EXHIBIT H

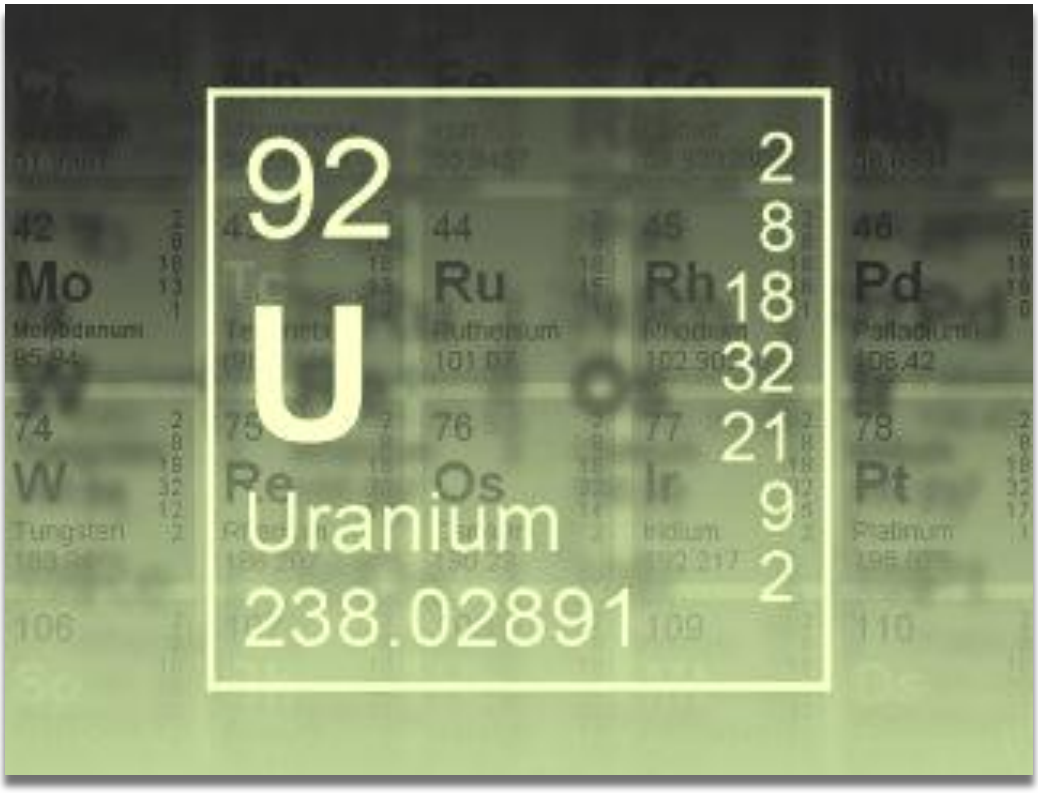
DEQ/DMME URANIUM STUDY:

FULL COMPONENTS OF ENVIRONMENTAL IMPACT ANALYSES

Uranium Study:
Full Components of Environmental Impact Analyses

Commonwealth of Virginia
Department of Environmental Quality
Department of Mines, Minerals and Energy
Department of Health

Date: October, 2012



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LIST OF ACRONYMS

AEA	Atomic Energy Act
ALARA	As Low As Reasonably Achievable
ARC	Appalachian Regional Commission
BLM	U.S. Bureau of Land Management
BMPs	Best Management Practices
CATEX	Categorical Exclusion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNSC	Canadian Nuclear Safety Commission
CSA	Canadian Standards Association
DEIS	Draft Environmental Impact Statement
DEQ	Virginia Department of Environmental Quality
DMME	Virginia Department of Mines, Minerals and Energy
DMP	data management plan
DOD	Department of Defense
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ER	Environmental Report
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FONSI	Finding of No Significant Impact
FR	Federal Register
FWCA	Fish and Wildlife Coordination Act
ICRP	International Commission on Radiological Protection
IDT	interdisciplinary team of experts
KOPs	Key Observation Points
MOU	Memorandum of Understanding
MSHA	Mine Safety and Health Administration
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	National Academy of Sciences
NEPA	National Environmental Protection Act

NHPA	National Historic Preservation Act
NMSS	Nuclear Material Safety and Safeguards
NOI	Notice of Intent
NRC	Nuclear Regulatory Commission
NRCS	Natural Resource Conservation Service
NRIS	National Register Information System
NUREG	Nuclear Regulatory Guide
OSHA	Occupational Safety and Health Administration
QA/QC	Quality Assurance/Quality Control
RAIs	requests for additional information
RFP	Request for Proposal
ROD	Record of Decision
SAP	sampling and analysis plan
SCEQs	State Councils on Environmental Quality
SEPAs	state environmental policy acts
SMCRA	Surface Mining Control and Reclamation Act
SPCC	Spill, Prevention, Control, and Countermeasures Plan
U.S.	United States
U.S.	United States
UMTRCA	Uranium Mill Tailings Radiation Control Act
USACE	Corps of Engineers
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
UWG	Uranium Working Group
VA	Virginia
VAC	Virginia Administrative Code
VDACS	Virginia Department of Agriculture and Consumer Services
VDCR	Virginia Department of Conservation and Recreation
VDGIF	Virginia Department of Game and Inland Fisheries
VDH	Virginia Department of Health
VDHR	Virginia Department of Historic Resources
VDOT	Virginia Department of Transportation
VMRC	Virginia Marine Resources Commission
WES	Wright Environmental Services

1.0 INTRODUCTION

The Commonwealth of Virginia (Virginia), Department of Environmental Quality (DEQ) has contracted with Wright Environmental Services, Inc. (WES) to provide Virginia's Uranium Working Group (UWG) with information addressing the full components of an environmental impact analysis (EIA) for uranium mining and milling. An EIA is a multi-disciplinary investigation to evaluate potential significant environmental effects and impacts of a proposed action (i.e., uranium mining and/or uranium milling). The Environmental Impact Statement (EIS) process required by the National Environmental Policy Act of 1969 (NEPA) as implemented by the Nuclear Regulatory Commission (NRC) is used to illustrate the complete components and the legal context for future EIAs which could be applied to uranium mining and/or milling in Virginia. The purpose of this report is to identify the necessary and relevant EIA components from existing effective regulatory frameworks to aid Virginia in developing a conceptual regulatory framework for the life-cycle of potential uranium mining and milling in the Commonwealth. The objective of this report is to enhance the Working Group's understanding of the required components of a comprehensive EIA as well as the associated legal requirements and the timing of the associated analyses.

1.1 Procurement Summary

On March 2, 2012, the DEQ issued the request for proposal (RFP) # 12-06-PJ (Uranium Study). The purpose of the procurement was to acquire contractor services to provide information and expert analysis of uranium mining and milling issues in Virginia relevant to the statutory jurisdictions of DEQ and Virginia Department of Mines, Minerals and Energy (DMME). Sealed bids were submitted by April 3, 2012, and contract EP8811027 was awarded on May 21, 2012.

The Contract identifies two major work Tasks (A and B). Work Task A involves the development of an initial report based on 1) a review of studies related to uranium mining and milling in Virginia, 2) a comparison of other existing regulatory programs for uranium mining and milling, and 3) a review of emerging standards from international organizations. The Initial Report was submitted on July 30, 2012.

Work Task B involves ongoing technical advice and assistance to the UWG. The efforts of Work Task B will result in a series of interim reports, analyzing a range of issues identified in the RFP, as well as other issues identified by the UWG. The efforts of Work Task B will provide additional detail to the issues and recommendations addressed in this initial report. This report is developed in response to Work Task B.2.g and is one of several reports developed as part of the uranium study.

On March 5, 2012, the Department of Health issued RFP # 1200001-999 (Uranium Study). The purpose of the procurement was to acquire contractor services to conduct a study of uranium

mining and milling issues in Virginia relevant to the statutory jurisdiction Virginia Department of Health (VDH). The Contract identifies two major work Tasks (A and B). Work Task A involved the development of an initial report based on 1) a review of Virginia and other relevant studies related to uranium mining and milling in Virginia, 2) a comparison of existing uranium mining and milling regulatory programs including NRC, agreement state programs, and international programs (such as Canada and France) and recommends provisions from within those regulatory programs that are relevant to the Board of Health's mission, and 3) a review of emerging standards from international organizations. The initial report for the VDH contract was completed on July 27, 2012.

Work Task B involved ongoing technical advice and assistance to the UWG. The efforts of Work Task B has resulted in a series of interim reports analyzing a range of issues identified in the RFP (Tasks B.1 and B.2), and support of the VDH public meetings regarding the regulation of private wells as well as this final report.

1.2 Purpose and Objective

The DEQ, DMME, and the VDH requested the same task (Components of a Comprehensive EIA) under two different contracts. This document is intended to meet the objectives of all three departments and includes topics that also might relate to other Commonwealth departments such as the Virginia Department of Agriculture and Consumer Services (VDACS), Virginia Department of Game and Inland Fisheries (VDGIF) and Virginia Department of Transportation (VDOT).

The purpose of this Report is to respond to Work Task B.2.g in Contract EP881027 (RFP) 12-06-PJ (Uranium Study) and Work Task B.2.e in VDH Contract #1200001-999. Based on a review of existing studies, existing regulatory programs and our collective experience, this report presents an analysis and points for consideration concerning the full components of an environmental impacts assessment that a potential future regulatory framework for uranium mining and milling in Virginia might be expected to encompass. The report includes the following discussions:

- the regulatory framework for EIA and NEPA;
- the required components of and EIA or EIS, as typically addressed within NEPA;
- the timing of environmental studies, impact analyses and submittals; and
- the timing of environmental impact analyses.

The primary focus of this report is to present a review of the regulatory framework for existing NEPA and State EIA processes, review the required components of EIA and NEPA decision documents as well as the timing of these components within the permitting and licensing

process. This report emphasizes the NEPA process as implemented by NRC, as different federal agencies implement NEPA according to their specific regulations and in line with their individual missions. This report is intended to assist the UWG in assessing potential changes to the existing EIA process as it may be implemented for uranium mining.

2.0 REGULATORY FRAMEWORK

Typically states, and federal agencies, when federal surface or subsurface interests are involved, require permit/license applicants to conduct studies and investigations for proposed activities that have the potential to cause impacts to the community, environment or public health in some way. Currently, the most robust national assessment of impacts is addressed by NEPA. Under NEPA, procedural requirements have been established by all federal agencies to conduct environmental reviews. These reviews can result in several outcomes, which include a Categorical Exclusion (CATEX) or preparation of Environmental Assessments (EA) or EIS. If an EA results in a determination that significant impacts on the environment would not occur from the proposed action then a Finding of No Significant Impact (FONSI) would be produced. NEPA serves to ensure that environmental factors are considered equally with other factors in the decision-making process. This section summarizes the NEPA process and requirements to illustrate the most robust environmental review process currently applied in the United States (U.S.).

2.1 National Environmental Policy Act

The NEPA, enacted on January 1, 1970, establishes the national environmental policy and goals for the protection, maintenance, and enhancement of the environment and provides a process for implementing these goals by the federal agencies. The Act also established the Council on Environmental Quality (CEQ), which is responsible for the development and maintenance of the CEQ regulations for NEPA compliance. These regulations are found in 40 Code of Federal Regulations (CFR) Parts 1500-1508. The NEPA rules are applied to projects at any level of government in which federal funding is involved, where work will be conducted by the federal government or where a permit or approval from a federal agency is required.

The CEQ regulations require that federal governmental agencies create procedures to implement NEPA. Since each federal agency has a specific mandate and mission, NEPA allows for variability in implementation of these procedures between federal agencies as long as the procedures met the CEQ regulations. As a relevant example, the NRC NEPA regulations are promulgated in 10 CFR Part 51 "*Environmental Protection Regulations for Domestic Licensing and Regulated Regulatory Functions.*" These requirements and associated guidance (see Table 2-1) describe the components that must be addressed for a comprehensive assessment of potential environmental impacts when applying for an NRC license. Though NRC does not regulate mining, this comprehensive process for assessing potential impacts could be readily applied by Virginia to uranium mining and/or milling.

The NEPA process starts when a federal agency proposes to undertake an action such as approving a license or permit in response to a participant's application (e.g., to develop a mine and/or mill). Assessments under NEPA are tiered, depending on the magnitude of associated impacts. Figure 2-1 illustrates the general process by which an agency determines the level of

environmental impact analysis required. One of three levels of NEPA analysis will result from this process, a CATEX, an EA or and EIS, as defined in 40 CFR Part 1508.

If an agency determines that, based on previous determinations for similar actions at comparable sites, the proposed action (e.g., the refurbishment of a road surface, replacement of an existing permitted storage tank, etc.), will have no individual or cumulative significant environmental impacts then the agency may categorically exclude the action from environmental impact analyses through a CATEX. A number of agencies have developed lists of actions which are normally categorically excluded from environmental evaluation under their NEPA regulations.

Preparation of an EA is required for activities where the potential for significant environmental impact may exist or the activity cannot be excluded since there is no prior basis for exclusion. The EA provides data that aid in the determination of the necessity for an EIS. The EA results in either a FONSI at which point the activity can be continued with no additional environmental impact analyses required, or a determination that an EIS is necessary for the proposed action. An EIS is required when the potential for significant impact to human health and the environment exists.

The first step in the EIS process begins when the applicant performs project design planning to scope the proposed action and then designs and implements baseline studies that encompass the environment potentially affected (see Section 3.5). Appropriate scoping of these studies is paramount to adequate baseline characterization. The project design and baseline studies provide information about the proposed action and are compiled in an Environmental Report (ER) for submittal to the regulatory authority (e.g., the NRC for a uranium mill in a non-agreement state). The ER documents are typically structured in a manner consistent with the documents they are intended to support (e.g., EA, EIA, or EIS) to facilitate agency review and checks for completeness. After receipt of the ER, the regulatory authority, determines if the document is complete. The regulatory authority either accepts the document as essentially complete or prepares requests for additional information (RAIs) that need to be provided before the application can be considered complete. Once all RAIs are addressed, the regulatory authority publishes a Notice of Intent (NOI) in the Federal Register to complete a draft EIS. The NOI is a notice to the public that the EIS process will begin and outlines how the public can be involved in that process.

At this point, the agency forms an interdisciplinary team (IDT) of experts in all resource areas to guide the NEPA process throughout its duration. The Nuclear Regulatory Guide (NUREG) 1748, Section 4.1.1 (NRC, 2003) provides a suggested formation and roles for the project team. Agencies often use a third party contractor, under a memorandum of understanding (MOU) that would assist them in the EIA process.

