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UNITED STATES NUCLEAR REGULATORY COMMISSION
Fuel Processing & Fabrication Branch

BRANCH POSITION FOR THE CONTENTS OF APPLICATIONS FOR
URANIUM ORE-BUYING STATION LICENSES

A. INTRODUCTION

In order to process or refine ores containing by weight 0.05% or more of uranium, after removal from their place of deposit in nature, a USNRC Source Material License is required. An applicant for a license to receive, possess, and use source materials is required to provide detailed information on his proposed facilities, equipment, experience, and procedures. This information is used by the Commission in determining whether the applicant's proposed activities will, among other things, result in undue risk to the health and safety of the public. General guidance for filing an application is provided in §40.31 of 10 CFR Part 40, "Applications for Specific Licenses." The purpose of this enclosure is to provide specific guidance on the contents of an application for a USNRC Source Material License authorizing uranium ore-buying station activities (when the activities include ore processing such as crushing). The information in this enclosure is intended to provide instructive guidance and should not be considered as a substitute for a careful evaluation of the proposed program by the applicant or for assuring that the application clearly and adequately describes the radiation safety procedures that will be followed.

Change to existing (license) programs require the issuance of an appropriate license amendment. An application for such an amendment should describe the proposed changes in detail.

B. FILING AN APPLICATION

An application for a uranium ore-buying station license should be filed using Form AEC-2 in accordance with the requirements specified in §40.31 of 10 CFR Part 40. As required by §40.31(f) of 10 CFR Part 40, an application should be filed nine months prior to commencing construction of the proposed ore-buying station. Applications may be filed with the Director for Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. Applications may also be filed in person at the Commission's offices at 1717 H Street NW, Washington, D.C.; or 7920 Norfolk Avenue, Bethesda, Maryland.

The Commission has adopted a statement of general policy and procedure entitled "Licensing and Regulatory Policy and Procedures for Environmental Protection," 10 CFR Part 51. This policy statement and §40.31(f) of

10 CFR Part 40 require the submittal of Environmental Reports by applicants for Nuclear Regulatory Commission (NRC) permits and licenses for certain facilities, including uranium ore-buying stations which perform uranium crushing operations. Thus, a license application for a uranium OBS license must be accompanied by an Environmental Report. This report will contain information supplementing that already in the application and will be attached as an Appendix.

C. CONTENTS OF AN APPLICATION

The application should contain the information specified in items 1 through 8 of Form AEC-2. The information required in items 9 through 14 of Form AEC-2 should be incorporated into the various items identified below. In discussing these items, a narrative form of presentation should be used. Each subject should be treated in sufficient depth to permit the Commission independently to determine whether the applicant's proposed activities will be conducted in accordance with USNRC rules and regulations.

1.0 PROPOSED ACTIVITIES

This section should generally discuss the proposed OBS activities. For example such matters as expected longevity of the OBS, chemical and physical form of ores to be throughput, range of rate of accumulation, crushing process, operating plans and schedules, etc., should be discussed.

2.0 SITE DESCRIPTION

2.1 Geography and Demography

2.1.1 Geography

A geographic description of the area in which the OBS is located should be provided, including: (1) maps showing the location of the site with respect to State, county and local subdivisions, plus nearby inhabited areas; and (2) maps (topographic if available) showing the OBS, OBS perimeter, exclusion area boundary, company property, abutting and adjacent properties, nearby water bodies, and inhabited areas, plus other relevant details as may be appropriate.

2.1.2 Demography

A description of the potentially affected local and/or regional population should be provided.

2.2 Meteorology

Data on site meteorology should be provided including: (1) diurnal and monthly averages and extremes of temperature and humidity; (2) monthly wind characteristics including speed and direction, annual joint frequency of wind speed and direction by stability category; (3) data on precipitation; and (4) frequency of occurrence and effects of storms.

