaseous emissions;
 - 2) the sampling of surface water and groundwater;
 - 3) the sampling of soil and sediment;
 - 4) the sampling of vegetation and animals;
 - 5) the sampling of total radon and its daughters;
 - 6) the sampling of direct radiation with both passive integrating devices and survey instruments; and
 - 7) other environmental analysis that might be indicated as a result of site specific conditions.

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- m) A description of the proposed methods of decontamination, reclamation, stabilization and long-term care within the licensed site.
- n) A description of each emission source and emission control device incorporated into the source material milling operations. The description shall also include the efficiency, calibration procedures and maintenance schedules for emission control devices.
- o) A description of the licensee's procedure for monitoring all pathways of exposure to workers and the public. The frequency of monitoring for each pathway shall be site specific and designed to demonstrate compliance with the criteria of Section 332.170.
- p) A description of the administrative procedures that the applicant will apply to control activities at the source material milling facility and any byproduct material surface impoundment, and disposal area including, but not limited to, organization and lines of authority, management audit programs, and internal inspection programs.
- q) An estimate of the environmental effects of accidents on each operation.
- r) A description of regional and site specific characteristics which have seasonal or cyclical variations to include the range of variations in addition to the average values. The site specific pre-operational monitoring data must be based on data collected during a one year (four consecutive seasons) period or longer. This data shall be collected prior to any alteration of the environment by changes in topography, drainage, or construction of the milling facility and waste disposal system.
- s) A report describing methodology, calibration procedures, quality control and data analysis for each type of measurement shall be included in the application.

Section 332.70 Technical Analyses

The technical information shall also include the following analyses needed to demonstrate that the technical criteria of this Part will be met:

- a) Analysis of radiological impacts, including all pathways of exposure (i.e., ingestion, inhalation, external exposures) of an individual continuously present at the control boundary, the public and those

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Individuals working at the licensed site, in accordance with Section 332.170 and 32 Ill. Adm. Code 340.1010. The analysis of radiological impacts of the proposed project must include the construction, operation, decontamination, reclamation, stabilization and postclosure periods under both normal and low-frequency severe event conditions, e.g. floods, severe storms, earthquakes, tornadoes, extreme temperatures. In addition, the analysis shall include a description of assumptions and procedures used for determination of the source terms, concentrations, and dose-conversion factors. The impacts analysis shall also include the following:

- 1) A determination of the radiological impacts to an individual continuously present at the control boundary;
 - 2) A determination of the health impacts to the public, based on existing population and projected population, for 100 years, within a distance of 80 km;
 - 3) A determination of the health impacts to the public, based on existing population and projected population, for 100 years, within a distance to 5 km;
 - 4) Radiological analyses for a period up to 100 years after the anticipated closure;
 - 5) The radiological impacts on groundwater, estimated for a period of 1,000 years after the beginning of the operation; and
 - 6) Identification and differentiation of the roles performed by the natural site characteristics and design features in isolating the byproduct material from the environment. The analysis shall include assessments that show the exposures to humans from the release of radioactivity will not exceed the limits set forth in Section 332.170.
- b) Analyses of the protection of individuals during operations shall include assessments for expected exposures due to routine operations and accidents during operation, storage, transfer, transport, and disposal of ores, products, byproducts, and byproduct material as defined in this Part. The analyses shall include assessments that show that exposures will be controlled to meet the requirements of 32 Ill. Adm. Code 340.1010 for individuals in the restricted area, and the requirements of Section 332.170 for individuals outside the control boundary.

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- c) Evaluation of the long-term stability of the byproduct material disposal site and the need for active maintenance after closure of the source material milling facility and any byproduct material surface impoundment or disposal area shall be based upon analyses of active natural processes such as erosion, mass wasting, slope failure, settlement of byproduct material and backfill, infiltration through covers over disposal areas and adjacent soils, and surface drainage of the disposal site. The analyses shall include assessments that show that, after decommissioning, the disposal site will not require active maintenance.
- d) Analysis of the protection of the disposal site from inadvertent access shall include demonstration that the site closure requirements of Section 332.180 will be met.

Section 332.80 Institutional Information

Where the proposed disposal site is on land not owned by the federal or State government, the applicant shall submit evidence that arrangements have been made for transfer of ownership in fee to the federal or State government. Such arrangements shall provide that the governmental agency assuming custody of the byproduct material and its disposal site also assume responsibility for long-term care, observation and maintenance after termination of the license issued by the Department.

Section 332.90 Financial Information

The financial information shall be sufficient to determine that the financial qualifications of the applicant are adequate to carry out the activities for which the license is sought and to comply with financial surety regulations set forth at Section 332.260.