The regulatory authority then holds public scoping meetings with interested members of the public, other federal and state agencies and tribal representatives. The regulatory authority presents the proposed action and works with the meeting attendees to determine the environmental issues related to the proposed action that should be included in the EIS. The public scoping process to solicit input on the application occurs simultaneously with the technical review of the application and ER. At least one public scoping meeting is usually held and public comments are typically accepted for at least 30 days after the publication of NOI. The lead agency conducting the EIA will often identify affected communities, key regulatory stakeholders or other agencies with EIA obligations related to the application and request their participation in scoping and developing the EIA document as cooperating agencies. Cooperating agencies contribute technical expertise and assist the lead agency in preparation of environmental analyses. If the cooperating agency has some overlapping jurisdiction over a portion or all of a proposed action, they can adopt the final decision document of the lead agency rather than being required to conduct a separate EIA. The regulatory authorities can opt out of cooperating agency status, if they do not have jurisdiction by law over the proposed action, but can review and comment during public scoping and draft document reviews.

After public scoping, a draft EIS will be prepared that includes a purpose and need statement, a description of the proposed action, reasonable alternatives to the proposed action including a no action alternative in which the project does not go forward, a description of the baseline environmental conditions that might be affected, potential impacts from the proposed action and possible mitigations to reduce or eliminate those actions, as well as a cost benefit analysis of the proposed action. The preparation of the draft EIS frequently takes longer than nine months to complete, depending on the size and complexity of the proposed action. The draft EIS is made available for a 30-day public review and comment. At the same time the EIS is submitted to the state and other governmental and tribal entities for a 45-day to 60-day review period. Typically, for controversial projects, additional time is often requested and granted for extended review by other agencies and the public.

After the public comment and review period, responses to the comments are developed, the draft EIS is modified in response to comments, as applicable and a final EIS is prepared. Preparation of the final EIS takes at least 30 days and can take many months, depending on the scope of the changes developed from the public comment and cooperating agency review process. Responses to comments generated during the public comment period are included in a separate appendix to present the full range of comments and responses to those comments. A NOI to release the final EIS will be published in the Federal Register. The EIS process typically results in a Record of Decision (ROD), which outlines the decision, describes alternatives that were considered, and provides information on mitigating and monitoring potential environmental impacts. In the case of the NRC NEPA process, the NRC does not issue a ROD but rather issues the requested license to the applicant. The public has 30 days to appeal the issuance of the ROD and/or license.

If appealed, the permit or license typically remains active during the appeal process unless an issue of imminent public safety is identified. The regulatory authority will review the appeal, hold appropriate hearings and then either approve or deny the appeal. If the appeal is upheld, the issuing agency takes appropriate action, which may include suspension of the license or may include revision to the license to rectify any deficiencies. If the appeal is denied, the license remains in force as issued.

The timeline for typical EIA, not including baseline studies, depends on the scope and complexity of the EIA. EAs can take less than one year or as long as two years while EIAs can be completed in between one year and 2.5 years, depending on the complexity and potential significance of the proposed action.

2.2 State Environmental Protection Acts and Procedures

The CEQ has identified that 15 states (California, Connecticut, Georgia, Hawaii, Indiana, Maryland, Massachusetts, Minnesota, Montana, New York, North Carolina, South Dakota, Virginia, Washington, and Wisconsin), the District of Columbia, the Commonwealth of Puerto Rico, and Guam have state environmental policy acts (SEPAs). These SEPAs are not required by federal law and are state specific. Some SEPAs create councils on environmental quality (SCEQs), which provide oversight and review EIAs. In this report, the term EIA will be used when generally referring to the evaluation of environmental impacts even though specific states may use different names such as Environmental Impact Analysis, Environmental Assessment, Environmental Impact Report, Environmental Effects Report or Environmental Impact Statement.

All 17 above-listed jurisdictions require review of potential environmental impacts for proposed state projects. Eleven (California, District of Columbia, Hawaii, Massachusetts, Minnesota, Montana, New York, Puerto Rico, South Dakota, Washington, and Wisconsin) of the 17 jurisdictions require review of state and local permitting actions regardless of land ownership (Montana, 2000). Four states (Massachusetts, Montana, South Dakota, and Wisconsin) require review of state permitting actions but not local permitting actions.

In general, the SEPAs require governmental agencies to review proposed actions to determine if a review under the SEPA is required for a proposed action. The governmental agencies must determine if the proposed action will result in significant impact or no significant impact to the environment. Most of the 17 jurisdictions require this environmental assessment process. This environmental assessment process is used to determine if a detailed EIA is required. If a governmental agency knows or believes that a significant impact to the environment will or could occur from a proposed action an EIA must be prepared. Several states do not have the intermediate environmental assessment step, only the detailed EIA.

Some states identify specific actions that are required to undergo the environmental review process. Other states may identify projects over a certain size or that exceed a certain cost as having to undergo an environmental review such as an EIA. Some states identify tiered categories of actions. For example, proposed actions in the lowest category would require an EA, while the highest category would require an EIS.

Some of the jurisdictions allow recovery from applicants of the costs incurred during the environmental review process of permitting actions. One state, Montana, allows recovery of only the costs incurred during data gathering up to $2,500 for proposed actions for which an EIS is required (Montana, 2000).

2.3 Agreement States

Agreement States are those states or commonwealths that have signed a formal agreement with the NRC pursuant to Section 274 of the Atomic Energy Act (AEA). Under this agreement, the NRC has relinquished regulatory control over certain by-product, source and special nuclear material uses in the state. NRC periodically assesses the compatibility and adequacy of the state's program for consistency with the national materials program for AEA radioactive material. There are currently 37 agreement states, of which Virginia is one. However, Virginia's agreement state status does not include the authority to regulate uranium processing. Virginia has licensing regulations for AEA radioactive material (12 Virginia Administrative Code [VAC] 5-481, Part III), recordkeeping and reporting regulations (12 VAC 5-481, Part IV, Article 12 and 13), inspection and enforcement regulations (in 12VAC5-481-110 and statute 32.1-234.1), financial assurance regulations (12 VAC 5-481-630), occupational dose limits 12 VAC 5-481, Part IV, Article 3), dose limits for members of the public (12 VAC 5-481, Part IV, Article 4), survey and monitoring regulations (12 VAC 5-481, Part IV, Article 6), and liquid waste disposal regulations (12 VAC 5-481-920). If Virginia were to amend its agreement with NRC to include uranium processing, it would become the lead agency for any associated EIAs.

As a component of becoming an agreement state for uranium recovery operations, NRC requires that states seeking such an agreement have state laws and regulations that have requirements for environmental reviews and evaluations similar to those in 10 CFR Part 51. As part of the EIA process, the state should provide the opportunity for public review and comment including a public hearing on the issuance of a radioactive materials license authorizing uranium milling.

The Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA) amended the AEA to require the NRC to re-evaluate the Agreement State programs for regulation of uranium recovery facilities in effect at the time UMTRCA was passed. Upon application from a state to amend its existing agreement between the NRC and the determination by NRC that the Agreement State's revised program was adequate to protect human health and safety and the environment, the NRC was authorized to enter into an Amended Agreement with a state, which allowed a state to

continue to regulate uranium recovery facilities. Provisions were included for additional states to enter into such agreements with the NRC.

3.0 REQUIRED COMPONENTS

A complete EIA process should require the applicant to provide information on the potential of significant environmental impacts associated with the proposed action. The information is typically provided in the form of an ER (see Section 2.1). Though these components are assessed in both EAs and EISs, the descriptions, evaluations, and analyses are more robust in an EIS than in an EA, because an EA is intended as a screening step rather than a comprehensive assessment. The detail provided in the ER and EIA should provide sufficient detail to allow reviewers to independently verify estimates of and potential impacts.

Table 3-1 outlines the required topics for the NEPA process, the existing Virginia statutes and regulations addressing environmental review requirements for state projects on state lands, and the NRC regulatory guidance for these topics in an EIS. It should be noted that other agencies (e.g., U.S. Bureau of Land Management [BLM]) also have regulations and guidance for implementing NEPA that are similar but slightly different than NRC's due to different agency mandates. If Virginia chooses to allow uranium mining and/or to regulate uranium milling, it should consider including these NEPA components in their environmental review process.

3.1 Statement of Purpose and Need

The agency responsible for the EIA develops a statement of purpose and need for the proposed action. The "purpose" portion of this statement focuses on the agency's intent to provide the applicant with permission to develop the proposed action (i.e. approve a mine permit). The "need" portion of the statement addresses the agency's need to respond to the application and to fulfill its obligations under NEPA.

An example Statement of Purpose and Need, applicable to uranium processing might be:

The Commonwealth of Virginia (and/or the NRC) is considering a proposal from Proponent X to mine and mill uranium near the Cole's Hill Area. The purpose of this EIA/EIS is to evaluate issues and concerns related to human health and the environment from the Proponent X's proposal. The agency needs to assess impacts to the environment and human health in order to make the decision to provide Proponent X with a permit to mine uranium, and/or license to mill uranium.

The purpose and need statement is usually developed by the IDT after they have received a proposal from the applicant/proponent that is satisfactory. The permit or licensing application is usually accompanied by an ER. The proposal would include a detailed Plan of Operations for development of a uranium mine and/or mill. The purpose of the EIA is to evaluate the environmental impacts of the applicant's proposal and determine whether to approve or deny the proposed action, under conditions of approval (such as additional mitigation measures) to protect the environment (in accordance with NRC regulations for milling licenses and/or Virginia

regulations for mining permits). The need for action is to allow the proponent to exercise their rights under United States mining laws. There is a moratorium on Uranium mining in Virginia, but if it were to be lifted, the proponent would have the right to develop and remove the mineral resources as set forth by the General Mining Law of 1872 as amended. The 1872 Mining Law and 1897 Organic Act provide that the public has a statutory right to conduct prospecting, exploration, development and production activities on federal lands (1955 Multiple Use Mining Act and case law).

3.2 Description of Ownership and Proponent

The ownership of the project, including land and lease agreements, and the proponent of the proposed action must be identified. The inclusion of this information allows a complete understanding of the entities proposing the action. This typically includes identification of significant foreign interest or ownership in the controlling entities.

3.3 Description of Proposed Action

The description of the proposed action outlines in general terms the nature and type of activities to be conducted under the proposed action. The description outlines and quantifies the activities, disturbances, and produced materials as well as the wastes and effluents that will occur under the proposed action.

3.3.1 Location and Setting

A description of the proposed site characteristics is required to adequately understand the potentially affected environment. This section should include geographic coordinates of the project, a legal description, and a vicinity map of the area. Additionally, the location and setting should include a general description of the area in which the proposed action would occur including topography, elevation, adjacent property owners and general physical setting.

3.3.2 Principal Permits and Approvals Needed

In the majority of cases proposed actions require a variety of federal, state, and local permits, licenses and approvals. This section of the ER and associated EIA describe the permits and approvals already acquired or those still needed and the agencies responsible for regulating and approving. This aids in ensuring the full scope of the proposed action and the relevant stakeholders are identified.

3.3.3 Facilities

The temporary and permanent facilities and structures (roads, utilities, buildings etc.) to be built under the proposed action must be described in adequate detail to allow an understanding of the proposed action and the potential impacts associated with their construction, use and

decommissioning. Since projects such as mines and mills typically evolve over time, these facilities are frequently addressed with respect to the phase of project life cycle.

3.3.4 Design

A description of the design of the proposed action is provided in sufficient detail that allows an independent assessment of the facility and potential impacts. Buildings and facilities should be included on figures and building and plant layouts included. The entire process including flow diagrams should be described in sufficient depth to allow an understanding of the quantities and constituents of the process streams, effluents and wastes managed and generated by the processes. Equipment to be used during the proposed action should be identified.

Specific attention is focused on effluent and waste management, since these materials have the highest potential for impact. This includes sufficient detail of the design of chemical, waste and product storage facilities to allow independent verification that the facilities will meet the appropriate standards for capacity, integrity, durability and quality control.

In addition, a detailed environmental monitoring program is presented for monitoring the potentially affected environment (i.e., air, groundwater, surface water, soils, ecologic and human receptors). The level of precision, accuracy and quality control of the monitoring program must be detailed to allow independent verifications that the monitoring program adequately monitors the full scope of the proposed activities and potential impacts. Typically, the baseline environmental monitoring systems are incorporated into the operation, reclamation and post-reclamation monitoring programs. Therefore, the baseline study can be very beneficial to all parties if designed with pre- and post-operational design criteria.

3.3.5 Construction

The anticipated types and quantities of equipment and personnel planned for project preparation and construction needs to be fully characterized to support assessment of potential socioeconomic and transportation impacts. In addition, the size, extent and locations of disturbance and quantities of material disturbed and handled must be described to support assessment of potential air quality impacts during construction. The effect the proposed construction may have on land use, land cover, water resources, and wildlife habitats must be described. Both adverse and beneficial effects of site preparation and construction on the site and the region should be included in the discussion. Resources utilized during construction should be identified as either a permanent (irreversible or irretrievable commitment) or temporary.

3.3.6 Operations

A generalized plan of operations of the proposed action including a schedule should be discussed. The operations should include the manner in which material is utilized as well as

quantities and types of material generated, the chemical and physical characteristics of these materials, the consumption rates of materials and the handling and management of such materials. Additionally, any effluents and other wastes should be adequately characterized and waste minimization or disposal methods described.

A description of the procedures, equipment, technology, and processes used for operations of the proposed action needs to be sufficient enough in detail to allow an understanding of the potential impact of these operations on the physical, biological and socio-economic environment. The water management, sediment control, and runoff quantities, mitigation, and containment measures should be adequately explained. The quantity, type and source of energy supplied to the facilities should be identified. Additionally, a discussion of the impacts of transportation on the environment, types (heavy vehicle vs. light vehicle) and rates (i.e., trips per day, miles traveled) of vehicular traffic associated with the proposed action such as material shipments to and from each facility and transportation associated with the work force required for the proposed action will be required. Human health and public exposure rates need adequate characterization and monitoring and reporting requirements outlined.

3.3.7 Reclamation and Closure

The description of the proposed reclamation and closure should include methods to minimize lasting environmental effects of the proposed action to the extent allowable (i.e., waste isolation, stabilization, mitigation of surface impacts). Figures outlining the post disturbance topography, areas temporarily and permanently excluded from public use, land cover and any facilities or buildings anticipated to remain should be included. The size, extent and locations of disturbance and quantities of earth disturbed and handled during reclamation must be described to support assessment of potential air quality impacts during construction. The effect the proposed reclamation may have on land use, land cover, water resources, and wildlife habitats must also be addressed. Both adverse and beneficial effects of site reclamation on the site and the region should be included in the discussion. Resources utilized during reclamation should be identified as either a permanent (irreversible or irretrievable commitment) or temporary. The timing and methods employed during reclamation should also be discussed as well as long-term monitoring and planned end-state land use.