2.3 Hydrology

2.3.1 Surface water

Describe the location, size, shape, and other hydrologic characteristics of streams, rivers, lakes, marshes, estuaries, etc., of the environs. Include a description of any upstream and downstream river control structures and downstream water supply users (including location, amount, and purpose; i.e., domestic, agricultural, etc.), and provide a map (topographic, if available) showing major hydrologic features of the area.

2.3.2 Groundwater

Describe the regional and local groundwater aquifers, formations, sources, and sinks. Describe the recharge potential of the immediate plant area. Describe the present and projected regional use; indicate gradients and seasonal variations in groundwater levels beneath the site.

2.4 Geology

Describe the geological aspects of the site. The discussion should note the broad features and general characteristics of the site and environs including stratigraphy and structural geology.

3.0 FACILITY DESIGN AND CONSTRUCTION

3.1 Crushing Process

Provide a quantitative flow diagram of the OBS process showing throughput and the range of possible assays of feed materials. Include a diagram of the plant layout, indicating areas and points in the process where dusts, fumes, or gases are generated.

3.2 Major Equipment

Provide a description of and operating specifications for all major items of process equipment.

3.3 Instrumentation

Provide a description of the safety instrumentation and control systems, including the minimum specifications and operating characteristics.

4.0 WASTE MANAGEMENT SYSTEM

4.1 Gaseous

Provide a description of the dust collection and ventilation equipment that are utilized during OBS operations, including the type, specifications, and location of such equipment, e.g., ore transfer points, crushing, etc. Include an analysis of the efficiency of the equipment as designed to prevent exposures to as low as practicable. Also, include a description of types and concentration of effluents discharged and methods (i.e., scrubbers, filters, etc.) for preventing releases of radioactive materials and for limiting such releases to as low as practicable. Include provisions for operating the equipment at its reasonably expected best performance during operations.

4.2 Liquids and Solids

Provide the following information on the ore retention system:

1. A description of the functional design basis of the proposed system.
2. Drawings showing the layout in plan; typical cross section of ore pad embankments showing proposed design and, if applicable, anticipated future extensions, and other pertinent design details. Embankment design should include information on seepage control and protection of embankment surfaces.
3. A design analysis of the integrity of the proposed system including, as applicable, the results of soil tests, materials of construction, natural phenomena such as flooding, stability investigations and characteristics of fill material as well as descriptions of the construction methods and specifications.

4.3 Contaminated Equipment

Provide a description of the methods for disposing of contaminated waste solids (such as filters, filter presses, obsolete or worn-out equipment, etc.) that are generated in the OBS process.

5.0 OPERATIONS

5.1 Corporate Organization

Provide a detailed description of the applicant's organization, including authority and responsibility of each level of management and/or supervision in regard to development, approval and adherence to operating procedures, maintenance activities, and changes in the plant circuit.

5.2 Qualifications

Provide a description of the qualifications and experience of the personnel in the applicant's organization assigned the responsibility for developing, conducting, and administering the radiation safety program for the OBS.

5.3 Training

Provide a description of the radiation safety instructions provided employees, including a copy of the applicant's written radiological safety operation instructions. These instructions should include instructions for wearing personnel monitoring devices and respirators, instructions for cleaning up excessive quantities of dust, etc.

5.4 Security Ore Storage Areas

Provide a description of the method for preventing unauthorized entry into ore storage areas.

5.5 Radiation Safety

Provide a description of the radiation safety program to be conducted including:

1. A description of the methods, instrumentation, and equipment for determining exposures of employees to external radiation. For personnel monitoring devices, indicate the number and category of personnel involved in the program and the supplier of the devices.
2. A description of the survey program which is followed to determine concentrations of airborne radioactivity within the OBS including the make, model number, and capacity of sampling devices, and the procedures for sample analysis and instrument calibration. In the description of the routine and sampling program, include:
 - a. A description of each sampling location with respect to operating personnel;

6.1.2 Regional Demography and Land Uses

Two maps indicating nearby inhabited locations and the locations and areas of towns and cities should be provided. One map should cover an area showing all inhabited locations which might reasonably be affected by the proposed activities. The permanent and transient populations within these areas should be tabulated for the last year in which affected populations were not influenced by the proposed activities plus census years through the anticipated life of the project. The other more detailed map should include the same information for an area whose boundary represents those points where individuals, if present, might be exposed to radioactive materials in excess of one percent of natural background.