Section 332.100 Evaluation of License Application and Issuance of a License

a) Environmental Analysis

- 1) Each application for a license or license amendment must be reviewed and the license or amendment must be issued by the Department before commencement of any major construction activity. As part of its review of such applications, the Department shall prepare a written analysis of the impact of the license including any activities conducted pursuant thereto. The analysis shall include the following:
 - A) An assessment of the radiological and nonradiological impacts to the public health of the activities to be conducted pursuant to the license or amendment;

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- B) An assessment of any impact on any waterway and groundwater resulting from the activities conducted pursuant to the license or amendment;
 - C) Consideration of alternatives, including alternative sites and engineering methods, to the activities to be conducted pursuant to the license or amendment; and
 - D) Consideration of the long-term impacts including decommissioning, decontamination and reclamation impacts, associated with activities to be conducted pursuant to the license or amendment.
- 2) Commencement of construction prior to issuance of the license or amendment shall be grounds for denial of the license or amendment. As used in this section, the term "commencement of construction" means any clearing of land, excavation, or other substantial action that would adversely affect the environment of a site. The term does not mean site exploration, necessary borings to determine foundation conditions, or other preconstruction monitoring or testing to establish background information related to the suitability of the site or the protection of environmental values; and
- 3) The environmental analysis prepared in accordance with subsection (a)(1) shall be available to the public before the commencement of hearings regarding the merits of the application.
- b) Public participation
- 1) Written comments
 - A) Upon completing preparation of the analysis pursuant to subsection (a), the Department shall publish a notice of the availability of the environmental analysis in the official State newspaper and in a newspaper published in the county or counties where the facility which is the subject of licensing action is to be located. This notice shall specify how a copy of the environmental analysis can be obtained as well as the deadline and address for submitting written comments on the license application.
 - B) The Department shall accept written comments on the license application and the environmental analysis for at least 45 days following the publication of the notice described in subsection (b)(1)(A).

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2) Hearings

- A) At least 30 days prior to the issuance or renewal of a license pursuant to this Part, the Department shall publish a Notice of Opportunity to request a hearing in the official State newspaper and in a newspaper published in the county or counties where the facility that is the subject of the license application is located. This notice shall contain:
- i) a statement identifying the location of the facility,
 - ii) a statement of the availability of the environmental analysis,
 - iii) a statement of the right to request a hearing,
 - iv) the date by which a request for a hearing is to be submitted to the Department, such date shall be no less than 20 days from the date of the publication of the notice, and
 - v) a statement of the actions that will be taken by the Department in the event that a hearing is not requested.
- B) Any person who would be adversely affected by the issuance of the license may request a hearing. The request must be in writing and must contain a brief statement of the basis upon which the issuance of the license is being challenged. If the request is not submitted by the date specified in accordance with subsection (b)(2)(A), or if the request is submitted but later withdrawn, the Department shall issue the license in accordance with subsection (c).
- C) If any hearing is requested in accordance with subsection (b)(2)(B), the parties to the hearing shall be the Department and the Respondent. The provisions of 32 Ill. Adm. Code 200.20, 200.40, 200.50, 200.80 through 200.140 and 200.160 through 200.230 shall be applicable to the hearing.
- c) Upon a determination that an application meets all criteria of this Part, the Department shall issue a specific license authorizing the construction of the source material milling facility and any byproduct material surface impoundment and disposal area. Upon

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completion of the construction in accordance with the license specifications, the Department shall authorize operations at the licensed site after verification of compliance with the license specifications.

- d) The Department may incorporate in any license at the time of issuance, or thereafter by appropriate rule or order, additional requirements and conditions in order to:
 - 1) Ensure compliance with the requirements of this Part;
 - 2) Reduce potential hazard to public safety during operation;
 - 3) Protect the environment; or
 - 4) Prevent loss or theft of materials subject to this Part.
- e) The Department may require reports, examine records and inspect activities under the license as necessary to demonstrate compliance with the requirements of this Part.
- f) Throughout the construction and operating phases of the source material milling facility, a monitoring program shall be conducted by the licensee in order to:
 - 1) Demonstrate compliance with the standards of this Part and 32 Ill. Adm. Code 310, 340, and 400;
 - 2) Evaluate the performance of control systems and procedures;
 - 3) Evaluate environmental impacts of operation; and
 - 4) Detect potential long-term adverse effects.
- g) The source material milling facility shall be designed and operated so that effluents and emissions are less than the exposure and concentration limits specified in 32 Ill. Adm. Code 340, Appendix A and in Section 332.170. The licensee shall limit emissions and exposures by using emission control devices. If the licensee cannot meet the requirements using emission control devices, then institutional controls, such as extended licensed site boundaries and buffer zones, may be used to ensure that limits of exposure and concentrations at the boundary of the restricted area will be met. The licensee shall submit to the Department proposed operation procedures and shutdown procedures as evidence that the requirements specified in 32 Ill. Adm. Code 340 will be met.

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Section 332.110 General Conditions of Licenses

- a) The licensee shall be subject to the provisions of the Radiation Protection Act (the Act) (Ill. Rev. Stat. 1987, ch. 111 $\frac{1}{2}$, pars. 211 et seq.) and to all rules, regulations, and orders of the Department. The terms and conditions of the license are subject to amendment, revision, or modification, by reason of amendments to, or by reason of regulations and orders issued in accordance with the terms of the Act.
- b) Each person licensed by the Department pursuant to the regulations of this Part shall confine possession and use of materials to the locations and purposes authorized in the license.
- c) The licensee shall not process any ore or place any byproduct material in any surface impoundment or disposal area until the Department has inspected it and, based on the results of the inspection, has determined that it conforms to the description, design, and construction described in the application for the license.
- d) No license issued under this Part, or any right thereunder, may be transferred, assigned, or in any manner disposed of, either voluntarily or involuntarily, directly or indirectly, through transfer of control of the license to any person, unless the Department finds, after securing information, that the transfer is in accordance with the provisions of the Act and gives its consent in writing in the form of a license amendment.
- e) The authority to receive and process ores and to place byproduct material within any surface impoundment and disposal area expires on the date stated in the license. Any expiration date on a license applies only to the receipt and processing of ores and the emplacement of byproduct material. Failure to renew the license shall not relieve the licensee of responsibility for implementing reclamation, decontamination, stabilization and closure, postclosure observation and maintenance, and transfer of the license to the ultimate governmental owner.
- f) The license will terminate only on the full implementation of the final closure plan as approved by the Department, including postclosure observation and maintenance, and meeting the requirements of Section 332.140.