3.4 Analysis of Alternatives

Alternatives to the proposed action that reduce or mitigate potential impacts must be proposed and assessed. Alternatives are different activities, locations, or techniques that could be employed to meet the project need and achieve the purpose of the proposed action. A range of reasonable alternatives should be analyzed and compared. These alternatives could include for example, alternative locations for the proposed action, alternative methods of development, alternative ways to implement the project and alternative methods to mitigate or monitor potential environmental effects of the proposed action. An example of an analysis of alternatives

would be alternative locations for tailings disposal. This alternative could address the placement of tailings above ground or below ground in relation to known information on the risk of tailings release from flooding events. Another specific example of alternative analysis would be the methods used in uranium milling. Alternatives could be developed based on acid or alkaline leach and the potential impacts to the environment from each leach process.

The result might be several alternatives, both in location and process, in order to mitigate environmental and human health effects. If the alternatives meet the Purpose and Need of the action, and are practicable, they would be carried through the resource analysis for biological, physical and other EIA elements. The environmental effects of each reasonable alternative must be analyzed, though some alternatives may be dismissed from detailed analysis due to lack of feasibility or clear absence of benefit.

One alternative always considered is the no action alternative. This alternative outlines environmental effects from the proposed project not occurring and is represented by the existing baseline conditions. This is the baseline (no impact from the proposed action) against which the proposed action and reasonable alternatives are compared.

3.5 Description of Affected Environment

The applicant must describe in sufficient detail the environment that would be affected by the proposed action to allow comparison of the potential impacts to the environment with respect to the existing baseline conditions. This environmental baseline should address the seasonal variability of the environmental media and topics considered. The establishment of biological, physical, and socioeconomic baseline conditions prior to the proposed action allows an assessment of potential future impacts and provides a basis for the monitoring of future changes in these conditions. Table 3-1 outlines the main components for description of the affected environment. In general, baseline conditions should be identified for land use, transportation, soils and geology, water resources, ecological resources, meteorology, climatology, air quality, noise levels, historic and cultural resources, visual and scenic resources, socioeconomics and social demographics (i.e., minority and/or disadvantaged populations) to support assessment of environmental justice issues.

Consultation with other Commonwealth departments and federal agencies is instrumental in defining the existing condition of resources, as well as documenting any regulations and statutes that are already in place to protect the resources. Examples are the NRC, U.S. Environmental Protection Agency (EPA), and Mine Safety and Health Administration (MSHA), and Department of Defense (DOD), and Corps of Engineers (USACE).

When designing baseline studies, attention must be given to the level of precision and accuracy and the quality control of baseline studies. The appropriate level of detail is critical to ensure that the studies sufficiently address the full scope (area of potential impact) and range of media,

constituents, and parameters to the appropriate levels (i.e., detection levels for constituents in water, air and soil). The appropriate level of precision and accuracy and the quality control of baseline studies will afford meaningful comparison to regulatory requirements and future conditions.

3.6 Assessment of Environmental Impacts, Mitigation of Potential Impacts and Monitoring

Once the proposed action and the baseline environmental conditions have been described, the proponent must adequately assess the potential impacts, positive and negative, from the proposed action on the potentially affected environment. These impacts include changes to air, water, soil concentrations, changes to human (public and occupational worker) exposures, disturbance to plant and animal species and habitats, as well as social and socioeconomic impacts. After estimating the impacts, the proponent must discuss best management practices and reasonable efforts to mitigate or lessen the potential impacts. After estimating the impacts, the proponent must discuss Best Management Practices (BMPs) and reasonable efforts to mitigate or prevent to the best extent possible. The proponent must propose a systematic program of observation, measurement and reporting that will determine to what extent impacts are occurring to the public and the environment as a result of the proposed action. This is an integral part of the baseline monitoring and compliance monitoring programs developed during the design of the proposed action.

The NRC recommends that impacts discussions are organized by the subject areas (e.g., air, water, soil, etc.), and then rated by NRC staff significance criteria, SMALL, MODERATE, and LARGE. This categorization is then used throughout the analyses (NRC, 2003). These significance criteria are defined as follows.

SMALL: The environmental effects would not be detectable or are so minor that they would not destabilize nor noticeably alter any important attribute of the resource.

MODERATE: The environmental effects would be sufficient to noticeably alter, but not destabilize, important attributes of the resource.

LARGE: The environmental effects would be clearly noticeable and are sufficient to destabilize important attributes of the resource.

Whether or not negative or positive impacts occur are highly site specific and cannot be adequately assessed until the site is chosen and the affected environment assessed. These impacts would be addressed and modeled as part of an EIA. The BMPs would probably reduce the likelihood of the impacts/effects. Only with air, soil, water and other site-specific data can specific potential impacts on human health and the environment from the operation of a uranium mine/mill be assessed.

3.7 Cumulative Impacts

Cumulative impacts can be defined as the sum of the incremental impacts on the environment that could result from the proposed action, as well as other current projects in the area, past projects in the area and reasonably likely future actions. The components of the proposed action, when viewed individually, may not appear as likely to cause significant impacts. However, when viewed together with other actions (i.e., other resource development and/or infrastructure projects in the area) the actions may cause significant overall impacts to the physical, biological and socioeconomic environment. A proponent must adequately describe past, present and likely future actions of others in the area of the proposed action and the cumulative environmental effects that all these actions combined may have. This would include any potential impacts on neighboring states (e.g., West Virginia, etc.), and the legal aspects of these impacts.

The impacts of any connected actions should also be considered. A connected action is an activity that would not likely occur without the proposed action but if the proposed action occurs, the additive impact, if any, of the connected action must be considered. One example of a connected action would be uranium mining associated with the uranium milling. From the NRC perspective, the uranium milling operation would be the proposed action, which it regulates, with a connected action of the associated uranium mine, which it does not regulate.

If a uranium mine and mill were proposed near or adjacent to each other and the mine or mill would not reasonably be operated without the other, then they would be considered connected actions. In the case where the NRC has jurisdiction over uranium milling, the scope of the NRC EIS would include all the impacts from the connected action from the associated uranium mining. The state or Commonwealth in which the mining and milling was proposed has the option of being cooperating agency with the NRC, wherein they participate in the scoping and development of the EIS, and subsequently adopt all or parts of the NRC EIS in lieu of their own environmental review process. However, this in no way precludes the state of Commonwealth from conducting its own EIA. If a state or commonwealth has assumed jurisdiction over uranium milling from the NRC, it too can develop a single EIA.

3.8 Best Management Practices and Design Features

The proponent or the entity that proposes uranium mining and/or milling, includes design features and BMPs in their statement of proposed action. Some of these design features are typical of any construction or mining project, including uranium milling and mining. Inclusion of design features and BMPs helps to avoid or minimize environmental effects to specific resources. Discussion of BMPs could include such items as: safety programs for the worker, dosimeters, radiological monitoring, air quality and storm water permitting, preparation of an erosion and sediment control plans, a noxious weed management plan, a traffic control plan, a health and safety plan, and reclamation plans with specific practices related to the area of interest

in the Commonwealth. Also, the use of emerging efficient technologies to reduce emissions could prevent and reduce pollution.

Characterization of baseline conditions prior to permit issuance would set the stage for on-going monitoring. In this case, a statistically designed background or baseline study of radionuclides in air, water and soil could be conducted to use in long term monitoring. These studies help distinguish measured contaminant levels in the future from existing natural background levels; and are essential. Comprehensive and ongoing monitoring during operations could be effective in ensuring that operations are not exceeding standards set forth by regulating agencies.

The measures mentioned above are expected to eliminate or reduce impacts associated with various resource aspects of the project. There may be some effects, such those to wetlands, that when impacted, must be mitigated in kind. A comprehensive EIA could include appropriate site modeling and demonstration of the application of best practices for mining and milling projects. This would validate that proposed operations, waste management and reclamation activities would be protective of public health, safety and the environment.

3.9 Cost-Benefit Analysis

A cost-benefit analysis is a systematic process for calculating and comparing benefits and potential costs of a proposed action. The cost-benefit analysis evaluates monetary impacts (i.e., local tax revenues, land value impacts, agricultural products prices, etc.) and non-monetary costs and benefits (i.e., aesthetic impacts, impacts to local housing, schools and municipal infrastructure). Fundamentally, the cost-benefit analysis allows assessment of whether the benefits outweigh the costs and the magnitude and areas of the differences. The cost-benefit analysis can reveal how to maximize benefits or minimize adverse socioeconomic impacts.

4.0 SPECIFIC RESOURCES/ELEMENTS TO CONSIDER

The following resources would be described in an EIA in their existing condition, and analyzed for impacts to human health and the environment. The process culminates in mitigation strategies or revisions to the engineering design of the mine/mill facility. Table 4-1 lists some of the resources/components) that might be affected by the proposed milling/mining of uranium in Virginia, summarizes potential issues and concerns and studies, potential hazards or risks associated with the impact, general applicable federal acts and guidance, Commonwealth department that may oversee, license or permit activities, and several BMPs or design features that could be considered to reduce impacts.

4.1 Physical Elements

4.1.1 Geography and Climate

Consideration of potential extreme rainfall events and hydrologic regime is required for a license for a proposed facility as described in 10 CFR Part 40, Appendix A, "*Criteria Relating to Operation of Uranium Mills and Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material from Ores Processed Primarily for their Source Material Content.*"

Site-specific considerations within Virginia would be addressed at the point that a license application was submitted. The environmental and climatic characteristics of Virginia were documented in the National Academy of Sciences (NAS) 2011 Final Report (NAS, 2011). This study and others could be used as the basis of the existing environmental descriptions in an EIA. The area of interest would be dependent on the location of the proposed uranium mine/mill. The area of interest, or study area, may be different for each element/resource.

4.1.2 Air Quality

Surface mining involves a number of activities that can impact air quality or generate noise. Assessment of the air quality and background noise levels would be required. Blasting during mining, ore hauling, and release of radon during uranium processing activities may produce particulate matter, and fumes. Basic equipment operation in the disturbed areas of mine pits, backfill areas, and haul roads can generate airborne particulate matter. Wind passage over open areas of mine sites also produces airborne particulate matter. Truck haulage of ore on public roads is also a source of particulate matter.

4.1.3 Geology

The general geology including paleontology, geologic hazards, and mineral resources would be needed in the discussion of the affected environment in a comprehensive EIA. Depending on the location of the uranium mine or mill, the mineralogy available would reveal the potential

constituents in waste. Indeed, the milling process is a function of geology. The decision as to whether to employ acid or alkali leaching methods depends on the efficiency of carbonate removal. There are two critical steps in the process selection and this decision is influenced by the following: 1) The size of the resource, grade and number of domains; 2) Type and nature of minerals present; 3) Mineralogy of the host rock; 4) Beneficiation option and 5) Impurities in the pregnant liquor or by product opportunity (UMETCO, 1984).

Geologic hazards such as mass movement (landslides), earthquakes or other natural disasters would be included in the resource evaluation of geology. The EIA would include an analysis of landslide potential and earthquake potential. A seismic hazard analysis program should be used to identify earthquake potential.

4.1.4 Soils

Soils and their health are of particular concern to mining because of their importance to agriculture, wildlife and plants. An EIA would present an overview of the study area's soil formation process, soil profile, and the soil classification system. It would provide a calculation of the disturbance to specific area soils, both short and long term, and describe potential effects to the soils. Usually the Natural Resource Conservation Service (NRCS) web soil survey (NCRS, 2012) is used to document the soil type, chemical composition, erosion factor, construction management and more. An additional site specific baseline analysis of naturally occurring concentrations of radionuclides in soils would be necessary to assess impacts to soils from a proposed uranium mine or mill.

4.1.5 Water Resources

Impacts to water resources, including surface water, groundwater, hydrology, and water usage, are of major concern to the public and regulators. The potential for water to act as a pathway for contaminants, both chemical and radiological, that could negatively impact human health is a prime consideration when evaluating the potential environmental effects of a uranium mine/mill. Both surface waters and groundwaters afford transport media and pathways for the spread of contaminants. A comprehensive EIS would include baseline sampling of waters and would be tailored to a specific mill/mine application in Virginia.

4.1.6 Watershed Health, and Drinking Water

The siting of the mine and the milling and processing facilities should be in a topographic position where the upstream watershed area is minimized in the case of surface water and the depth to groundwater is maximized in the case of groundwater. In the case of both the mine and the mill, it is paramount to divert undisturbed runoff around the disturbed area. The smaller the upstream watershed area, the less significant will be the diversion issues. In the case of a mine, both underground and surface, it is likely that groundwater will be encountered. The effects of dewatering on surrounding uses should be considered. Reclamation of the mine and its impact

on groundwater quantity and quality should be considered. Burial of acid forming and toxic materials below the water table needs to be addressed. Although milling and facilities should not discharge liquid (or solid) wastes, depth to groundwater should be a siting consideration in the proponent's proposal for an application to mine/mill uranium.

A proposed mining and/or milling operations should be designed, operated, and closed or decommissioned in a manner which ensures the protection of the waters of the Commonwealth. If contamination is detected through the monitoring program in place at the facility, by the regulatory authority or by offsite parties, remedial action is required. Such actions may include, but are not limited to characterization and additional monitoring, containment and disposal, containment and treatment, removal and treatment, disposal, in-situ treatment (e.g., chemical or biological remediation) and other technologies. The selection of the appropriate action will depend on site-specific conditions on a case by case basis. Whereas water quality restoration to baseline or better is required by all states and the federal government prior to the end of mining and reclamation, the meaning of baseline and reclamation standards are often state specific. For example, some states (e.g., Colorado) and the NRC require restoration to baseline on a parameter-by-parameter basis, while others require restoration to the pre-mining class of use (e.g., Wyoming).

4.2 Biological Elements

A comprehensive EIA would include an intensive study of biological resources of the proposed study area. This would be accomplished by literature searches and biological surveys. If the action is proposed on federal land, the Endangered Species Act (ESA) is applicable. The ESA is administered by the U.S. Fish and Wildlife Service (USFWS) through consultation on actions by federal agencies and coordination with state agencies. In addition, the Fish and Wildlife Coordination Act (FWCA) pertains to federally-controlled water development projects and land development projects that affect any water body. Whenever Office of Surface Mining, USACE, or EPA authorizes an action within the scope of the FWCA, they consult with the USFWS and counterpart state agencies to obtain recommendations on ways to mitigate adverse effects on fish and wildlife resources.

