WAC 246-247-120 Appendix B—BARCT compliance demonstration. Purpose. A BARCT demonstration is used to choose control technologies for the mitigation of emissions of radioactive material from new emission units or significant modifications to emission units. The bases for the BARCT demonstration requirements are the BARCT standard given in WAC 246-247-040, and the definition of BARCT given in WAC 246-247-030. This procedure incorporates certain implementing criteria that enable the department to evaluate a facility's compliance with the BARCT standard. It is the applicant's responsibility to demonstrate the effectiveness of their BARCT determination to the department. The facility should contact the department at the conceptual design phase for guidance on the BARCT demonstration requirements. The department may adjust this demonstration procedure on a case-by-case basis, as needed, to ensure compliance with the substantive standard.

Scope. The BARCT demonstration includes the abatement technology and indication devices that demonstrate the effectiveness of the abatement technology from entry of radionuclides into the ventilated vapor space to release to the environment. The applicant shall evaluate all available control technologies that can reduce the level of radionuclide emissions.

Technology Standards. The BARCT demonstration and the emission unit design and construction must meet, as applicable, the technology standards shown below if the unit's potential-to-emit exceeds 0.1 mrem/yr TEDE to the MEI. If the potential-to-emit is below this value, the standards must be met only to the extent justified by a cost/benefit evaluation.

ASME/ANSI AG-1, Code on Nuclear Air and Gas Treatment (where there are conflicts in standards with the other listed references, this standard shall take precedence)

ASME/ANSI N509, Nuclear Power Plant Air-Cleaning Units and Components

ASME/ANSI N510, Testing of Nuclear Air Treatment Systems

ANSI/ASME NQA-1, Quality Assurance Program Requirements for Nuclear Facilities

40 C.F.R. 60, Appendix A, Methods 1, 1A, 2, 2A, 2C, 2D, 4, 5, and 17

ANSI/HPS N13.1-1999, Sampling and Monitoring Releases of Airborne Radioactive Substances from the Stacks and Ducts of Nuclear Facilities

The following standards and references are recommended as guidance only:

ANSI/ASME NQA-2, Quality Assurance Requirements for Nuclear Facilities

ANSI N42.18, Specification and Performance of On-Site Instrumentation for Continuously Monitoring Radioactivity in Effluents

ERDA 76-21, Nuclear Air Cleaning Handbook

ACGIH 1988, Industrial Ventilation, A Manual of Recommended Practice, 20th ed., American Conference of Governmental Industrial Hygienists

BARCT Demonstration Procedure.

Step 1. **Define facility process variables.** Describe the physical and chemical process. Include the potential radionuclide release rates (by isotope, in units of curies/year), process variables (such as flow rate, temperature, humidity, chemical composition), and other technical considerations. Base the radionuclide release rate on the potential-to-emit.

Radionuclides selected for consideration in the BARCT demonstration shall include those which contribute more than ten percent of the potential TEDE to the MEI or more than 0.1 mrem/yr, and any others which the department determines are necessary.

Step 2. **Gather information on all available control technologies.** Search for all available technologies that can reduce the emissions levels for the radionuclides selected in Step 1. Sources of information shall include previous BARCT demonstrations, regulatory authorities, industry or regulatory agency databases, literature searches, information from technology vendors, research and development reports, and any other means necessary to identify all available technologies. "Available technology" includes any technology that is commercially available. Recently completed searches may be used with department approval.

Step 3. **Determine technical feasibility.** Determine technical feasibility by evaluating vendor specifications for available control technologies identified in Step 2 with respect to the process variables identified in Step 1. Evaluate combinations of abatement technology and control devices by component, and the system as a whole.

If a control technology has poor safety, reliability, or control effectiveness as achieved in practice under the proposed process conditions, or the technology is not applicable to the emission unit under consideration, the technology may be eliminated with supporting documentation of the technical infeasibility.

Step 4. **List all feasible control technologies in order of effectiveness.** Evaluate feasible control technologies for efficiency (effectiveness) in reducing the TEDE to the MEI. List them in order, with the most effective first. If the most effective feasible technology is proposed as BARCT, the demonstration is complete at this step.

Step 5. **Evaluate the environmental, energy, and economic impacts.** Evaluate each control technology in succession, beginning with the most effective. Present an objective evaluation considering both beneficial and adverse impacts. Quantify the data where possible. Impact cost and effectiveness evaluations are incremental and include only that portion of the facility which comes under the authority of this chapter. Evaluate at least the following impacts:

Environmental impact - Determine the incremental environmental impact, both beneficial and adverse. Evaluate the beneficial impact of reduction in the TEDE to the surrounding population or, at a minimum, to the MEI due to the abatement of radioactive air emissions. Consider the adverse impacts from waste generation (radioactive and nonradioactive, air and nonair), disposal and stabilization, construction of control equipment, and the health and safety to both radiation workers and the general public.

Energy impact - Determine the incremental energy impact. Include the impact of any resulting need for new services such as energy distribution systems.

Economic impact - Determine the incremental economic impact. Determine capital and expense costs including design, development, procurement, construction, operation, maintenance, taxes, waste disposal, and any other applicable financial components. Base all costs on the expected lifetime of the emission unit and reduce to an annualized cost for evaluation and comparison.

The adverse economic impact compared to the beneficial impact, including reduction in TEDE to the surrounding population or the MEI, is a measure of the cost versus benefit for the control technology evaluated.

The most effective technology may be eliminated from consideration if the applicant can demonstrate to the department's satisfaction that the technology has unacceptable impacts. State clearly the basis for this conclusion and proceed to the next most effective control technology. If the next most effective technology is proposed as BARCT, the demonstration is complete; otherwise, evaluate the control technology for impacts in accordance with this step.

If the control technology cannot be eliminated on the basis of its impacts, it is proposed as BARCT.

Reporting. Prepare a BARCT compliance demonstration report for department review. Provide sufficient information such that the department can validate essential results. If no control technology is feasible, or emissions are unacceptable, the department reserves the right to prohibit the construction and operation of the emission unit(s).

[Statutory Authority: RCW 70.98.050 and 70.98.080. WSR 18-01-083, § 246-247-120, filed 12/15/17, effective 1/15/18. Statutory Authority: RCW 70.98.050. WSR 04-18-094, § 246-247-120, filed 9/1/04, effective 10/2/04. Statutory Authority: Chapters 70.98 and 70.94 RCW and chapter 173-480 WAC. WSR 94-07-010, § 246-247-120, filed 3/4/94, effective 4/4/94.]