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- g) Notification of Bankruptcy:
- 1) The licensee shall notify the Department, in writing, immediately following the filing of a voluntary or involuntary petition for bankruptcy under any Chapter of Title 11 (Bankruptcy) of the United States Code by or against:
 - A) The licensee;
 - B) An entity (as that term is defined in 11 U.S.C. 101(14)) controlling the licensee or listing the license or licensee as property of the estate; or
 - C) An affiliate (as that term is defined in 11 U.S.C. 101(2)) of the licensee.
 - 2) This notification must indicate:
 - A) The bankruptcy court in which the petition for bankruptcy was filed; and
 - B) the date of the filing of the petition.
- h) The licensee shall submit written statements, as requested by the Department at any time before termination of the license, to enable the Department to determine whether the license should be modified, suspended, or revoked.

Section 332.120 Application for Renewal or Closure

- a) An application for renewal or an application for closure under Section 332.130 shall be filed at least 1 year prior to license expiration.
- b) Applications for renewal of a license shall be filed in accordance with Sections 332.40 through 332.90. All applications for closure shall be filed in accordance with Section 332.130. Information contained in previous applications, statements, or reports filed with the Department under the license may be incorporated by reference.
- c) In any case in which a licensee has filed an application in proper form for renewal of a license, the license does not expire until the Department has taken final action on the application for renewal.
- d) In determining whether a license will be renewed, the Department will apply the criteria set forth in Section 332.100.

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- e) Upon evaluation of an application to amend the license for closure submitted in accordance with Section 332.130, the Department shall issue an amendment to the license authorizing closure if the assessment of the application demonstrates that the technical criteria of Sections 332.200 through 332.240 will be met.

Section 332.130 Contents of Application for Site Closure and Stabilization

Prior to beginning final closure of the licensed site, or as otherwise directed by the Department, the licensee shall submit an application to amend the license for closure. The application for amendment shall include an updated closure plan.

AGENCY NOTE: Other circumstances which would cause the Department to direct the licensee to submit an application for closure include, but are not limited to, failure to meet the technical criteria of this Part, failure to post and maintain adequate financial surety, or failure to meet the requirements of the Act.

- a) Any additional geologic, hydrologic, or other data pertinent to the long-term containment of the emplaced byproduct material generated during the operational period.
- b) The results of tests, experiments, or any other analyses relating to any surface impoundment and disposal area, closure, waste migration, and interaction with byproduct material or any other tests, experiments, or analyses pertinent to the long-term containment of the emplaced byproduct material within the disposal site.
- c) Any proposed revision of plans for:
 - 1) Decontamination and/or dismantlement of mill and surface impoundments;
 - 2) Recontouring or backfilling of areas; or
 - 3) Stabilization of the disposal area for postclosure care.
- d) Any information, not previously submitted to the Department, regarding the potential environmental impact of closure activities and long-term performance of the disposal site.

Section 332.140 Postclosure Observation and Maintenance

- a) The licensee shall observe, monitor, and maintain the licensed site until closure is complete and the license is terminated under the

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authorization of the Department in accordance with Section 332.150. The licensee shall be responsible for disposal site maintenance for 15 years after completion of closure. A longer time period for post-closure observation and maintenance will be required if the Department determines that the licensee has not designed and closed the disposal site in accordance with the closure plan specified in the license.

- b) During the postclosure period, the licensee shall conduct four disposal site inspections each year, once each season. Additional inspections shall be performed after each earthquake, which at the disposal site exceeds a level 6 on the Modified Mercalli Index, or flood, or abnormal change in climate, such as precipitation in excess of 10 times the seasonal average level. The results of the inspections, the monitoring data and the evaluation of the monitoring data shall be reported to the Department within 60 days after each inspection. The Department shall require more frequent disposal site inspections, if necessary to establish compliance with the requirements of Section 332.100, or if there has been unauthorized use of the disposal site.