The VDGIF manages over 203,000 acres for the benefit of citizens. Virginia fish and wildlife conservation is managed by VDGIF and the Virginia Marine Resources Commission (VMRC). These agencies have partnered with the USFWS to manage harvested and endangered species under many federal programs. The VDGIF manages all other wildlife in the state.

The VDGIF has developed a Comprehensive Wildlife Conservation Strategy (Action Plan) for wildlife (VDGIF, 2005). This 900-page action plan would need to be reviewed and consultation on biological resources obtained as part of an EIA. The Virginia Action Plan identifies 925 species of greatest conservation need, 60 percent of which are aquatic, 70 percent of which

are invertebrates. These species are grouped into four tiers of relative conservation need: *critical*, *very high*, *high*, and *moderate*. These tiers allow for prioritization of threats facing species and of conservation actions addressing those threats.

The following paragraphs discuss biological resources in further detail. For an EIA, the biological resources would be described in more detail in their existing condition, and evaluation of impacts to human health and the environment. Biological surveys would be part of an EIA and would address the site-specific presence of species of greatest conservation need, and would also establish a baseline for biological elements in the study area. The EIA should identify the species (flora and fauna) within the terrestrial and aquatic environments that are important components of food chains leading to, and used by, people living in the area of the proposed action.

4.2.1 Wildlife

An EIA would include baseline surveys for terrestrial wildlife. Some of these studies may already exist, and the VDGIF would be consulted throughout the EIA process. If not already available, baseline studies would likely include terrestrial wildlife, birds of prey, and migratory birds on the federal and state endangered and threatened lists located within the vicinity of the proposed action. The baseline wildlife survey would likely include identification of natural community types that are imperiled, critically imperiled or vulnerable according to commonwealth and federal criteria, if they occur in the vicinity or on the proposed site. Consultation and coordination with the VDGIF before and during the EIA process would serve to ensure that the appropriate survey methodology and wildlife populations are included in baseline surveys.

4.2.2 Aquatic Wildlife

An EIA might include baseline surveys for aquatic wildlife and associated stream health. Some of these studies may already exist, and the VDGIF would be consulted throughout the EIA process. If not already available, baseline studies might include benthic organisms and fish counts depending on the proximity to water of the proposed action. Indicator species, if available, might be considered for use in biological monitoring. An example of using indicator species may be found in the Baseline Survey of Radionuclides in Animal Tissues at the Proposed Pinon Ridge Mill Site in Colorado (Whicker, 2008).

A description of aquatic wildlife in Virginia is provided in the Wildlife Action Plan (VDGIF, 2005).

"The headwaters of the Roanoke River drain the Northern Ridge and Valley and Blue Ridge Mountains of Virginia. In Virginia, a majority of the watershed drains the Piedmont ecoregion. The Roanoke crosses into North Carolina before entering the Mid-Atlantic Coastal Plain.

Several rivers within the drainage are significant on their own and include the Dan, Smith, Mayo, and Banister Rivers. The Roanoke joins the Pee Dee and Chowan drainages to form the South Atlantic freshwater ecoregion, which is considered "globally outstanding" in terms of biological distinctiveness (Abell et al., 2000). The South Atlantic freshwater ecoregion is home to 48 endemic aquatic species including fish, mussels, and amphibians."

4.2.3 Vegetation

An EIA would include surveys for plants (including threatened and endangered species) and also presence of noxious weeds, and BMPs for weed control. Again, these studies would be part of the baseline information needed to monitor vegetation health in the long term.

General land cover is provided in the Wildlife Action Plan (VDGIF, 2005).

"Approximately 95% of the land area is considered submontane and 5% is montane. The small amount of montane occurs in the western edge of the Piedmont and is the foothills of the Blue Ridge. Most of the land cover in the Piedmont is forest, followed by agriculture and open habitats. Approximately 5% of the land area is within a Conservation Land and therefore has some degree of conservation protection. Wetlands, forest, and water areas are protected in a higher proportion than they occur overall, while agriculture/open and developed land cover types are protected at a lower proportion.) "

4.2.4 Wetlands

A comprehensive EIA would include surveys for wetlands, wetland evaluations, and delineations of confirmed wetlands.

The Virginia Department of Environmental Quality describes the facts regarding wetlands in Virginia on their website (DEQ, 2012). The DEQ ensures the protection of more than 1 million acres of tidal and non-tidal wetlands. If a proposed action, such as uranium mining or milling, would affect state waters (including wetlands) a permit is required by the DEQ through the Virginia Water Protection Permit Program.

4.2.4.1 Virginia Water Protection Permit Program

Virginia law requires no net loss in the amount and function of wetlands (DEQ, 2012). This means the overall number of acres and quality of wetlands must be protected. DEQ enforces this law through the Virginia Water Protection Permit Program.

The Virginia Water Protection Permit Program issues permits for projects that affect state waters, including wetlands. In general, wetlands are areas where water saturation (from either surface water or groundwater) determines soil conditions and plant communities. The goal of the program is to balance the economic and development interests of the Commonwealth with the protection of wetland resources (DEQ, 2012).

The DEQ issues general and individual permits for activities that affect wetlands. General permits are issued for activities that will have a minimal effect on non-tidal wetlands. General permit projects can be elevated to an individual permit if DEQ determines the project exceeds minimal impact standards. General permits help to increase the efficiency and the speed of Virginia's permitting process. However, they are issued with the same high standards as individual permits. Individual permits are issued to projects with large impacts on tidal and non-tidal wetlands.

After an individual permit application has been approved, a public notice announcing a public comment period on the activity must be published in a newspaper in the locality of the affected wetland. Individuals may submit written comments in response to the public notice. The DEQ may hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the proposed permit. The DEQ also notifies property owners near the affected wetland (DEQ, 2012).

If effects to wetlands are unavoidable, the applicant must compensate for these losses by creating or restoring wetlands, purchasing 'credits' from approved wetland mitigation banks or preserving wetland buffers.

The USACE Engineers Section 404 permit and associated Section 401 certification for the discharge of dredge and fill materials into waters of the United States may be required for the mining/milling facility.

4.3 Socioeconomic Elements

Discussions of socioeconomic resources and indicators must be included in the ER and the EIA. Socioeconomic resources are resources that provide social or economic value to, and are currently available to, regional and local communities. Examples include:

- heavy industrial businesses such as mining, forestry, or construction;
- light industrial businesses such as transportation or warehousing;
- agriculture;
- commercial businesses such as retail stores;
- services such as hospitals and other health care facilities, and tourism businesses;
- developed natural resource uses such as flood control and recreation facilities; and
- docial organizations such as churches, 4H, the Community Educational Outreach Service; and scouting organizations.

Socioeconomic indicators are factors that can be used to measure the effects that proposed project alternatives may have on different resource conditions, and the magnitude of any change from current conditions. Examples include:

- statistical characteristics of human populations (referred to as demographic information) such as population size, in-migration and out-migration, housing information, schools and education levels;
- economic numbers concerning employment, income, and earnings;
- federal, state, and county tax revenue;
- social values that may affect community response to project impacts; and
- community organizations and services.

The following questions posed by the VDH (Virginia, 2012) could be addressed in this component of the EIA.

1. Has uranium mining and milling historically correlated with a decline in agricultural productivity/profitability due to negative public perception of agricultural commodities produced near uranium mining and milling operations?
2. If so, have agricultural producers received compensation for their losses?
3. How have they received compensation and from whom?
4. What baseline productivity data is necessary to assure adequate compensation?
5. Have uranium mining and milling historically correlated with a decline in the profitability of pre-mining tourist establishments due to negative public perception of the area near uranium mining and milling operations?
6. If surface water supplies are reduced or quality is impacted, what effect would this have on water front property values and tourism? Historically how have property values and tourism been impacted by radiological contamination, or the perception of radiological contamination?
7. Could a uranium mining and/or milling operation purchase crop insurance on behalf of local farms to cover losses resulting from a contamination event?
8. Is there a base of qualified workers in Virginia to fully staff uranium mining and milling operations? Would works be brought in from out-of-state? Would training be provided to local citizens interested in working for a uranium mining and milling operation?
9. Would jobs created in the uranium mining and milling industry in Virginia offset losses in other job sectors (agriculture, tourism, etc.)? Would the uranium mining and milling

industry provide a long-term employment base for the state vs. current employment sectors that may be adversely impacted?

10. Include a brief discussion of the market demand and pricing for uranium.
11. Do uranium mining and milling operations currently receive federal subsidies?
12. How will uranium mining and milling operations in Virginia be taxed?
13. What is the cost of containing tailings and other radioactive waste for the long term?

4.3.1 Socioeconomic Demographics

A comprehensive EIA would describe existing conditions of and cover impacts to demographics, ethnic diversity, employment and unemployment, income and poverty levels, natural resources, economic projections, social values, community organizations and services. The demographic statistics of Virginia may be found in U.S. Census Bureau reports and specific county data when evaluating a known area. The Appalachian Regional Commission (ARC) works in partnership with the states in Appalachia including a portion of Virginia. ARC could provide pertinent information in an EIA regarding development districts and research in some counties.

4.3.2 Human Health and Mine Workers

Occupational health and safety would be evaluated in an EIA. Known uranium mining and milling human health risks could provide a foundation for an EIA analysis in regard to human health impacts. However, several baseline studies would be required in order to analyze effects. Potential public exposure to radiation as a result of the project should be assessed through the use of a radiological dose model(s) incorporating the major potential external and internal pathways based on local/regional dietary surveys and traditional land use practices. The local stakeholder community should be engaged in the identification of the "representative person(s)" to be modeled and their relevant exposure pathways. The Canadian Standards Association (CSA) standard N288.1 (CSA, 2008) and International Commission on Radiological Protection (ICRP) publication 101, Part 2 (ICRP, 2006) should be consulted for guidance.

The Millennium Project, a Canadian Uranium Mine proposal provided details on the requirements for Human Health in their EIA (Canadian Nuclear Safety Commission [CNSC], 2010). These requirements are listed below and could be used for any uranium mining/milling proposal:

- calculations of predicted annual radiation doses to all persons, including truck drivers and miners, working at or near the Millennium mine, including as a result of malfunctions and accidents;
- calculations of predicted annual radiation doses to the public, including as a result of malfunctions and accidents;

- potential non-radionuclide hazards to workers in airborne dust and programs that are, or will be, in place to monitor for these hazards;
- engineered controls, programs, Action Levels and a Radiation Protection Code of Practice proposed to control worker radiation doses and intake of radioactive prescribed substances; and
- measures designed to provide for the health and safety of miners and other underground workers.

The EIA should identify the species (flora and fauna) within the terrestrial and aquatic environments that are important components of food chains leading to, and used by, people living in the area of the proposed action. The status of these species in the impact area in regards to their relative abundance and any measured levels of contaminants in their tissues, especially heavy metals and radionuclides, should be documented (CNSC, 2012a).

An EIA should discuss the development of any additional training modules for environmental instrumentation, protection and awareness and how the proponent's commitment to the ALARA (As Low As Reasonably Achievable) principle of radiation protection will be implemented.

Most mining activities carry potential health risks of airborne dust and fumes from blasting and other operations that generally result from inhalation of particulate matter, fugitive dust and dust emanating from the mining operations and hauling. Effects to air quality are usually localized within the immediate area of the mining site. The EIA should discuss site specific worker protection programs and the manner in which these programs meet the regulatory requirements of Occupational Safety and Health Administration (OSHA) and MSHA. The EIA should include information on health and safety of the public and workers as a result of malfunctions and accidents (CNSC, 2012b.) As DMME provides oversight of mining operations in the Commonwealth, consultations with DMME before and during the EIA process should occur.

4.3.3 Land Use and Public Lands

If an application to mine or mill uranium on public lands was submitted, the state or public agency (e.g. U.S. Forest Service [USFS]) with jurisdiction over those lands would either be a cooperating agency or the lead agency depending on the specific nature of the proposal. Relevant traditional land use mapping data should be included in the EIA. An EIA should address the current use of lands and resources for traditional purposes by Aboriginal persons.

4.3.4 Agriculture

An EIS would need to address direct and indirect effects to agriculture in the vicinity of a proposed action. Indirectly, foods produced by agriculture in the area would need to be surveyed for baseline and reviewed as to the potential effects of a proposed action. Baseline studies have been recommended, and are provided in WES, 2012, as stated below:

"The applicant/licensee shall conduct representative sampling and associated analyses of crops being commercially grown for human and/or livestock foodstuff (including pasture land grasses and tobacco) within 2 miles of the site boundaries during the one-year baseline sampling period used for the environment report which will accompany the license application. All sampling and analyses shall be conducted according to procedures and methods approved by VDH/VDACS prior to commencement of sampling. The applicant/licensee shall continue the same sampling and analyses from the end of the one-year baseline sampling program until the radioactive materials license for the mill is either granted or denied by VDH. If the license is issued by VDH, the applicant/licensee shall continue the sampling and analyses as required by VDH per the license. The applicant/licensee shall file a report of its findings annually by March 31 of the year following the sampling period."

4.3.5 Scenic or Visual Resources

Scenic or visual resources are usually described in an EIA, especially if the proposed action were to be located on federal property, such as USFS lands. The existing environment is established using key observation points (KOPs), which are photographs of the site of the proposed action, taken from public vantage points. A KOP is a location where an observer can see an area that would potentially be impacted by a proposed activity. Federal lands may have designations for visual resources that would be addressed. Monitoring of the KOPs could be required by the lead agency in order to assess the viewshed for changes during construction and operation of a proposed action.

Impacts to aesthetic value of the local viewshed could be mitigated to the extent possible by landscape architecture, color selection (of buildings and equipment), and other best management practices.

4.3.6 Environmental Justice

NEPA requires an analysis of the environmental impacts to minority and poor communities to ensure that they are not burdened with an unfair portion of the impacts of a proposed action. Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-income Populations*, was issued by President Clinton on February 11, 1994 (59 Federal Register [FR] 7629). This order requires that "each federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities, on minority populations and low-income populations." Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks (Executive Order 13045, 62 FR 19885) states that each federal agency shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children and ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks. Environmental health risks and safety

risks mean risks to health or to safety that are attributable to products or substances that the child is likely to come into contact with or to ingest. An EIA needs to include a discussion of environmental justice and its relationship to the location of the proposed project. With regard to environmental justice, the location of the mine is determined by the geologic setting of the uranium resource. Uranium companies construct mine and mill facilities near the resource to reduce economic costs associated with transporting the ore to a processing facility.