Descriptive material should include tables giving significant population and visitor statistics of neighboring schools, plants, hospitals, sports facilities, residential areas, parks, etc., within 5 miles of the plant. Indicate the nature and extent of present land use (agriculture, livestock raising, dairies, residences, industries, recreation, transportation, etc.).

6.1.3 Ecology

In this section the applicant should identify the important flora and fauna in the region of the site (which may reasonably be expected to be affected by the proposed activities), their habitats and distribution, as well as the relationship between species and their environments. A species, whether animal or plant, is "important" (1) if it is commercially or recreationally valuable, (2) if it is rare or endangered, (3) if it affects the well-being of some important species within criteria (1) and (2) above, or (4) if it is critical to the structure and function of the ecological system. A "rare or endangered" species is any species officially designated as such by the U.S. Fish and Wildlife Service.

6.1.4 Background Radiological Characteristics

Regional radiological data, including both natural background radiation levels and results of measurements of any concentrations of radioactive materials occurring in important biota, in soil and rocks and in regional surface and local ground waters should be reported. This data, whether determined during the applicant's preoperational surveillance program (see Section 6.5.1.5) or obtained from other sources should be referenced.

6.1.5 Other Environmental Features

For certain sites, some relevant information on the OBS environs may not clearly fall within the scope of the preceding topics. Additional

information may be required with respect to some environmental features in order to reflect the value of the site and site environs to important segments of the population. Such information should be included here.

6.2 The Ore-Buying Station

The operating OBS is to be described in this section. Since the environmental effects are of primary concern for this report, the OBS effluents and related systems that interact with the environment should be described in particular detail.

6.2.1 External Appearance of the OBS

The building layout and plant perimeter, exclusion boundary, and plant profile should be shown to scale by line drawings or other illustrative techniques.

The architectural design and efforts to make the structures and grounds aesthetically pleasing should be noted.

6.2.2 Plant Circuit

The entire OBS process and/or circuit should be quantitatively and qualitatively described in sufficient depth to permit confirmation of the quantities and constituents of all gaseous, liquid, and solid wastes and effluents generated in the process. A flow diagram of the process and/or circuit should also be included.

6.2.3 Sources of OBS Wastes and Effluents

Clearly identify the location of the release points for all gaseous, liquid, and solid wastes and effluents (including bulk storage locations, i.e., piles of ore, etc.) specifying quantities, concentrations, and the physical and chemical characteristics of all materials released. Average and maximum release rates should be included plus all pertinent supporting information such as assumptions and computational methods used. The quantities and concentrations of nonradioactive materials released into the environs should be compared with State and other applicable standards.

6.2.4 Controls of OBS Wastes and Effluents

Provide a description of OBS waste and effluent control systems and equipment for minimizing to as low as practicable the quantities of materials released into the environment. Identify the operating efficiency factors for such systems and equipment.

6.2.5 Sanitary and Other OBS Waste Systems

Describe any other nonradioactive solid or liquid waste materials, such as sanitary, laundry, and chemical laboratory wastes that may be generated during mill operation. Describe the manner in which they will be treated and controlled and describe procedures for disposal.

Describe any other gaseous effluents (i.e., from diesel engines, heating plants, incinerators) created during OBS operation; estimate the frequency of release and describe how they will be treated before release to the environment.

6.2.6 Mining Activities

This portion of the report should contain a thorough description of the interrelated mining activities including:

1. Topographical maps showing possible ore source locations and areas to be mined and haulage and access loads.
2. Identification of all sources of effluents associated with mining activities (haulage dusts, bulk storage locations, etc.), including release rates and concentrations and their physical and chemical characteristics.