Section 332.150 Termination of Source Material Milling Facility License

- a) Following closure and the period of postclosure observation and maintenance, the licensee may apply for termination of the license. The license shall be terminated when the Department finds:
- 1) That the closure of the licensed site has been made in conformance with the licensee's closure plan, as amended and approved as part of the license;
 - 2) That the licensee has established that the technical criteria of this Part will be met;
 - 3) That any long-term care funds and records are transferred to the federal or State agency that will assume institutional control of the disposal site;
 - 4) That the postclosure monitoring program is ready for implementation by the federal or State agency;
 - 5) That the federal or State agency that will assume responsibility for long-term care, observation, and maintenance of the disposal site is prepared to assume such responsibilities;
 - 6) That permanent monuments or markers warning against intrusion have been installed;

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- 7) That the U.S. Nuclear Regulatory Commission has made a determination of compliance with the decontamination, decommissioning, reclamation, and stabilization standards; and
 - 8) That title to the byproduct material and to the disposal site has been transferred to the United States of America or the State.
- b) In addition to satisfying requirements in subsection (a) above, the licensed site other than the disposal area, shall be decontaminated to the following limits prior to termination of the license:
- 1) Concentration of radionuclides in soil above background concentrations averaged over areas of 100 square meters, shall not exceed:
 - A) for total radium,
 - 1) 5 picocuries per gram of dry soil, averaged over the first 15 centimeters below the surface; and
 - 11) 15 picocuries per gram of dry soil, averaged over layers of 15 centimeters thickness more than 15 centimeters below the surface; and
 - B) for radionuclides other than isotopes of radium,
 - 1) the concentration limits specified in 32 Ill. Adm. Code 340, Appendix A, Table II, Column 2, with units changed from microcuries per milliliter to microcuries per gram; and
 - 11) where combinations of radionuclides are involved, the concentration limits shall not exceed those determined by calculating the sum of the ratios in accordance with the method described in 32 Ill. Adm. Code 340, Appendix A, Note 1.
 - 2) The level of gamma radiation measured at a distance of 100 centimeters from the surface shall not exceed the background level by more than 20 microroentgens per hour.
 - 3) Soil contamination levels with non-radioactive hazardous substances shall be less than the levels specified as contamination limits in other applicable State or federal regulations.

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Section 332.160 General Requirements

Source material milling facilities, and byproduct material surface impoundments and disposal areas shall be sited, designed, operated, closed, and controlled after closure so that exposures to individuals will be within the requirements established in the technical criteria in Sections 332.170, 332.180, 332.190 and 332.240.

Section 332.170 Protection of the General Population from Radiation

- a) At all times, concentrations of radioactive material, excluding radon, thoron, and their progeny, which may be released to the general environment in groundwater, surface water, air, soil, or other means shall not result in an annual dose equivalent commitment in excess of 25 millirem (0.25 mSv) to the whole body, 75 millirem (0.75 mSv) to the thyroid, and 25 millirem (0.25 mSv) to any other organ of any member of the public. Releases of radionuclides in effluents to the general environment shall be maintained as low as is reasonably achievable.
- b) During the operating life and facility decommissioning, the combined concentration of radon and thoron at the boundary of the licensed site, measured at a height of one meter from the surface, averaged annually, shall not exceed three picocuries per liter above the background concentration at the licensed site.
- c) The disposal area shall be designed so that after reclamation and stabilization, the annual total radon release rate through the cover from the byproduct material shall not exceed two picocuries per square meter per second. Furthermore, the direct gamma exposure rate from the byproduct material shall be reduced to background levels normal for areas in the vicinity.

Section 332.180 Protection of Individuals from Inadvertent Access

Design, operation, and closure of the source material milling and any byproduct material surface impoundment and disposal area shall protect any individual inadvertently entering onto the disposal site and occupying it at any time after active institutional controls over the disposal site are removed.

Section 332.190 Protection of Individuals During Operations

Operations at a licensed site shall be conducted in compliance with the standards for radiation protection established in 32 Ill. Adm. Code 340, except that releases of radionuclides in effluents from the licensed site shall be governed by Section 332.170. Every effort shall be made to maintain radiation exposures as low as is reasonably achievable.

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Section 332.200 Stability of the Byproduct Material Disposal Site After Closure

The disposal site shall be sited, designed, used, operated, stabilized and closed to achieve long-term stability and to eliminate the need for active maintenance following closure so that only surveillance, monitoring, or minor custodial care is required.

Section 332.210 Technical Criteria for Byproduct Material Disposal Sites - Siting Criteria

- a) Byproduct material shall be disposed of in a manner that provides containment of the material by preventing disturbances and dispersion by natural forces, and by doing so without active maintenance. In evaluating a byproduct material disposal site, the Department shall consider:
 - 1) Remoteness from populated areas;
 - 2) Hydrologic and other natural conditions as they contribute to continued immobilization and isolation of contaminants from groundwater sources; and
 - 3) Potential for minimizing erosion, disturbances, and dispersion by natural forces over the long term.
- b) The disposal site selection shall be an optimization, to the maximum extent achievable, of the features listed in subsection (a). At a minimum, however:
 - 1) The disposal site shall not be within a distance of 2.5 km (1.5 miles) from the boundary of any municipality without the consent of the governing body of the municipality. The disposal area must incorporate a distance of at least 100 meters between any waste disposal unit and the control boundary;
 - 2) The tailings and waste disposal site shall not be located in a 100-year flood plain, as defined in the rules of the Illinois Department of Transportation, 92 Ill. Adm. Code 706, Subpart C;
 - 3) The characteristics of the disposal site shall allow prediction, analysis and monitoring of any migration of effluents, e.g., the site geology must be simple enough to allow reliable hydrological modeling;
 - 4) The depth to the water table at the disposal site shall not permit groundwater intrusion, perennial or otherwise, into the waste;