Related socioeconomic issues that that could impact environmental justice may be:

- short- and long-term (including post-mining) economic impacts on a local and regional scale;
- impacts to local businesses;
- impacts to government services;
- tax revenue; and
- cumulative effects related to other future socioeconomic contributions.

The criteria used to assess significance of impacts to environmental justice include any disproportionate burden of environmental or economic impacts on minority or poor communities, including:

- loss of job opportunities;
- impacts to personal property, such as subsidence, negative changes in water quantity or quality;
- reduced access to government services; and
- reduced access to recreational facilities.

4.3.7 Recreation

The impact of a proposed action on recreation would be evaluated during the course of the EIA, including recreational availability to all socioeconomic classes of communities. Positive impacts and negative impacts to socioeconomic resources that would affect the entire community in the proposed mine/mill area would be analyzed in this component of the EIA. Also, issues related to socioeconomic class, smoking and their relationship to occupational hazards from the uranium mining and recovery industry should be an EIA component.

A comprehensive EIA would assess the recreation values in the area of the proposed action, with and potential economic losses to the surrounding community from impacts to these values. In terms of aesthetics, any mining can have a visual impact to recreation activities nearby. Also,

recreational activities are related to quality of surface and groundwater, and therefore tie into the impact analysis for those resources.

Recreational activities that occur in and around the proposed action would be documented and assessed for consequences from mining and milling of uranium. This could include recreational facilities such as campgrounds and designated areas for boating, fishing, swimming, and hiking. Any known waterway users (including recreational, commercial and traditional) should be identified and details regarding any consultations with these user groups and/or individuals.

4.3.8 Short-term Uses and Long-term Productivity

Short-term uses and long-term productivity of a resource (e.g., soil, vegetation) would be evaluated in an EIA. Reclamation of disturbed areas would return the disturbed soil to long-term productivity by being utilized as growth medium in reseeded areas, while the unreclaimed areas and road cuts might permanently eliminate some areas from potential production.

4.3.9 Irreversible and Irretrievable Commitments of Resources and a Cumulative Impacts Analysis

Irreversible and irretrievable commitments of resources are often a part of cumulative impact analysis. This analysis addresses the impacts that cannot be addressed by mitigation or best management practices, and would be "irreversible and irretrievable commitments" such as extraction of uranium, long-term soil disturbance or use of surface and groundwater. Removal of undisturbed vegetation might result in the loss of timber that, especially on public lands, would represent an irretrievable loss.

4.3.10 Historic and Cultural Resources

An EIA needs to include a discussion of the presence, if any, of historic and cultural resources within the proposed permit boundary and within the viewshed of the proposed facility. Permit and license applicants may be required to conduct archeological surveys of proposed mine sites if the reviewing agencies believe that archeological sites may be present. This analysis may be presented as part of physical or socioeconomic elements. Historic and archaeological resources are sometimes broadly categorized as cultural resources. Cultural resources consist of prehistoric and historic districts, sites, structures, artifacts, and other physical evidence of human activities considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. Prehistoric and historic archaeological resources are locations where human activity measurably altered the earth or left deposits of physical remains. Typical environments in which archaeological resources can be found include rock shelters, terraces, floodplains, Native American burial mounds, and ridgetops. Architectural resources, which may include dams, bridges, and other structures having historic or aesthetic importance, generally must be older than 50 years to be considered for protection under existing federal cultural resource laws.

Cultural resources that may be present within any mine site include cemeteries, historical sites and structures, archeological sites, public parks, and other features of cultural significance to surrounding communities. Historical cemetery sites may exist in coal mining areas because they were often located on mountaintops and ridge crests. The Surface Mining Control and Reclamation Act of 1977 (SMCRA) prohibits mining within 100 feet of a cemetery, although cemeteries may be relocated if authorized by applicable state laws or regulations (SMCRA, 1977). Mining may not be conducted in public parks or places listed in the National Register of Historic Places without joint approval of federal, state, and local agencies with jurisdiction over these features. Consultation under Section 106 of the National Historic Preservation Act (NHPA) compels agencies to consider the impact of mining projects on historic properties and the various alternatives to minimizing adverse effects. Mining is not allowed in the National Park System, the National Wildlife Refuge System, the National System of Trails, the National Wilderness Preservation System, the Wild and Scenic Rivers System, or National Recreation Areas unless valid existing rights can be demonstrated under the guidelines established in 30 CFR 761.16 (EPA, 2005).

Lists of known recorded cultural resource sites for the Commonwealth are maintained by the Virginia Department of Historic Resources (VDHR). In addition, the National Park Service maintains an online version of the National Register Information System (NRIS) (2012).

Areas of community concern but not otherwise designated for regulatory protection may also become a consideration during the permitting process. An example of this would be the recent controversy over proposed plans to mine on Blair Mountain in West Virginia, site of a bloody conflict between coal operators and miners attempting to unionize in 1921.

4.3.11 Transportation

The EIA should contain a comprehensive description of transportation of the uranium ore from the proposed mine site to potential receiving facilities (mill site) including references to current regulatory standards for transportation of radioactive substances. The description in the proposed action and proponent's environmental report should discuss:

- Container design and safety criteria. Water draining from wet run-of-mine ore could potentially contain radioactive material or other deleterious substances in suspension or dissolved form, and should be prevented from leaking out of the haul truck.
- Loading process, trucks, haul cycles, and safety procedures, including traffic control measures for the haul road, use of road salt (if applicable), dust control and severe weather driving restrictions.
- Radiological and non-radiological occupational health and safety procedures and training for truck drivers.

- Potential for radiological exposure (e.g., from dust) to the public traveling on nearby highways and roads.

4.3.12 Noise

Noise generated by all aspects of the proposed action would be evaluated in an EIA. This may include impacts to the atmospheric environment, disturbance effects on residents in the area, wildlife and habitat use, terrestrial fauna, and other resources.

Discussion of protective/mitigation measures identified to mitigate noise-related impacts resulting from the proposed mining/milling would be presented in the proponent's proposal and environmental report, and documented in the EIA.

4.3.13 Wastes, Solid and Hazardous

Mine and mill waste materials are associated with geologically anomalous concentrations of chemical elements (ore deposits). Thus, they commonly have an elevated risk of leaching chemical constituents that may impact water resources. This potential is increased by disaggregation of rock into smaller pieces as well as by potentially exposing material to previously absent geochemically oxidizing conditions. An assessment of the potential impacts should be addressed in appropriate material handling plans as well as potential water treatment and other mitigation costs.

Discussion of protective/mitigation measures identified to mitigate impacts resulting from the generation of wastes would be presented in the mill or license application and environmental report, and documented in the EIA.

5.0 TIMING OF ENVIRONMENTAL STUDIES, IMPACT ANALYSES AND SUBMITTALS

The EIA process begins with a proposed action and includes document development and public input milestones before completion. Adequate planning and design should be conducted before the baseline studies are scoped to ensure that all aspects of the potentially affected environment are addressed.

5.1 Planning: Description of Proposed Action

In order to understand the scope of the impacts, the activities likely to occur under the proposed action must be understood. Adequate planning and initial design of the proposed facilities, including location, size, type and construction, operation and reclamation activities allows the proper scoping of the baseline studies and ensures the correct areas and media of the environment are included in baseline studies and analysis.

5.2 Scoping of Baseline Studies

The intent of the baseline studies is to ensure that the physical, biological, and socio-economic environments are sufficiently characterized to allow an understanding of the relative impacts of the proposed action. The baseline studies must encompass the full scope of potential impacts and all media must be identified, (e.g., air, groundwater, surface water, soil, terrestrial ecology, aquatic ecology, etc.). The aerial extent of any particular study varies by EIA topic. For example, population distribution should be assessed for 50 miles around the site (NRC Reg Guide 3.8, Reg Guide 3.46), and groundwater and surface water location, nature and use would be assessed within and adjacent to the site (NRC Reg Guide 3.8, Reg Guide 3.46).

The baseline studies must address all regulatory requirements for each type of media sampled. The analytical method and reporting limits must be sufficient to demonstrate compliance with the regulatory standards as well as appropriate accuracy, precision, and quality requirements.

The appropriate level of detail is critical to ensure that the studies sufficiently address the full scope (area of potential impact) and range of media, constituents, and parameters to the appropriate levels (i.e., detection levels for constituents in water, air and soil). The appropriate level of precision and accuracy and the quality control of baseline studies will afford meaningful comparison to regulatory requirements and future conditions.

5.3 Design of Sampling and Analysis Plans, Quality Assurance/Quality Control Plans, and Data Management Plans

Once the full scope of the proposed action is understood and the necessary baseline studies identified, a sampling and analysis plan (SAP), a quality assurance/quality control (QA/QC)

plan, and a data management plan (DMP) should be drafted. The development and use of these documents will ensure that all baseline studies meet the objectives for which the studies were intended.

The SAP for each sampled media should incorporate documentation of all analytes to be tested, the analytical methods used to test those analytes, the laboratory detection limits and quantification limits.

The QA/QC Plan should outline the purpose for which the data are being collected and procedures to validate and measure the accuracy, precision and representativeness of the data. A QA/QC Plan serves to aid in determining if the data can be utilized for the purpose intended. If the data do not meet necessary standards for accuracy, additional samples can be collected.

The DMP outlines procedures to track and manage all data collected. The DMP should include procedures for tracking the quality of the data to allow them to be utilized appropriately. Additionally, the DMP identifies the manner in which data will be tracked, categorized, and stored, ensuring their quality and integrity.

5.4 Baseline Study Implementation

All EIA/EIS processes require baseline analyses; however, some parameters and baseline studies are specific to uranium mining or to the NRC implementation of NEPA for licensed uranium recovery activities. For example, baseline gamma radiation, radon and radioparticulate studies are necessary to understand the natural radiation conditions in the area of a proposed action. In addition, the parameters Radium-226, Radium-228, Thorium-230, Polonium-210 and Lead-210 are radionuclides that NRC requires which are not typically assessed for other proposed actions but which are relevant for assessing some uranium related projects.

The frequency and duration of baseline sampling vary by media. Studies for some media (i.e., radon, soils, and geology) are conducted either once or enough times to statistically calculate background values at the site as they are not likely to vary with season. However, sampling of other media (i.e., groundwater, surface water and wildlife studies) needs to be conducted during different seasons to ensure that seasonal changes are identified. Flowing surface water (e.g., streams) is typically sampled more frequently (e.g., monthly) than non-flowing surface water bodies (i.e., lakes and ponds) to capture the variability that may exist in this media.

6.0 TIMING OF ENVIRONMENTAL IMPACT ANALYSES

Baseline studies are typically performed over a one year period to encompass seasonal variability in the environment. Most of these monitoring programs are continued throughout operational periods and provide the basis for compliance monitoring. Frequently, the proponent of an action compiles the data necessary for the EIA process into an ER. The ER documents are typically structured in a manner consistent with the EIA documents they are intended to support (e.g., EA, EIS) to facilitate agency review and checks for completeness. After receipt of this report the regulatory authority determines if the document is complete. The regulatory authority either accepts the document as essentially complete or prepares RAIs that need to be provided before the application can be considered complete. Once all RAIs are addressed, the regulatory authority publishes a NOI to complete a draft (EIS).

The regulatory agency then begins a public scoping process to solicit input on the application and simultaneously continues the technical review of the application and ER. As part of public scoping, the regulatory agency holds at least one public meeting and typically accepts public comments for at least 30 days after the publication of NOI. The lead agency conducting the EIA will often identify affected communities, key regulatory stakeholders or other agencies with EIA obligations related to the application, and requests their participation in scoping and developing the EIA document (i.e., EA or EIS) as cooperating agencies. Cooperating agencies contribute technical expertise and assist the lead agency in preparation of environmental analyses. If the cooperating agency has some overlapping jurisdiction over a portion or all of a proposed action, they can adopt the final decision document of the lead agency rather than being required to conduct a separate EIA. The regulatory authorities can opt out of cooperating agency status if they do not have jurisdiction by law over the proposed action, but can review and comment on the proposed action during public scoping and draft document reviews.

The preparation of the draft EIS frequently takes longer than nine months to complete, depending on the size and complexity of the proposed action. After publication of the draft EIS, the regulatory authority accepts comments from the public and other governmental and tribal entities. The public comment period lasts at least 30 days. The regulatory authority summarizes the comments, prepares responses to these comments and modifies the document to address the issues identified in the comments.

This modified document is the final EIS. Preparation of the final EIS takes at least 30 days and can take many months, depending on the scope of the changes developed from the public comment and cooperating agency review process. Responses to comments generated during the public comment period are included in a separate appendix to present to the public the full range of comments and how the comments were addressed. A NOI for the final EIS is then published. The public comment period on the final EIS lasts at least 30 days. Unless the comments received on the final EIS identify a significant flaw, which could require a revision to the final EIS and

potentially to the application itself, comments are incorporated into the ROD or, in the case of the NRC, into the license they issue to the applicant. After publication of the ROD or issuance of the license, the public has 30 days to appeal the decision. If appealed, the permit or license typically remains active during the appeal process unless an issue of imminent public safety is identified. The regulatory authority will review the appeal, hold appropriate hearings and then either approve or deny the appeal. If the appeal is upheld, the issuing agency takes appropriate action, which may include suspension of the license or may include revision to the license to rectify any deficiencies. If the appeal is denied, the license remains in force as issued. The timeline for typical EIA, not including baseline studies, depends on the scope and complexity of the EIA. EAs can take less than one year or as long as two years while EIS can be completed in between 1 year and 2.5 years, depending on the complexity and potential significance of the proposed action.

7.0 POINTS FOR CONSIDERATION

Virginia has statutes, administered by DEQ, that require review of potential environmental impacts related to major Commonwealth projects. The Code of Virginia § 10.1-1188 requires that each Commonwealth agency, board, authority, commission or branch of government submit environmental impact reports on major state projects that cost $500,000 or more. "Major state project" means the acquisition of an interest in land for any state facility construction, or the construction of any facility or expansion of an existing facility. This process is similar to the federal NEPA process in that environmental impacts from a proposed project are reviewed to ensure that the impacts to natural resources are adequately understood. Additionally, DEQ requests input from other agencies in the Commonwealth, regional planning district commissions and localities. However, Virginia's process does not require environmental review of uranium mining or milling projects on private land. Should Virginia decide to implement a SEPA or incorporate the commensurate requirements of a SEPA into specific statutes that apply to uranium mining and/or milling several points of consideration are proposed.