6.2.7 Reclamation and Restoration

Discuss in depth plans for site reclamation and restoration including:

1. Plans for reclaiming and restoring lands disturbed by OBS activities.
2. Financial arrangements to be made (such as bonding arrangements, etc.) to insure that adequate funds will be available for site reclamation and restoration when operations are concluded.

6.3 Environmental Effects of Site Preparation and OBS Construction

In the applicant's discussion of adverse environmental effects, it should be made clear which of these are considered unavoidable and subject to later amelioration and which are regarded as unavoidable and irreversible.

The applicant should organize the discussion in terms of the effects of site preparation on (a) land use and (b) water use. The applicant should consider consequences to both human and wildlife populations and indicate which are unavoidable, reversible, etc., according to the categorization set forth earlier in this section.

In the land use discussion, describe how construction activities may disturb the existing terrain and wildlife habitats. Consider the effects of such activities as creating building material supply areas; building temporary or permanent roads, bridges, service lines; disposing of trash, excavating, and land filling. Provide information bearing on such questions as: How much land will be torn up? For how long? Will there be dust or smoke problems? What explosives will be used? Where and how often? Indicate proximity of human populations and identify undesirable impacts on their environment arising from noise, from inconvenience due to the movement of men, material, machines, including activities associated with any provision of housing, transportation, and educational facilities for workers and their families. Describe any expected changes in accessibility of historical and archaeological sites in the region. Discuss measures designed to mitigate or reverse undesirable effects, such as erosion control, dust stabilization, landscape restoration, control of truck traffic, and restoration of affected animal habitat.

The discussion should also include any effects of site preparation and OBS construction activities whose consequences may be beneficial to the region.

The discussion of water use should describe the impact of site preparation and construction activities on area water sources, when applicable.

6.4 Environmental Effects of Operation of OBS and Source Mines

This section describes the interaction of the OBS ore source and mines and the environment. To the extent possible, material already presented does not need to be repeated. Measures planned to reduce any undesirable effects of the total project on the environment should be described in detail.

In the discussion of environmental effects, effects that are considered unavoidable but either inherently temporary or subject to later amelioration should be clearly distinguished from those regarded as unavoidable and irreversible.

The impacts of operation of the proposed activity should be, to the fullest extent practicable, quantified and systematically presented. In the discussion of each impact, the applicant should make clear whether the supporting evidence is based on theoretical, laboratory, on-site, or field studies undertaken on this or on previous occasions. The source of each impact--the plant subsystem, waste effluent--and the population or resource affected should be made clear in each case. The impacts should be distinguished in terms of their effects on surface water bodies, groundwater, air, land use, ecological systems, and important plants and animals.

Finally, the applicant should discuss the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity. The applicant should assess the action for cumulative and projected long-term effects from the point of view that each generation is trustee of the environment for each succeeding generation.

6.4.1 Radiological Impact on Biota Other Than Man

In this section the applicant should consider the impact on biota other than man attributable to the release of radioactive materials from the facility. The biota to be considered are those species of local flora and local and migratory fauna defined as "important" in Section 6.1.3. Since the region may contain many important species, the applicant need consider only those important species whose terrestrial and/or aquatic habitats provide the highest potential for radiation exposure.

6.4.2 Radiological Impact on Man

In this section the applicant should consider the radiological effects of the operations on man. Estimates of the radiological impact via various exposure pathways should be provided for both individuals and the population within 50 miles of the OBS.

6.4.2.1 Exposures Pathways

The various possible exposure pathways for radiation to man should be identified and described in textual and flow chart format. These should include inhalation, ingestion and direct radiation pathways.