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- 5) The natural characteristics of the disposal site such as hydrology, geology, and topography shall contribute to continued immobilization and containment, and shall ensure that waste will be contained within the disposal site boundary for a period of at least 1,000 years after the decommissioning;
 - 6) The disposal site shall not be located where other facilities, activities or land uses could adversely impact the ability of the site to meet the technical criteria of this Part, or mask the environmental impacts of the disposal area;
 - 7) The disposal area structure shall not be located above a geologic fault system. The disposal site geology must be stable, i.e., mass wasting, erosion, slumping, or land sliding shall not adversely affect the long-term containment.
 - 8) The disposal area shall not be located near a capable fault that could cause a maximum credible earthquake larger than that which the disposal area could reasonably be expected to withstand. As used in this Part, the term "capable fault" has the same meaning as defined in Section III(g) of Appendix A of 10 CFR 100, in effect on January 1, 1988, exclusive of subsequent amendments or editions. The term "maximum credible earthquake" means that earthquake which would cause the maximum vibratory ground motion based upon an evaluation of earthquake potential considering the regional and local geology and seismology and specific characteristics of local subsurface material.
- c) When evaluating disposal sites, the Department shall place emphasis on containment of byproduct material, a matter having long-term impacts, as opposed to consideration only of short-term convenience, impacts or benefits. While containment of byproduct material will be a function of both site and engineering design, major consideration shall be given to siting features that pertain to the long-term nature of the hazards.
 - d) To avoid the proliferation of small byproduct material disposal sites and reduce perpetual surveillance obligations, byproduct material from in-situ extraction operations, such as residues from solution evaporation or contaminated control processes, and wastes from small remote aboveground extraction operations shall be disposed of at existing large byproduct material disposal sites; unless, considering the nature of the wastes, such as their volume and specific activity, and the cost and environmental impacts of transporting the wastes to large disposal sites, such off-site disposal is demonstrated to be impracticable or the advantages of onsite burial clearly outweigh the benefits of reducing the perpetual surveillance obligations.

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Section 332.220 Technical Criteria for Byproduct Material Disposal Sites -
Design Criteria

- a) When submitting a proposed method of disposal for evaluation by the Department, the licensee shall either:
- 1) Submit to the Department a plan describing how the licensee will dispose of byproduct material and contaminants below grade; or

AGENCY NOTE: The Department presumes that disposal of tailings by placement below grade, either in mines or in excavated pits, is the method of disposal which best furthers the objective of containment of byproduct material and contaminants without requiring active maintenance. However, below grade disposal is not the most environmentally sound approach if a groundwater formation is relatively close to the surface or not very well isolated by overlying soils and rock. Geologic and topographic conditions might make full below grade disposal impracticable.

- 2) Submit to the Department data which supports the licensee's conclusion that disposal below grade is not the most environmentally sound approach, as well as a description of the licensee's alternative method for tailings disposal. The alternative method shall provide for excavation to the greatest degree achievable, given the geologic and hydrologic conditions at the site, so that the size of retention structures, and the steepness of slopes of associated exposed embankments shall be minimized. The licensee shall also demonstrate that its proposed above grade disposal program will provide containment of the byproduct material equivalent or superior to that which would be achieved from below grade disposal.

b) Disposal site surfaces

- 1) Embankment and cover slopes shall be relatively flat after final stabilization to minimize the potential for erosion and to provide conservative factors of safety assuring long-term stability. Final slopes shall be contoured to grades that are as close as possible to those which would be provided if byproduct material were disposed of below grade. Slopes shall not be steeper than 10 horizontal to 1 vertical.
- 2) All disposal site surfaces shall be contoured to avoid areas of concentrated surface runoff or abrupt or sharp changes in slope. In addition to rock cover on slopes, areas toward which surface runoff might be directed shall be well protected with rock cover or rip rap.

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- c) The disposal site and area, where feasible, shall be designed to incorporate features which will promote deposition. For example, design features which promote deposition of sediment suspended in any runoff which flows into the disposal area might be utilized; the object of such a design feature would be to enhance the thickness of cover over time.
- d) The disposal site shall be designed so that the upstream rainfall catchment does not increase surface erosion or flooding of the disposal site.
- e) A full self-sustaining vegetative cover shall be established or rock cover employed to control wind and water erosion. However, rock covering of slopes is unnecessary where:
 - 1) top covers are very thick (on the order of 10m or greater);
 - 2) impoundment slopes are very gentle (on the order of 10 horizontal: 1 vertical or less);
 - 3) bulk cover materials have inherently favorable erosion resistance characteristics;
 - 4) there is negligible drainage catchment area upstream of the disposal site; and
 - 5) the topographic features of the disposal site provide wind protection.
- f) Where rock cover is employed, in order to avoid displacement of rock particles by human and animal traffic, root invasion, or by natural process, and to preclude undercutting and piping, the following factors shall be accounted for in the rock cover design:
 - 1) Shape, size, composition, and gradation of rock particles. Except for bedding material average particle size shall be at least cobble size or greater;
 - 2) Rock cover thickness and zoning of particles by size;
 - 3) Steepness of underlying slopes; and
 - 4) Individual rock fragments shall be dense, sound, and resistant to abrasion, and shall be free from cracks, seams, and other defects that would tend to unduly increase their destruction by water and frost actions. Weak, friable, or laminated aggregate shall not be used.