The VDH, DEQ, and DMME (Departments) should consider a framework using a tiered or categorization process for environmental reviews that would allow the Commonwealth to have different levels of environmental review for different proposed actions. A tiered process from CATEX to EIS would benefit Virginia in that it would have varying levels of review for proposed actions. This categorization could identify certain actions that would be categorically excluded from the EIA process as well as actions that would automatically trigger an EIS, if they met appropriate criteria. Additionally, should Virginia identify actions for which the potential for significant environmental impact is unknown an EA could be prepared to determine if significant impacts could occur.

- The Departments should consider the creation of a Citizens Advisory Board or a CEQ, which would allow Virginia to have centralized authority for oversight, review, and public comment. A CEQ could provide comprehensive review and oversight of EIAs and ensure that public input is adequately included in the process. A centralized authority for EIAs would minimize confusion for the public by allowing the public to access the public scoping and comment process through one governmental authority.
- The Departments should consider incorporation of public involvement in the scoping process and in the environmental reviews to ensure an open and transparent process. Multiple opportunities for public comment in easily accessible locations would serve to improve the environmental review process. Public scoping meetings could be held in various locations to allow ready access for the public. Additionally, accepting public comment on proposed actions

through an online portal or through e-mail, would ensure that the public can easily comment.

- The Departments should consider means to systematically catalog and document public input, comment review and development of comment responses. These comments and responses should be compiled in a database. Database reports could be generated and included in an appendix to the final EIA. Since some comments may fall along similar lines, the Departments should consider specifically allowing grouping of such comments and associated responses. Grouping of these comments would require only one response which would allow the public to have a response to the comment without unnecessarily increasing the bulk of the final document.
- The Departments should consider establishing a structured administrative appeals process. This would afford the public an additional chance to challenge the approval of a proposed action.
- The Departments should consider requirements to make publically available, in electronic and hard copy format, all draft and final EIAs through a central authority. The availability of documents in a centralized location would ensure that the public can adequately review, comment, and locate documents generated as part of the environmental review process. If a CEQ is created, this authority could be tasked to ensure the creation of a publically accessible database and repository of all documents generated during the environmental review process. This requirement would mitigate the concern that the public does not have ready access to EIAs.
- The Departments should consider adopting specific allowances in the environmental review process for adoption of all or parts of other Commonwealth agency environmental review determinations and/or federal NEPA determinations, as long as the process meets the Commonwealth's minimum requirements. This would allow Virginia to avoid duplication of environmental review processes already addressed by other agencies.
- The Departments should consider establishing a mechanism for cost recovery for the EIA process from applicants. The costs associated not only with the environmental review of a proposed action but also for potential Commonwealth split analyses of selected baseline study samples, public scoping processes and document preparation are not insignificant. Frequently, governmental agencies do not have adequate staffing to collect data, conduct public scoping, respond to comments and prepare draft and final environmental review documents. These tasks can be contracted by the agencies to a third-party with such experience at costs lower than those to maintain comparable internal staffing.

- The Departments should consider drafting guidance for baseline data that the applicant should provide, such as watershed description, characterization of the geology, characterization of the geochemistry, pre-mining and milling radiological assessment, and characterize streams, springs, ponds, impoundments, wetland, tidal flats, bays and drainages within and immediately adjacent to the proposed mine or processing area.
- The Departments should consider requiring characterization of all types and means of surface water use in the area. Such uses may include irrigation and domestic water as well as ecological usages of the water including fresh and, as applicable, saltwater fisheries, shellfish and ecological demands by other species including threatened and endangered species.
- The Departments should consider requiring health related baseline studies such as, information about population smoking rates, occupational or recreational exposures to silica dust, and radon levels in buildings within a geographic area.
- The Departments should consider requiring determination of baseline rates for conditions of concern including respiratory conditions (including asthma, chronic obstructive pulmonary disease or COPD) and kidney disease.
- If baseline rates for the conditions described above have not been determined, it would be useful to attempt to establish these baselines for Pittsylvania County and any other potentially affected county, if for no other reason than to be able to use these baselines to determine whether any conditions that are reported after the start-up of uranium mining or processing operations exceeded baseline rates and/or existed prior to the start of these operations.
- The Departments should consider requiring representative measurements of concentrations of constituents in environmental media such as air, water, vegetation, domestic food products, soil, radiation and meteorology.
- The Departments should consider requiring adequate coverage of the area of interest, such as a watershed, county, or property.
- The Departments should consider requiring adequate continuing measurement of background concentrations of constituents identified in baseline studies.
- The Departments should consider requiring representative measurements of direct gamma radiation.
- The Departments should consider requiring acquisition of adequate data on which to base exposure and dose estimates for members of the public.

8.0 REFERENCES

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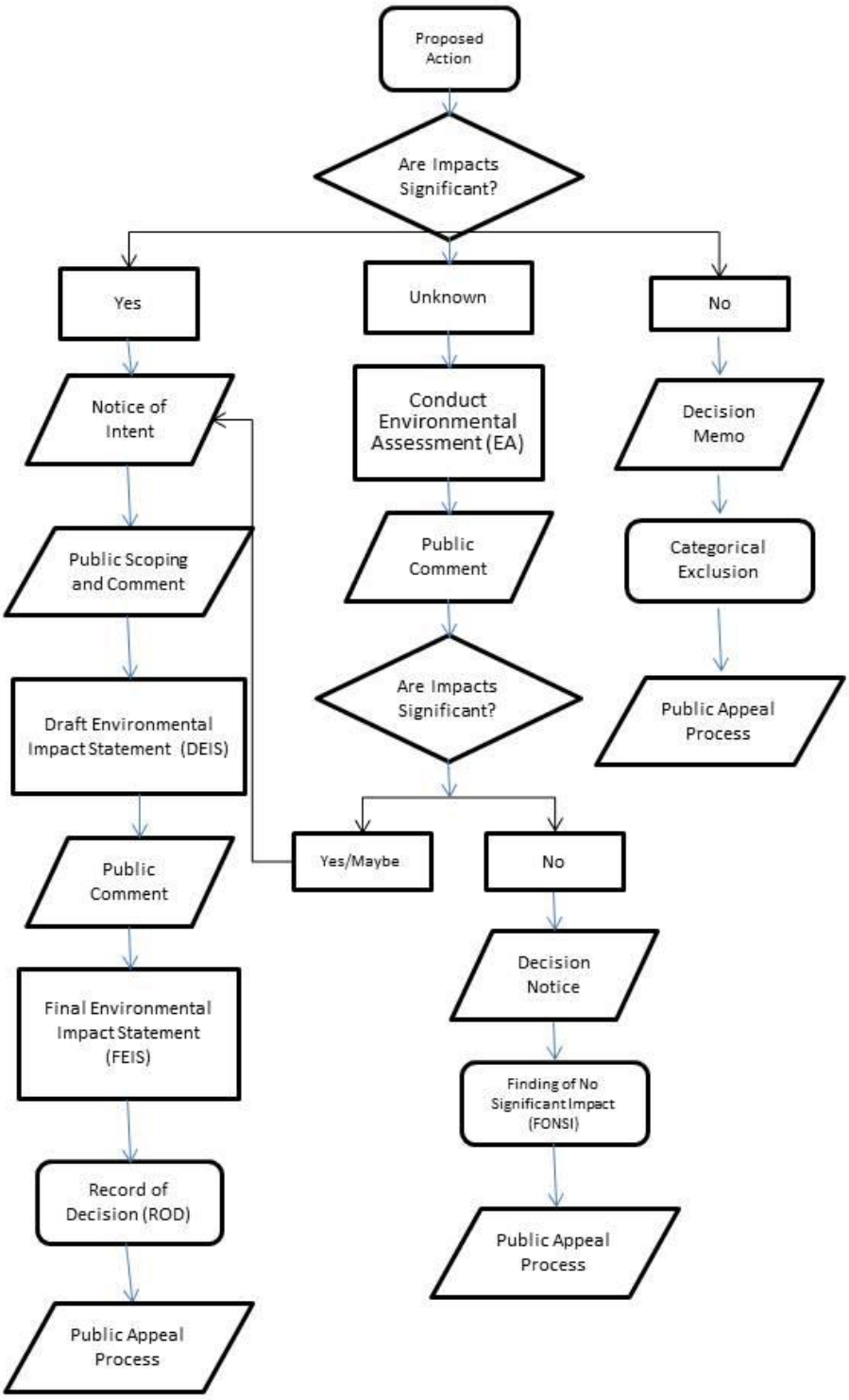
FIGURE

Figure 2-1 NEPA Process Flow Chart



TABLES

Table 3-1 Components of EIA/EIS with Virginia and NRC Guidance References

Topic	Virginia DEQ Guidance	NRC	
		Statute/Regulation	Guidance
I. Purpose and Need	Procedure for EIR of Major State Facilities Ch. 6 Part B Sec. 1	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch. 1; NRC RG-3.8, Ch.1; NUREG-1748 Ch. 5.1.1
II. Applicable Regulatory Requirements, Permits, and Required Conditions	Procedure for EIR of Major State Facilities Ch. 3 and Appendix 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.1.4
III. Public Participation	Procedure for EIR of Major State Facilities, Appendix 1, Notice of Intent	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.1.3
IV. Public Meetings and Information	Procedure for EIR of Major State Facilities, Appendix 1, Notice of Intent	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.1.3
V. Summary of Issues	Procedure for EIR of Major State Facilities Ch. 3, Chapter 6 Parts A & B	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.8, Ch.1
Schedule	Procedure for EIR of Major State Facilities Ch. 5, Part A, The Time Table for Review	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.2.2
VI. Description of the Proposed Action	Procedure for EIR of Major State Facilities, Chapter 6, Part B, Section 1. Project Identification	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.2.2
VI.A Mine	Procedure for EIR. Content in an EIR report. Section A.1. DMME Guidance Memorandum No. 16-07 (COV 2007)	The NRC does not regulate uranium mining[1]	The NRC does not regulate uranium mining[1]
VI. Mill[2]	Procedure for EIR of Major State Facilities Ch. 3, Chapter 6 Parts A & B	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.2.2
Waste Management Facilities	Procedure for EIR of Major State Facilities Ch. 3, Chapter 6 Parts A & B	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.2.2
Ancillary Facilities	Procedure for EIR of Major State Facilities Ch. 3, Chapter 6 Parts A & B	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.2.2
VII. Alternatives	Procedure for EIR of Major State Facilities Ch. 6 Part B Sec. 4	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch. 8; NRC RG-3.8, Ch.10; NUREG-1748 Ch. 5.2
No Action Alternative	Procedure for EIR of Major State Facilities Ch. 6 Part B Sec. 4	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.2.3

Table 3-1 Components of EIA/EIS with Virginia and NRC Guidance References

Topic	Virginia DEQ Guidance	NRC	
		Statute/Regulation	Guidance
Proposed Action Alternatives	Procedure for EIR of Major State Facilities Ch. 6 Part B Sec. 4	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.2.2
Alternative Sites	Procedure for EIR of Major State Facilities Ch. 6 Part B Sec. 4	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.2.2
Alternative Designs on Proposed Site	Procedure for EIR of Major State Facilities Ch. 6 Part B Sec. 4	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.2.2
Alternative Methods of Operation on Proposed Site	Procedure for EIR of Major State Facilities Ch. 6 Part B Sec. 4	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.2.2
Alternatives Considered but Not Analyzed in Detail	No corresponding COV guidance[2].	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.2.4
Site Location Alternatives	Procedure for EIR of Major State Facilities Ch. 6 Part B Sec. 4	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.2.4
Technical Alternatives	No corresponding COV guidance.	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.2.4
VIII. Affected Environment			
VIII.1 Geography and Physiography	Procedure for EIR of Major State Facilities Ch. 6 Part B Sec 1	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 3.4.3
VIII.2 Land Use	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 2	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.2.1; NRC RG-3.8, Ch.2.1; NUREG-1748 Ch. 5.3.1
Site Location	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 2	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.2.1; NRC RG-3.8, Ch.2.1; NUREG-1748 Ch. 5.3.1
Regional Land Use Patterns	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 2	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.2.1; NRC RG-3.8, Ch.2.1; NUREG-1748 Ch. 5.3.1
Local Land Use Patterns	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 2	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.2.1; NRC RG-3.8, Ch.2.1; NUREG-1748 Ch. 5.3.1
Surrounding Land Uses	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 2	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.2.2; NRC RG-3.8, Ch.2.2; NUREG-1748 Ch. 5.3.1
Agriculture	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3; Appendix 3	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.8, Ch.2.2; NUREG-1748 Ch. 5.3.1

Table 3-1 Components of EIA/EIS with Virginia and NRC Guidance References

Topic	Virginia DEQ Guidance	NRC	
		Statute/Regulation	Guidance
Mineral Resources and Mining	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3; Appendix 2 and Virginia Code §2.2-1157	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.8, Ch.2.2; NUREG-1748 Ch. 5.3.1
Recreation	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3; Appendix 3	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.8, Ch.2.2; NUREG-1748 Ch. 5.3.1
Land Use Planning Issues	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 2	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.8, Ch.2.2; NUREG-1748 Ch. 5.3.1
VIII.3 Air Quality	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.6
Meteorology, Climatology, and Air Quality	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.2.5; NRC RG-3.8, Ch. 2.8; NUREG-1748 Ch. 5.3.6
Meteorology	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.2.5; NRC RG-3.8, Ch. 2.8; NUREG-1748 Ch. 5.3.6
Climatology	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.6
Regional Climate Data Sources	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.6
Fugitive Dust	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20 -	This specific topic is not included in the NUREG 1748 guidance but would fall under general air quality, NUREG-1748, Ch. 5.3.6
Burning Activities	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20 -	This specific topic is not included in the NUREG 1748 guidance but would fall under general air quality, NUREG-1748, Ch. 5.3.6
Nonattainment area for criteria pollutants	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20 -	This topic is not included in the NUREG-1748 guidance[1]
State Designated Volatile Organic Compound and/or Nitrogen Oxides Emissions Control Area	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	-10 CFR 51, Sub. A § 51.10, § 51.20	This topic is not included in the NUREG-1748 guidance[1]