6.4.2.2 Airborne Effluents

From release rates of particulate and gaseous effluents, meteorological data and land use calculate the radiation doses (whole-body and organ doses) to individuals at (a) the site boundary location with the highest potential dose (b) the nearest residence(s) and/or occupied structures (c) nearby recreational areas, and (d) nearest population center. Calculations should include doses resulting from inhalation of particulates, inhalation of radon-222 and daughter products, ingestion of food or water contaminated by deposited material, external radiation from submersion in contaminated air or from contaminated ground.

6.4.2.3 Liquid Releases

From estimates of liquid release rates (if any) including drainage or surface run-off from contaminated areas estimate the radionuclide concentrations in receiving waters and calculate the radiation doses to individuals using these waters. Calculations should include use of water for drinking, irrigation, fishing and recreational purposes.

6.4.2.4 Direct Radiation

Estimate external whole-body doses to individuals at nearby locations from direct radiation for OBS.

6.4.2.5 Population Doses

Estimate doses to the whole-body and organs (man-rem and organ-rem doses) of the population within 50 miles of the OBS. Estimates should include the significant exposure pathways identified in Sections 6.4.1.2 - 6.4.1.4.

6.4.3 Effects of Sanitary and Other Waste Discharges

Describe and discuss the environmental impact associated with sanitary and other mill waste systems discussed in Section 6.2.5.

6.4.4 Resources Committed

Discuss any irreversible and irretrievable commitments of resources due to OBS operations.

6.5 Effluent and Environmental Measurements and Monitoring Programs

The purposes of this section are to describe in detail the means by which the applicant collected the baseline data presented in other sections and to describe the applicant's plans and programs for monitoring the impacts of his proposed activities on the environment.

Section 6.5.1 is addressed to the measurement of preexisting characteristics of the site and the surrounding region. This program will establish a reference framework for assessing subsequent environmental effects attributable to the activity. The applicant's attention is directed to two considerations pertinent to this section. First, the term "preexisting" refers to the characteristics of the site prior to any mining-related activities. A given characteristic or parameter may or may not require assessment prior to site disturbance and mill construction, depending on whether that particular characteristic may be altered at these stages. Second, in most instances this guide indicates the specific environmental effects to be evaluated; consequently, the parameters to be measured will be apparent. In some cases, it may be necessary for the applicant to establish a monitoring program based on his own identification of potential or possible effects and to provide his underlying rationale for such. Accordingly, the applicant should carefully review the plans for measurement of preexisting conditions to ensure that these plans include all factors that must be subsequently monitored, as discussed in Section 6.5.2.

Sampling design, frequency, methodology (including calibration and checks with standards), and instrumentation for both collection and analysis should be discussed as applicable.

6.5.1 Applicant's Preoperational Environmental Programs

The programs for collection of environmental data prior to operation should be described in sufficient detail to make it clear that the applicant has established a thorough and comprehensive approach to environmental assessment. The description of these programs should be confined principally to technical descriptions of instrumentation, scheduling, technique, and procedures. Organizational aspects such as scheduling or validation are relevant only as they may bear upon technical program characteristics.

Where information from the literature has been used by the applicant, it should be concisely summarized and documented by reference to original data sources. Where the availability of original sources that support important conclusions is limited, the applicant should provide either extensive quotations or references to accessible secondary sources. In all cases, information derived from published results should be clearly distinguished from information derived from the applicant's field measurements.

6.5.1.1 Surface Waters

When a body of surface water may be affected by the proposed activities, the applicant should describe the programs by which the background condition of the water and the related ecology were determined. In cases where a natural water body has already been subjected to environmental stress from pollutant sources, the nature of this stress and its consequences should be evaluated. The applicant should then estimate the potential quality of the affected water body.

6.5.1.2 Groundwater

In those cases in which the proposed activities may potentially affect local groundwater, the program leading to assessment of potential effects should be described.

6.5.1.3 Air

The applicant should describe the program for obtaining information on local air quality, if relevant, and local meteorology. The description should show the basis for predicting such effects as the dispersion of gaseous effluents as well as present the methodology for gathering baseline data.