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- g) All disposal site surfaces must be contoured to avoid areas of concentrated surface runoff or abrupt or sharp changes in slope gradient. In addition to rock cover on slopes, areas toward which surface runoff might be directed must be protected with rock cover (rip rap). Overall stability, erosion potential, and geomorphology of surrounding terrain must be evaluated to assure that there are not ongoing or potential processes, such as gully erosion, which would lead to disposal area instability.

Section 332.230 Technical Criteria for Byproduct Material Disposal Sites - Groundwater Protection

- a) In order to provide adequate protection of groundwater resources, the disposal site shall be designed and constructed to conform with the requirements of criterion 5 of 10 CFR 40, Appendix A, in effect on January 1, 1988, exclusive of subsequent amendments or editions. Criterion 13 of 10 CFR 40, Appendix A, in effect on January 1, 1988, identifies the constituents for which standards shall be set or complied with if the specific constituent is expected to be in or derived from the byproduct material and has been detected in groundwater.
- b) The licensee shall establish a detection monitoring program needed for the Department to set the site-specific groundwater protection standards in subsection (a) above. The licensee or applicant shall propose for Department approval as license conditions which constituents are to be monitored on a site-specific basis. A detection monitoring program shall be designed and implemented to accomplish two purposes. The program shall be designed and implemented to detect leakage of the hazardous constituents for the disposal area so that the need to set groundwater protection standards is monitored. If leakage is detected, the program shall be designed and implemented to generate data and information needed for the Department to establish the standards under subsection (a) above. The data and information shall provide a sufficient basis to identify those hazardous constituents which require concentration limit standards and to enable the Department to set the limits for those constituents and the compliance period. The data and information shall also provide the basis for adjustments to the point of compliance, if necessary.
- c) Once groundwater protection standards have been established pursuant to subsection (a), the licensee shall establish and implement a compliance monitoring program. The purpose of the compliance monitoring program is to determine that the hazardous constituent concentrations in groundwater continue to comply with the standards set by the Department. In conjunction with a corrective action

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program, the licensee shall establish and implement a corrective action monitoring program. The purpose of the corrective action monitoring program is to demonstrate the effectiveness of the corrective actions. Any monitoring program required by this subsection may be based on existing monitoring programs to the extent the existing programs can meet the stated objective for the program.

Section 332.240 Technical Criteria for Byproduct Material Disposal Sites - Control of Radiation Hazards

- a) Licensees shall place an earthen cover over byproduct material at the end of source material milling operations and shall close the disposal site in accordance with a design which assures compliance with the requirements specified in Section 332.170(c) for a period of 1,000 years. Monitoring for total radon after installation of an appropriately designed cover is not required. Total radon emissions from cover material shall be estimated as part of developing a closure plan. The standard for total radon release rate specified in Section 332.170(c), however, applies only to emissions from byproduct material. In computing required byproduct material area cover thicknesses, average moisture in the cover shall be determined from similar soils and under similar circumstances. The effects of any synthetic layer shall not be taken into account in determining the calculated total radon release rate. If material other than soil is proposed as cover material, it shall be demonstrated that such material will not crack or degrade by differential settlement, weathering, or other mechanism, over long-term time intervals. Near surface cover material within the top three meters shall not include byproduct material or rock that contains elevated levels of radium; soils used for near surface cover shall be essentially the same, as far as radioactivity is concerned, as that of surrounding surface soils.
- b) The licensee shall ensure that disposal sites are closed in a manner that assures no active maintenance will be required. The licensee shall address the nonradiological hazards associated with the wastes in planning and implementing closure. To the extent necessary to prevent threats to human health and the environment, the licensee shall control or eliminate postclosure escape of nonradiological hazardous constituents, leachate, contaminated rainwater, or waste decomposition products to groundwater, surface water or to the atmosphere.

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Section 332.250 Technical Criteria - Source Material Milling Operations

- a) Liquids resulting from any of the mill processes shall not be released into surface streams. In addition, contaminated solutions, other than liquids resulting from any of the mill processes, shall not be released into the environment if the solutions have radionuclide concentrations in excess of those specified in 32 Ill. Adm. Code 340, Appendix A, Table II, Column 2.
- b) Byproduct material shall be chemically and physically treated to immobilize or remove the contaminants.
- c) An independent quality assurance program shall be established to assure that specifications of the monitoring program detailed in the license are met. If adverse groundwater impacts or conditions conducive to adverse groundwater impacts occur, action shall be taken to alleviate the impacts or conditions and restore groundwater quality to levels consistent with those before operations began.
- d) Source material milling operations shall be conducted so that all airborne effluent releases are reduced to levels as low as is reasonably achievable. Emissions controls shall be used. Institutional controls, such as extending the licensed site boundary and exclusion area, may be employed to ensure that offsite exposure limits are met, but only after all practicable measures have been taken to control emissions at the source. Notwithstanding the existence of individual dose standards, strict control of emissions is necessary to assure that population exposures are reduced to the maximum extent reasonably achievable and to avoid contamination. During operations and prior to closure, radiation doses from radon emissions from surface impoundments and disposal areas containing byproduct material shall be kept as low as is reasonably achievable. Checks shall be made and logged hourly of all parameters which determine the efficiency of product stack emission control equipment operation. It shall be determined whether or not conditions are within a range prescribed to ensure that the equipment is operating consistently near peak efficiency. Corrective action must be taken when performance is outside of prescribed ranges. Effluent control devices must be operative at all times during drying and packaging conditions and whenever air is exhausting from the product stack. Drying and packaging operations shall terminate when controls are inoperative. When checks indicate the equipment is not operating within the range prescribed for peak efficiency, actions shall be taken to restore parameters to the prescribed range. When this cannot be done without shutdown and repairs, drying and packaging