Table 3-1 Components of EIA/EIS with Virginia and NRC Guidance References

Topic	Virginia DEQ Guidance	NRC	
		Statute/Regulation	Guidance
10 km from Class 1 Pristine Area	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20 -	This topic is not included in the NUREG-1748 guidance[1]
VIII.4 Geology	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.2.6; NRC RG-3.46, Ch.2.6; NRC RG-3.8, Ch. 2.5; NUREG-1748 Ch. 5.3.3
Geology and Soils	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.2.6; NRC RG-3.8, Ch. 2.5; NUREG-1748 Ch. 5.3.3
VIII.5 Water Resources	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 2	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.2.7; NRC RG-3.8, Ch. 2.7.2; NUREG-1748 Ch. 5.3.4
Surface Hydrology	Code says: "Locally-developed watershed management plans"	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.2.7.2; NRC RG-3.8, Ch. 2.7.2; NUREG-1748 Ch. 5.3.4
Surface Waterbodies	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.4
Surface Water Quality	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.4
Groundwater	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.2.7.1; NRC RG-3.8, Ch. 2.7.1; NUREG-1748 Ch. 5.3.4
Regional Hydrogeology	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.4
Site Groundwater	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.4
Existing Wells and Springs	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.4
Groundwater Quality	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.4
Water Usage	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 2	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.4

Table 3-1 Components of EIA/EIS with Virginia and NRC Guidance References

Topic	Virginia DEQ Guidance	NRC	
		Statute/Regulation	Guidance
VIII.6 Ecology	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.2.8; NRC RG-3.8, Ch. 2.9; NUREG-1748 Ch. 5.3.5
Vegetation	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.5
Baseline Data	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3 and Appendix 10, List of Databases	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.5
Vegetation Cover Types	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.5
Wetlands	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.5
Invasive, Non-Native Species	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.5
Species of Special Status	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.5
Federally Listed Threatened and Endangered Species	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.5
Candidate Species	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.5
Wildlife	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.5
Terrestrial Wildlife Species	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.5
Aquatic Species	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.5
VIII.7 Socioeconomics	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 2	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.7.6; NRC RG-3.8, Ch. 8; NUREG-1748 Ch. 5.3.10

Table 3-1 Components of EIA/EIS with Virginia and NRC Guidance References

Topic	Virginia DEQ Guidance	NRC	
		Statute/Regulation	Guidance
VIII.8 Public and Occupational Health		10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.11
Background Exposure to Ionizing Radiation	12 VAC5-420, 12 VAC5-481[3]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.11
Occupational Injuries	Virginia Administrative Code, DMME, Chapter 40, Safety and Health Regulations for Mineral Mining and VAC 5-481-600	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.11
Summary of Health Effects Studies	Administrative Code 12VAC5-90-90, No specific corresponding COV guidance[2]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.11
Baseline Radiological Status	12 VAC5-420, 12 VAC5-481[3]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.11
Background Air Quality Radionuclides	12 VAC5-420, 12 VAC5-481[3]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.11
Background Radionuclides in Animal Tissue	No specific corresponding COV guidance[2]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.11
Environmental Radiation Impacts	No specific corresponding COV guidance[2]	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.7.0; NRC RG-3.8, Ch. 4&5, NUREG-1748 Ch. 5.4
VIII.9 Scenic/Visual Resources	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.9
VIII.10 Environmental Justice	No specific corresponding COV guidance[2]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.11
VIII.11 Historic and Cultural Resources	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3. and Appendix 6: Guidance for EIR Proponent Agencies Concerning Architectural and Archeological Resources. (COV 2012b)	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch. 2.4; NRC RG-3.8, Ch. 2.4; NUREG-1748 Ch. 5.3.8
VIII.12 Transportation	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 2 and Appendix 9	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.2
Transportation Routes	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 2	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.2

Table 3-1 Components of EIA/EIS with Virginia and NRC Guidance References

Topic	Virginia DEQ Guidance	NRC	
		Statute/Regulation	Guidance
Roadway System in Vicinity of the Site	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 2	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.2
Traffic Patterns	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 2	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.2
Traffic Crashes	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 2[4]	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.8, Ch. 7.2; NRC RG-3.46, Ch. 7.5.2; NUREG-1748 Ch. 5.3.2
VIII.13 Noise	Procedure for EIR of Major State Facilities, Appendix 4	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.3.7
VIII.14 Wastes, Solid and Hazardous	12 VAC5-481-390.B 3	10 CFR 40, Appendix A, 5.D.,and 10 CFR Part 61	NUREG-1748 Ch. 5.4.13
IX. Impacts and Mitigation	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.5
IX.1 Geography and Climate	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.5
IX.2 Land Use and Public Lands	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3 and Appendix 5	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.5
Land Use	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3 and Appendix 5, Checklist for Farm and Forest Lands Protection	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.7.1; NRC RG-3.8, Ch. 4.1; NUREG-1748 Ch. 5.4.1
Mitigation Measures	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3.5	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.1
Environmental Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.1
IX.3 Air Quality	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.6
Environmental Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.6

Table 3-1 Components of EIA/EIS with Virginia and NRC Guidance References

Topic	Virginia DEQ Guidance	NRC	
		Statute/Regulation	Guidance
General Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.6
Direct, Indirect and Cumulative Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 6	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.6
Short Term Affects	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 6	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.6
Long Term Affects	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 6	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.6
Comparison of Standards to Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 6	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.6
Air Permits	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 6	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.6
Atmospheric Transport Models	No corresponding COV guidance[2].	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.6
Dose Assessment of Radiological Impacts	No corresponding COV guidance[2].	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.6
Visibility Impacts	No corresponding COV guidance[2].	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.6
Construction, Operations, and Closure Impacts	No corresponding COV guidance[2].	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.6
Protective/Mitigation Measures	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 5	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.6
IX.4 Geology	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3		
Soils	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch. 2.6; NRC RG-3.8, Ch. 2.5; NUREG-1748 Ch. 5.4.3
Environmental Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.8, Ch. 2.5; NUREG-1748 Ch. 5.4.3

Table 3-1 Components of EIA/EIS with Virginia and NRC Guidance References

Topic	Virginia DEQ Guidance	NRC	
		Statute/Regulation	Guidance
General Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.8, Ch. 2.5; NUREG-1748 Ch. 5.4.3
Construction, Operations, and Closure Impacts	DMMEDMME Administrative Code (COV 2012d).	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.3
Protective/Mitigation Measures	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 5	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.3
IX.5 Water Resources			
Water Quality	Procedure for EIR of Major State Facilities Ch. 6., Part A and Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.2.7; NRC RG-3.8, Ch. 2.7; NUREG-1748 Ch. 5.4.4
Groundwater	Procedure for EIR of Major State Facilities Ch. 6., Part A and Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch. 2.7.1; NRC RG-3.8, Ch. 2.7.1; NUREG-1748 Ch. 5.4.4
Surface Water	Procedure for EIR of Major State Facilities Ch. 6., Part A and Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch. 2.7.2; NRC RG-3.8, Ch. 2.7.2; NUREG-1748 Ch. 5.4.4
Changes to the Hydrologic System	Procedure for EIR of Major State Facilities Ch. 6., Part A and Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.4
Reduced Water Availability Impacts	Procedure for EIR of Major State Facilities Ch. 6., Part A and Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.4
Direct, Indirect and Cumulative Impacts	Procedure for EIR of Major State Facilities Ch. 6., Part A and Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.4
Short Term Affects	Procedure for EIR of Major State Facilities Ch. 6., Part A and Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.4
Long Term Affects	Procedure for EIR of Major State Facilities Ch. 6., Part A and Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.4
Dose Assessment of Radiological Impacts	Procedure for EIR of Major State Facilities Ch. 6., Part A and Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.4
Environmental Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.4

Table 3-1 Components of EIA/EIS with Virginia and NRC Guidance References

Topic	Virginia DEQ Guidance	NRC	
		Statute/Regulation	Guidance
General Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.4
Tidal and Non-Tidal Wetland	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3 and Appendix 8, Virginia Coastal Zone Management Program Enforceable and Advisory Policies	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.4
Streams, Rivers, Lakes	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.4
100-year Flood Plain	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	
Groundwater Characteristics	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.4
Construction, Operations, and Closure Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3[4]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.4
Protective/Mitigation Measures	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 5	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.4
IX.6 Ecological Impacts		10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.6.3
Dewatering Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3[4]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5
Surface Run-Off Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3[4]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5
Dredge and Spoils Placement Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3[4]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5
Loss of Habitat	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3[4]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5

Table 3-1 Components of EIA/EIS with Virginia and NRC Guidance References

Topic	Virginia DEQ Guidance	NRC	
		Statute/Regulation	Guidance
Loss of Species	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3[4]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5
Secondary Impacts (construction noise)	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3[4]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5
Environmental Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5
General Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5
Significant Habitat	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5
Anadromous Fish Use Areas	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	None specifically	This topic is not included in the NUREG-1748 guidance[1]
Trout Streams	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	None specifically	This topic is not included in the NUREG-1748 guidance[1]
Colonial Waterbird Nesting Colonies	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	None specifically	This topic is not included in the NUREG-1748 guidance[1]
Chesapeake Bay Prevention Areas	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	None specifically	This topic is not included in the NUREG-1748 guidance[1]
Virginia Coastal Resources Management Area (Tidewater)	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	None specifically	This topic is not included in the NUREG-1748 guidance[1]
Vegetation	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.8, Ch. 2.9; NUREG-1748 Ch. 5.4.5
Baseline Data	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.3 and 5.6.5
On-Site Survey Methodology	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5

Table 3-1 Components of EIA/EIS with Virginia and NRC Guidance References

Topic	Virginia DEQ Guidance	NRC	
		Statute/Regulation	Guidance
Vegetation Cover Types	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5
Wetlands	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5
Submerged Aquatic Vegetation	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5[4]
Invasive, Non-Native Species	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5[4]
Unique or Important Terrestrial Veg.	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5
Species of Special Status	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3 http://bewildvirginia.org;	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5
Federally Listed Threatened and Endangered Species	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5
Candidate Species	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5
State of Virginia Species of Special Concern	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5[4]
Wildlife	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5
Terrestrial Wildlife Species	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5
Aquatic Species	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RGNUREG-1748 Ch. 5.4.5
Construction, Operations, and Closure Impacts		10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5
Protective/Mitigation Measures	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 5	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.5

Table 3-1 Components of EIA/EIS with Virginia and NRC Guidance References

Topic	Virginia DEQ Guidance	NRC	
		Statute/Regulation	Guidance
IX.7 Socioeconomic Impacts	No corresponding COV guidance[2]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.10
IX.8 Public and Occupational Health		10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.12
Nonradiological Impacts	DMMEDMME Administrative Code (COV 2012d).	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.12.1
Radiological Impacts	Radiation Protection Regulations (12 VAC5-481)[3]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.12.2
Pathway Assessment	Radiation Protection Regulations (12 VAC5-481)[3]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.12.2.1
Public and Occupational Health Impacts	VAC 5-481-600[3]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.12.2.2
IX.9 Scenic or Visual Resources	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.9
Environmental Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.9
General Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.9
Construction, Operations, and Closure Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3[2]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.9
Protective/Mitigation Measures	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 5	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.9
Hazardous Materials	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	
IX.10 Environmental Justice	No specific corresponding COV guidance[2]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.11
Adverse Health Impacts to Minority and Low-income Populations	No specific corresponding COV guidance[2]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.11

Table 3-1 Components of EIA/EIS with Virginia and NRC Guidance References

Topic	Virginia DEQ Guidance	NRC	
		Statute/Regulation	Guidance
Mitigation Measures	DMMEDMME Administrative Code (COV 2012d).	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.11
Pathways of Impact	No specific corresponding COV guidance[2]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.11
Ecological Resources	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch. 2.8; NRC RG-3.8, Ch. 2.9; NUREG-1748 Ch. 5.4.5
IX.11 Historic and Cultural Resources	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3, Appendix 6	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.8
Environmental Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.8
General Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.8
Construction, Operations, and Closure Impacts		10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.8
Protective/Mitigation Measures	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 5	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.8
IX.12 Transportation			
Transportation Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.2
Transportation Mode, Routs and Risk Estimates	No specific corresponding COV guidance[2]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.2
Mitigation Measures	No specific corresponding COV guidance[2]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.2
Environmental Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 3	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.2
General Impacts	No specific corresponding COV guidance[2]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.2
Construction, Operations, and Closure Impacts	No specific corresponding COV guidance[2]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.2

Table 3-1 Components of EIA/EIS with Virginia and NRC Guidance References

Topic	Virginia DEQ Guidance	NRC	
		Statute/Regulation	Guidance
Protective/Mitigation Measures	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 5	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.2
IX.13 Noise Impacts		10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.7
Environmental Impacts	Procedure for EIR of Major State Facilities Appendix 6	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.7
General Impacts	Procedure for EIR of Major State Facilities Appendix 6	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.7
Construction, Operations, and Closure Impacts	Procedure for EIR of Major State Facilities Appendix 6	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.7
Sources of Noise	Procedure for EIR of Major State Facilities Appendix 6	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.7
Cumulative Effects	Procedure for EIR of Major State Facilities Appendix 6	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.7
Protective/Mitigation Measures	Procedure for EIR of Major State Facilities Appendix 6	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.7
IX.14 Wastes, Solid and Hazardous, Impacts	DMMEDMME Administrative Code (COV 2012d).	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.13
Sources, Types, Quantities of Solid, Hazardous and Radioactive Wastes	DMMEDMME Administrative Code (COV 2012d).	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.13
Proposed Waste Management Systems	DMMEDMME Administrative Code (COV 2012d).	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.13
Disposal Plans	DMME Administrative Code (COV 2012d).	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.13
Waste Minimization Plan	DMME Administrative Code (COV 2012d).	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.4.13
Mitigation	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 5	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.5

Table 3-1 Components of EIA/EIS with Virginia and NRC Guidance References

Topic	Virginia DEQ Guidance	NRC	
		Statute/Regulation	Guidance
Commonwealth Pollution Prevention Plan VA§10.1-1425.11.	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 5	This topic is not included in the NUREG-1748 guidance[1]	This topic is not included in the NUREG-1748 guidance[1]
Pollution Prevention	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 5	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.5
Construction	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 5	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.5
Equipment	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 5	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.5
Recycling Efforts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 5	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.5
Stormwater Management	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 5	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.5
Pest and Weed Control	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 5	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.5
Water Conservation	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 5	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.5
Energy Conservation	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 5	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.5
X. Monitoring	Procedure for EIR of Major State Facilities, Appendix 10	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.5.7; NRC RG-3.8, Ch. 6.2; NUREG-1748 Ch. 5.6
Radiological Monitoring	No specific corresponding COV guidance[2]	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.5.7; NRC RG-3.8, Ch.6.2.1; NUREG-1748 Ch. 5.6.1
Physiochemical Monitoring	No specific corresponding COV guidance[2]	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.5.7.1; NRC RG-3.8, Ch.6.2.2; NUREG-1748 Ch. 5.6.2
Baseline Monitoring	No specific corresponding COV guidance[2]	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.8, Ch.6.2.2; NUREG-1748 Ch. 5.6.2