6.5.1.4 Land

Data collection programs concerning the terrestrial environment of the proposed facility should be described and justified with regard to both scope and methodology.

6.5.1.5 Radiological Surveys

This section of the Environmental Report should discuss the methods used to determine the preoperational radiation levels at the site and environs.

The methods used should be thoroughly described and documented. The discussion should include identification of sampling or collection sites, sampling methods, duration and frequency, and analytical procedures (including preanalysis treatment, instrumentation, and minimum sensitivities) as applicable.

6.5.2 Applicant's Proposed Operational Environmental Radiological Monitoring Program

The applicant should present the proposed operational monitoring program for planned operations. Review of this description will be facilitated if the applicant includes maps of observation sites and tabular presentation of summary descriptors of such factors as frequency, type of sampling, method of collection, analytic method, preanalysis treatment, instrumentation, and minimum sensitivities. The program description should be explicit with respect to the parameter limits that are not to be exceeded under normal operating conditions and with regard to the actions planned in the event the limits are exceeded.

The operational surveillance program should be described in detail, with specific attention given to the types of samples to be collected, sampling locations and frequency, the analyses to be performed on each sample, and the criteria for investigating increases of concentration of material detected in the environs. The analytical sensitivity (detection threshold) for each analysis and the schedule for reporting data collected from the surveillance program should be discussed.

6.6 Environmental Effects of Accidents

The applicant should discuss the environmental effects of possible accidents that may occur within the OBS or during transportation of ore, whether or not these accidents might produce a radiological impact on the site and/or its environs.

6.6.1 OBS Accidents

The applicant should provide an operating accident analysis for a spectrum of accidents which might occur ranging in severity from trivial to very serious. Each class within the spectrum should be characterized by an occurrence rate or probability and their potential environmental consequences, if any.

Assume failure of the ore retention system by flooding. Describe the probable maximum flood (PMF), as defined by the Corps of Engineers, and analyze and describe any injurious effects to the downstream environs from wastes released as a result of flooding.

6.6.2 Transportation Accidents

The potential environmental effects from a transportation accident involving (crushed or uncrushed) uranium ore should be evaluated. Even though the probability of such an accident may be low and its consequences small, the applicant should identify the environmental effects that might result.

6.6.3 Other Accidents

In addition to accidents that can release radioactivity to the environs, there may be accidents that, although radioactive materials are not involved, do have consequences that affect the environment. Such accidents as chemical explosions or fires and steam boiler failures can have significant environmental impacts. These possible accidents and associated effects should be identified and evaluated.

6.7 Alternatives to the Proposed Action

The applicant's choice of a particular OBS at a particular site must be supported through a comparative evaluation of available alternatives. The NRC will consider available alternatives that may reduce or avoid adverse environmental effects expected to result from construction and operation of the proposed OBS project. The NRC will not specify in advance which alternatives should be selected by the applicant for consideration; rather, the applicant should make this selection and also make clear the basis and rationale for the choices in regard to number, availability, suitability, and factors limiting the range of alternatives that might avoid some or all of the environmental effects previously identified.

6.8 Environmental Approvals and Consultations

List all licenses, permits, and other approvals of construction and operations required by Federal, State, local, and regional authorities for the protection of the environment. List those Federal and State approvals that have already been received, and indicate the status of matters regarding approvals yet to be obtained. For general background, submit similar information regarding approvals, and contacts with local authorities.

In view of the effects of the plant on the economic development of the region in which it is located, the applicant should also note the State, local, and regional planning authorities contacted or consulted. OMB Circular A-95 identified the State, metropolitan, and regional clearinghouse. (A listing of applicable clearinghouses may be obtained from the NRC).

Cite meetings held with environmental and other citizen groups with reference given to specific instances of the applicant's compliance with citizen group recommendations.

6.9 References

The applicant should provide a bibliography of all sources used in preparation of the Environmental Report. References cited should be keyed to the specific sections and page numbers to which they apply.