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operations shall cease as soon as practicable. Operations shall not be restarted after cessation due to abnormal performance until needed corrective actions have been identified and implemented. All such cessations, corrective actions, and restarts shall be reported to the Department, in writing, within ten (10) days of the subsequent restart. To control dusting from diffuse source, operators shall develop written operating procedures specifying the methods of control which will be used.

- e) To control fugitive dust from tailings, all surfaces not covered by standing liquids shall be wetted or chemically stabilized. For licenses initially granted after the effective date of this Part, management of tailings shall incorporate phased-in surface stabilization and reclamation.
- f) Byproduct material shall be managed so as to conform to the applicable provisions of 40 CFR 440, "Ore Mining and Dressing Point Source Category: Effluent Limitations Guidelines and New Source Performance Standards, Subpart C, Uranium, Radium, and Vanadium Ores Subcategory," in effect on January 1, 1983, exclusive of subsequent amendments or editions.
- g) Licensees and applicants shall satisfy the requirements of 40 CFR 61, in effect on July 1, 1988, exclusive of subsequent amendments or editions.
- h) Inspection of the byproduct material impoundments and disposal areas:
 - 1) The licensee shall conduct daily inspections of any surface impoundment and disposal site and document the results of the inspections. Records of the inspections shall be maintained for review by the Department for 5 years.
 - 2) The licensee shall notify the Department within 2 hours by telephone and then within 48 hours by written report of any failure of a byproduct material surface impoundment or disposal area which results in a release of byproduct material into unrestricted areas. The licensee shall notify the Department, in writing, within 5 working days of any condition which was not anticipated in the design of the byproduct material surface impoundment or disposal area and, if not corrected, could cause failure of embankments or other structures containing the byproduct material and the release of byproduct material into unrestricted areas.

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- 3) In cases of failure of the byproduct material impoundment, the report shall be maintained for transfer to the governmental agency to which the title of the facility will be transferred.

Section 332.260 Financial Surety Requirements

- a) The license applicant shall establish financial surety arrangements, prior to the Department authorization of commencement of operations, to assure the availability of sufficient funds for decontaminating, decommissioning and reclaiming the source material milling facility and licensed site as well as the stabilization, long-term care and maintenance of byproduct material disposal site.
- b) An acceptable surety arrangement may consist of cash or negotiable securities deposited with the Department, irrevocable assignments of savings or certificates of deposit, or the deposit of an instrument executed by the applicant or licensee and a corporate surety or financial institution with the Department designated as the beneficiary. However, self insurance, or any arrangement which essentially constitutes self insurance (e.g., a contract with a State or federal agency) will not satisfy the surety requirement since this provides no additional assurance other than that which already exists through license requirements. The value of the deposit shall be equal to or greater than the amount of the surety required by subsection (c). Any surety arrangement must be available in Illinois subject to judicial process and execution in the event required for the purposes set forth in this Part, and continuous for the term of the license.
- c) The amount of funds to be ensured by such surety arrangements shall be greater than or equal to the Department approved cost estimates for:
 - 1) decontamination, decommissioning, restoration, and reclamation of buildings and the licensed site;
 - 2) stabilization of the disposal area; and
 - 3) the requirements of Section 332.270 for long-term care, maintenance and control.
- d) Surety arrangements shall include provisions for long-term care and maintenance and control required by the Department at Section 332.270. In establishing specific surety arrangements, the applicant's or licensee's cost estimates shall take into account the

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total costs that would be incurred if an independent contractor were hired to perform the work. These total costs shall not be less than the sum of the cost of decontamination, restoration, and reclamation of buildings and the licensed site that have been or are reasonably expected to be contaminated before the next annual review.

- e) To avoid duplication and expense, the Department will accept surety arrangements that have been consolidated with surety arrangements established to meet requirements of other agencies in Illinois for decontamination, reclamation, restoration, and disposal, if the applicant demonstrates, in writing, that such surety provides the same or a greater degree of protection for the licensed site, provided that such arrangements are adequate to satisfy these requirements and that the portion of the surety which covers the decommissioning, decontamination, reclamation, and stabilization of the site, and the long-term care fund is specifically identified and committed for use in accomplishing these activities.
- f) The applicant's or licensee's surety arrangements will be reviewed annually by the Department to assure that sufficient funds will be available for completion of the reclamation plan if the work was to be performed by an independent contractor. The amount of surety shall be adjusted to recognize any increases or decreases resulting from inflation, changes in engineering plans, activities performed, and any other conditions affecting costs. Regardless of whether reclamation is phased through the life of the operation or takes place at the end of operations, a portion of the surety shall be retained until final compliance with the closure plan is determined by the Department. Proof of forfeiture shall not be necessary to collect the surety so that in the event that the licensee could not provide an acceptable replacement surety within the required time, the surety shall be automatically collected prior to its expiration.
- g) The term of the surety mechanism shall be open-ended, unless the licensee proposes another arrangement which provides an equivalent or greater level of assurance.