Table 3-1 Components of EIA/EIS with Virginia and NRC Guidance References

Topic	Virginia DEQ Guidance	NRC	
		Statute/Regulation	Guidance
Operational Monitoring	No specific corresponding COV guidance[2]	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.5.7.2; NRC RG-3.8, Ch.6.2.2; NUREG-1748 Ch. 5.6.2
Ecological Monitoring	No specific corresponding COV guidance[2]	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.46, Ch.5.7.5; NRC RG-3.8, Ch.6.2.4; NUREG-1748 Ch. 5.6.3
Baseline Monitoring	No specific corresponding COV guidance[2]	10 CFR 51, Sub. A § 51.10, § 51.20	NRC RG-3.8, Ch.6.2.4; NUREG-1748 Ch. 5.6.3
XI. Irreversible Environmental Changes	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 6		
Protective/Mitigation Measures	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 5		
Monitoring	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 6		
Summary of Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 6	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.8
Irreversible Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 6	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.8
Unavoidable Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 6[4]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.8
Mitigation Procedures	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 5	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.8
Remaining Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 6[4]	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.8

Table 3-1 Components of EIA/EIS with Virginia and NRC Guidance References

Topic	Virginia DEQ Guidance	NRC	
		Statute/Regulation	Guidance
XII. Cumulative Impacts	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 6	10 CFR 51, Sub. A § 51.10, § 51.20	NUREG-1748 Ch. 5.8
Past Actions	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 6[4]	10 CFR 51, Sub. A § 51.10, § 51.20[4]	NUREG-1748 Ch. 5.8[4]
Present and Reasonably Foreseeable Actions	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 6[4]	10 CFR 51, Sub. A § 51.10, § 51.20[4]	NUREG-1748 Ch. 5.8[4]
Uranium Mining Projects	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 6[4]	10 CFR 51, Sub. A § 51.10, § 51.20[4]	NUREG-1748 Ch. 5.8[4]
Uranium Exploration Projects	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 6[4]	10 CFR 51, Sub. A § 51.10, § 51.20[4]	NUREG-1748 Ch. 5.8[4]
Oil and Gas Development Projects	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 6[4]	10 CFR 51, Sub. A § 51.10, § 51.20[4]	NUREG-1748 Ch. 5.8[4]
Other Projects	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 6[4]	10 CFR 51, Sub. A § 51.10, § 51.20[4]	NUREG-1748 Ch. 5.8[4]
Potential Cumulative Impacts Associated with Increased Uranium Mining	Procedure for EIR of Major State Facilities Ch. 6. Part B Sec. 6[4]	10 CFR 51, Sub. A § 51.10, § 51.20[4]	NUREG-1748 Ch. 5.8[4]

Table 4-1 Summary of EIA Elements and Related Potential Effects from Uranium Mining and Milling in the Commonwealth of Virginia

Element/Resource	Issues and Concerns Related to Human Health and the Environment[1]	Potential Risks and Hazards	Applicable Federal Regulations and Entities	COV Oversight, Permitting or Licensing Entity	Potential or Suggested BMPs for Mitigation
Geology and Soils (including Palentology, Geologic Hazards and other Mineral Resources)	• Change in topography • Potential mine and mill tailings release • Exposure to sure to nearby populations. • Cumulative effects from other Virginia mining operations • Exposure of uranium deposits could result in long-term exposure to heavy metals and radiological elements. • Destruction of archeological, paleontologic and historic sites	Radionuclides, Silica, Heavy Metals Diesel Emissions/Particulate Matter	NRC MSHA OSHA	DMME DEQ VDH	• Stabilization of soils, contouring • Appropriate disposal of waste • See BMPs for Water Resources • Reclamation bonding • Paleo surveys before, during and after proposed action • Metallurgic testing of ore to determine heavy metals content (Moran 2012)
Water Resources (including Surface Water, Groundwater, Water Useage, Watershed Health, Drinking Water)	• In-situ leaching process for extracting uranium may not be safe. • Uranium, heavy metals and others may be transported in solution to groundwater. • The Uranium mining and milling activities potential of a catastrophic failure (from floods, extreme rainfall) of a uranium tailings containment structure and subsequent discharge of uranium tailings into nearby water features (Baker 2012, BREDL 2011). • Radiological contaminants Ra-	Radionuclides, Heavy Metals	Clean Water Act NRC	VDH DEQ	• Storm Management Plan, -- Baseline Studies • Predictive Modeling • Independent State Surface and Groundwater Sampling • Monitoring the water quality of private wells • Detailed hydrologic characterization (Moran) • Conduct epidemiological and other scientific data and studies • Conduct Baseline/Background Studies

Table 4-1 Summary of EIA Elements and Related Potential Effects from Uranium Mining and Milling in the Commonwealth of Virginia

Element/Resource	Issues and Concerns Related to Human Health and the Environment[1]	Potential Risks and Hazards	Applicable Federal Regulations and Entities	COV Oversight, Permitting or Licensing Entity	Potential or Suggested BMPs for Mitigation
	226 an Th-230 in the water column and sediments in the project area • Maximum contaminant levels (MCL) for combined radium (Ra-226 and Ra-228) in drinking water may be exceeded for an extended period of time. • Mine dewatering could reduce groundwater levels and affect nearby wells, springs and surface water bodies (RTI 2012) • Properties within 2 miles of the mining/milling operation could be affected for the long ter (Chmura 2012). • Uranium mining and milling may require the use of water that is currently used for residential and agricultural purposes.				
Public Lands (Wilderness, Parks, etc.)	• Noise and dust created by traffic and construction could be detectable on the adjacent private and public properties above current standards.	Particulate matter (same as air and water)	Clean Water and Air Acts NRC	DEQ	• See Air and Water • Consultation with public entities that manage the land

Table 4-1 Summary of EIA Elements and Related Potential Effects from Uranium Mining and Milling in the Commonwealth of Virginia

Element/Resource	Issues and Concerns Related to Human Health and the Environment[1]	Potential Risks and Hazards	Applicable Federal Regulations and Entities	COV Oversight, Permitting or Licensing Entity	Potential or Suggested BMPs for Mitigation
Wild and Scenic Rivers	• Recreational and scenic rivers could be affected by milling and mining activity.	Same as water resources	Clean Water Act	DEQ	• See Air and Water • Consultation with public entities that manage the rivers, especially if they are recreational rivers.
Scenic or Visual Resources	• Is the project area is visible from from residential or public lands? • There could be a long-term color and topography changes. -These may cause - effects to tourism and residental activities.	n/a	Federal Land Management Policy Act Wilderness Act	DEQ	• Locate new roads so they are visually screened (by topography or forest vegetation) from travel ways, when practicable.
Transportation	• Local, state and federal roads and highways may not have the capacity for additional traffic volume. • Pollution will increase from additional traffic.	Emissions, Carbon Dioxide, Dust, Fumes	Clean Air Act	**VDH** DEQ	• Comprehensive and ongoing monitoring of emissions, coupled with use of effective technologies to reduce pollution (RTI 2012)
Air Quality	• Soil and rock would be removed during mining and could result in the generation of radioactive particulate matter to the air. • Radon gas may be released from the proposed mining.	Particulate Matter, Fugitive Dust Radon Gas NOx, Sox, VOCs	Clean Air Act National Ambient Air Quality Standards (NAAQS) 40 CFR 61, subpart B	DEQ	• State Air Quality Permits requiring dust abatement measures, radon monitoring • Assuring compliance with Federal standards • Refer to Human Health and Worker Resource

Table 4-1 Summary of EIA Elements and Related Potential Effects from Uranium Mining and Milling in the Commonwealth of Virginia

Element/Resource	Issues and Concerns Related to Human Health and the Environment[1]	Potential Risks and Hazards	Applicable Federal Regulations and Entities	COV Oversight, Permitting or Licensing Entity	Potential or Suggested BMPs for Mitigation
Noise	• The overall effects from noise could be above allowable levels.	Exceedence of noise standards in Decibels (70 dB for NIOSH) OSHA MSHA	Federal Highway Administration (FHWA) noise regulations (23 CFR 772) requiring permit applicants to develop a project cost-benefit analysis that defines the break-even price for mining and/or milling.	DEQ VDOT	• Construction of Berms, Tree rows, and other sound-proofing techniques.
Vegetation	• Removal of surface layer would result in loss of vegetation. • The operations could spread noxious and invasive weed species. • Uranium mill tailing can spread radionuclides to forage grasses and other vegetation	Same as Air and Water	NAAQS Secondary standards	DEQ VDH	• Weed Management Plan, • Reclamation • Insurance bonding would ensure remediation efforts were funded
Wetlands	• Proposed action may affect wetlands in the Commonwealth. • If public wetlands are disturbed, the Corps could seek in-kind mitigation in order to comply with Section 404b.	Same as Air and Water	Executive Order 11990 Section 404 of the Clean Water Act	DEQ	• Corps of Engineers Involvement (if needed for 404b process)

Table 4-1 Summary of EIA Elements and Related Potential Effects from Uranium Mining and Milling in the Commonwealth of Virginia

Element/Resource	Issues and Concerns Related to Human Health and the Environment[1]	Potential Risks and Hazards	Applicable Federal Regulations and Entities	COV Oversight, Permitting or Licensing Entity	Potential or Suggested BMPs for Mitigation
Wildlife, Fish, and Plants	• There may be direct, indirect or cumulative effects to sensitive species, species of viability concern, or federally listed species.	Same as Air and Water	U.S. Fish and Wildlife Service Standards Clean Water Act Clean Air Act Wildlife Regulations	VDGIF DEQ	• Consult with Virginia Department of Game and Inland Fisheries. • Conduct biological surveys before, during and after the proposed action.
Agriculture	• Agriculatural products may be contamined by mining and milling through human injestion pathways.	Same as Air and Water	Clean Water Act Clean Air Act NRC	VDACS VDH	• See water resources, soil, and socioeconomics
Cultural Resources	• Cultural Resources could be effected if known archeological sites are present or new sites were uncovered in the surface of the uranium deposit area.	n/a	Native American Graves Protection and Repatriation Act (NAGPRA) Antiquities Act of 1906 16 USC 431-433	DEQ SHPO	• Cease all activities after locating a discovery area. • Surveys before, during and after • Further actions may also require compliance under provisions of the National Historic Preservation Act of 1966 (NHPA) and the Archaeological Resources Protection Act. • Consult State Historic Preservation Office (SHPO)
Recreation	• Recreation in the area could be effected.	n/a	Public Land Use Requirements	DEQ	• Consult with agencies responsible for public lands

Table 4-1 Summary of EIA Elements and Related Potential Effects from Uranium Mining and Milling in the Commonwealth of Virginia

Element/Resource	Issues and Concerns Related to Human Health and the Environment[1]	Potential Risks and Hazards	Applicable Federal Regulations and Entities	COV Oversight, Permitting or Licensing Entity	Potential or Suggested BMPs for Mitigation
Socioeconomics (may include Travel Management)	• Substantial benefits to the state could result from an increase in jobs. • There could be an increase in tax revenue and industry. • Local infrastructure such as emergency response systems would have to be upgraded (RTI report). • In some sectors, the proposed action could bring a negative "stigma" (egs: tourism and agriculture). • Private property values near mining could decrease.	Radionuclides, heavy metals	NRC 10 CFR Part 20 48 CFR Chapter 15 EPA Federal Acquisition Regulations System	DEQ VDOT	• If this is applied to Federal Lands, the Clean Air and Clean Water Acts would be applied. • Appropriate design, pollution control. • Pre-assess property values in proposed mining areas. • Involvement and communication among all stakeholders in the form of committees, public meetings and notices. • Requiring permit applicants to develop a project cost-benefit analysis that defines the break-even price for mining and/or milling.
Environmental Justice	• The health and environment of communities may be affected. These effects may be disproportionately distributed across various socioeconomic, racial and ethnic groups resulting in inequities. • This subject must be analyzed in most NEPA documents, and usually carries over to State and County assessments as well.		Policy from EPA Office of Environmental Justice	DEQ VDH Office of Minority Health Services: Where would this be added?	• Public Meetings • Literature available to the public • Epidemiology studies

Table 4-1 Summary of EIA Elements and Related Potential Effects from Uranium Mining and Milling in the Commonwealth of Virginia

Element/Resource	Issues and Concerns Related to Human Health and the Environment[1]	Potential Risks and Hazards	Applicable Federal Regulations and Entities	COV Oversight, Permitting or Licensing Entity	Potential or Suggested BMPs for Mitigation
Wastes, Hazardous and Solids	• Potential of exposure to mill and mine tailings. • Potential of exposure to heavy metals. • Mining operations could result in spills and contamination of the surrounding environment.	Full suite of chemicals and radionuclides associated with every aspect of mining and milling of uranium (including exploratory drilling)	RCRA/ CERCLA	DEQ VDH DMME	• Locating impoundments away from water features. • Appropriate engineering of impoundments and ponds. • Emergency and accident response plans • Frequent Monitoring • Spill Prevention, Control and Countermeasures Plan (SPCC) • See Air and Water Quality Resources
Human Health and Worker Health and Safety	• The mine/mill worker may be exposed to toxins. • Exposure to Ra-226 and radon gas from uranium milling and mining may cause health effects such as cancer, heart disease and stroke. • Human health and environmental risks are magnified (Halifax County 2008) because Virginia has a more people per square mile than Western States. • Tailings exposed to the surface may cause long term risks to future generations (Halifax County 2008).	Ra-226, radon gas, heavy metals	NRC 10 CFR Part 20 MSHA OSHA NIOSH	DEQ VDH DMME	• Dosimetry, Radiological Monitoring, • Predictive Modeling • BMPs from MSHA, OSHA and DOD radiation worker safety practices. • Involvement and communication among all stakeholders • Use and dissemination of existing and new scientific studies concerning long-term exposure to heavy metals and mildly radioactive substances. • Adopt applicable BMPs from the International

Table 4-1 Summary of EIA Elements and Related Potential Effects from Uranium Mining and Milling in the Commonwealth of Virginia

Element/Resource	Issues and Concerns Related to Human Health and the Environment[1]	Potential Risks and Hazards	Applicable Federal Regulations and Entities	COV Oversight, Permitting or Licensing Entity	Potential or Suggested BMPs for Mitigation
					Atomic Energy Agency 2010 Report. • Requirement to have Fire/Emergency Response/Health and Safety Plans