Section 332.270 Long-Term Care Fund

- a) Prior to termination of a source material milling or byproduct material license, a minimum fund of \$250,000 (1978 dollars) to cover the cost of long-term care, observation and maintenance shall be established by the licensee. If title and custody to land and byproduct material are transferred to the State, the fund shall be established in the State agency assuming custody. If title and

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custody are transferred to a federal agency, the fund shall be deposited in the general treasury of the United States.

- b) If the cost of long-term care monitoring and maintenance is determined on the basis of a site specific evaluation, to be greater than \$250,000 (1978 dollars), variance in the funding requirements shall be specified by the Department. The total amount of the fund must be such that with an assumed 1 percent annual real interest rate, the collected funds will yield interest in an amount sufficient to cover the annual costs of long-term care, observation and maintenance. The minimum funding requirement will be adjusted annually prior to actual payment to recognize inflation. The inflation rate to be used is that indicated by the change in the Consumer Price Index published by the U.S. Department of Labor, Bureau of Labor Statistics.

Section 332.280 Land Ownership

- a) These requirements relating to ownership of byproduct material, mineral rights, disposal sites and buffer zone apply to all licenses terminated, issued, or renewed after the effective date of this Part.
- b) Unless exempted by NRC, title to land (including any affected interests therein) which is used for the disposal of byproduct material, and the buffer zone and the title to byproduct material shall be transferred to the United States of America or the State of Illinois, at the State's option, prior to the termination of the license. The applicant or licensee shall attempt to obtain ownership of severable subsurface interests and rights, and shall, in the event that certain rights cannot be obtained, provide notification in local public land records of the fact that the land is being used for the disposal of radioactive material and that disruption and disturbance of the radioactive material without a license is prohibited.
- c) The use of the surface or subsurface estates, or both, of the lands transferred to the State or to the United States of America is prohibited unless the NRC determines by order that such use will not endanger the public health, safety, welfare, or environment. The person who transferred such lands to the State or to the United States of America shall have the right of first refusal with respect to such use of such lands.
- d) Byproduct material and land transferred to the United States of America or the State in accordance with this section shall be transferred without cost to the United States of America or the State other than administrative and legal costs incurred in carrying out such transfer.

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- e) The provisions of this section respecting transfer of title and custody to land and byproduct material do not apply in the case of lands held in trust by the United States of America for any Indian tribe or lands owned by such Indian tribe subject to a restriction against alienation imposed by the United States of America. Where such lands are used for the disposal of byproduct material, the licensee shall enter into arrangements with the NRC as may be appropriate to assure the long-term care and maintenance of such lands by the United States of America.
- f) In the event that title to the property and byproduct material is transferred to the United States government as required by subsection (b) above, the surety funds collected by the Department will be transferred to the United States government.
- g) Any source material milling license must contain such terms and conditions as the Department determines necessary to assure that prior to termination of the license, the licensee will comply with ownership requirements of this section for areas used for buffer zone and byproduct material disposal.

Section 332.290 Maintenance of Records, Reports, and Transfers

- a) Each licensee shall maintain any records and make any reports in connection with the license activities as may be required by the conditions of the license or by the rules, regulations, and orders of the Department.
- b) Records which are required to be maintained by regulation or by license conditions shall be maintained for a time period specified in the applicable regulation or license condition. If a record retention period is not otherwise specified, these records shall be maintained and transferred to the officials specified in subsection (d) below as a condition of license termination unless the Department otherwise authorizes their disposition.
- c) Records which shall be maintained pursuant to this Part may be the original, or a reproduced copy or microfilm if this reproduced copy or microfilm is capable of producing copy that is clear and legible at the end of the required retention period.
- d) Copies of records of the location and quantity of byproduct material contained in the disposal site shall be transferred upon license termination to the Department, the agency responsible for long-term

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care, the U.S. Nuclear Regulatory Commission, the chief executive of the nearest municipality, the chief executive of the county in which the disposal site is located, the county zoning board or land development and planning agency, and the Governor.

- e) Each licensee shall file a copy of its financial report or a certified financial statement annually with the Department in order to update the information base for determining the continued financial qualifications of the licensee.
- f) Each licensee shall submit status reports to the Department. The reports shall be submitted within 60 days after January 1 and July 1 of each year and shall cover the previous 6 months of operation. The reports shall include:
 - 1) Specification of the quantity of each of the radionuclides released to unrestricted areas in liquid and gaseous effluents;
 - 2) The results of the environmental monitoring program;
 - 3) The data shall be reported in a manner that will permit the Department to confirm the potential annual radiation doses to the public;
 - 4) A summary of licensee survey and maintenance activities;
 - 5) A summary of activities and quantities of licensed material processed, stored, transferred, or disposed of; and
 - 6) Any instances in which observed site, facility, process, or equipment characteristics were significantly different from those described in the application for a license; and
 - 7) If the quantities of radionuclides released are more than 25% greater than those anticipated in the license application, or if unanticipated maintenance is performed, a discussion of the cause of the release or the reason for the maintenance.