(b) The number of CCDFs generated must be large enough such that the maximum CCDF generated exceeds the 99th percentile of the population of CCDFs with at least a 0.95 probability.

(c) Any application for certification of compliance shall display the full range of CCDFs generated.

(d) Any application for certification of compliance shall provide information which demonstrates that there is at least a 95% level of statistical confidence that the mean of the population of CCDFs meets the requirements of section 13(a) of 40 CFR part 191.

Assurance Requirements

§194.41 Active institutional controls.

(a) Any application for certification of compliance shall include detailed descriptions of proposed active institutional controls, the controls' location, and the period of time the controls are proposed to remain active. Assumptions pertaining to active institutional controls and their effectiveness in terms of preventing or reducing radionuclide releases shall be supported by such descriptions.

(b) Assessments to determine compliance with the disposal regulations shall not consider any contributions from active institutional controls for more than 100 years after disposal.

§194.42 Monitoring.

(a)(1) Disposal systems shall be monitored after disposal to detect substantial and detrimental deviations from expected performance at the earliest practicable time and shall be consistent with monitoring required under applicable federal hazardous waste regulations at 40 CFR parts 264, 265, 268, and 270. These monitoring programs shall be done with techniques that do not jeopardize the containment of waste in the disposal system.

(2) Any application for certification of compliance shall include a detailed plan for monitoring the performance of the disposal system. At a minimum, such plan shall:

(i) Identify parameters that will be monitored and how baseline states will be determined;

(ii) Indicate how each parameter will be used to evaluate the performance of the disposal system; and

(iii) Discuss the length of time over which each parameter will be monitored to detect deviations from expected performance.

(b)(1) To the extent practicable, preclosure monitoring of the following disposal system parameters shall be conducted: (i) Brine quantity, flux, composition, and spatial distribution;

(ii) Gas quantity and composition; (iii) Temperature distribution; and

(iv) Any other disposal system

parameter(s) important to the containment of waste in the disposal system as identified by the study conducted under paragraph (b)(2) of this section. A disposal system parameter shall be considered important if it affects the system's ability to contain waste or the ability to verify predictions about the future performance of the disposal system. Such monitoring shall begin as soon as practicable after the Administrator's certification of compliance; however, in no case shall waste be emplaced in the disposal system prior to the implementation of such monitoring. Monitoring shall end when the last container of waste is emplaced in the disposal system but before shafts of the disposal system are backfilled and sealed.

(2) The Department shall conduct a study of the effects of disposal system parameters on the containment of waste in the disposal system and shall include the results of such study in any application for certification of compliance. The disposal system parameters studied shall include, but need not be limited to:

(i) Backfilled mechanical state including porosity, permeability, and degree of compaction and reconsolidation;

(ii) Extent of deformation of the surrounding roof, walls, and floor of the waste disposal room;

(iii) Initiation or displacement of major brittle deformation features in the roof or surrounding rock; and

(iv) Subsidence and other effects of human activity in the vicinity of the disposal system.

(3) For all disposal system parameters studied pursuant to paragraph (b)(2) of this section, any application for certification of compliance shall document and substantiate the decision not to monitor a particular disposal system parameter because that parameter is considered to be unimportant to the containment of waste in the disposal system and to the verification of predictions about the future performance of the disposal system.

§194.43 Passive institutional controls.

(a) Any application for certification of compliance shall include detailed descriptions of the measures that will be employed to preserve knowledge about the location, design, and contents of the disposal system. At a minimum, such measures shall include: (1) Identification of the controlled area by markers that have been designed, fabricated, and emplaced to be as permanent as practicable;

(2) Placement of records in the archives and land record systems of local, State, and Federal governments, and international archives, that would likely be consulted by individuals in search of unexploited resources. Such records shall identify:

(i) The location of the controlled area and the disposal system;

(ii) The design of the disposal system;(iii) The nature and hazard of the waste;

(iv) Geologic, geochemical, hydrologic, and other site data pertinent to the containment of waste in the disposal system; and

(v) The results of tests, experiments, and other analyses relating to backfill of excavated areas, shaft sealing, waste interaction with the disposal system, and other tests, experiments, or analyses pertinent to the containment of waste in the disposal system.

(b) Any application for certification of compliance shall include detailed descriptions of the proposed passive institutional controls and the period of time those controls are expected to endure and be understood.

(c) Any application for certification of compliance may include a proposed credit (which may vary over the regulatory time frame) for reducing the rate of human-initiated processes and events calculated using the procedures enumerated in §194.33. The Administrator shall allow such credit, or a smaller credit, to be taken if the Department demonstrates that such credit is justified because the passive institutional controls can be expected to endure, be understood, and act as a deterrent to potential intruders throughout the regulatory time frame. In no case, however, shall passive institutional controls be assumed to eliminate the likelihood of humaninitiated processes and events entirely.

§194.44 Engineered barriers.

(a) Disposal systems shall incorporate engineered barriers designed to prevent or substantially delay the movement of water or radionuclides toward the accessible environment.

(b) In selecting engineered barriers for the disposal system, the Department shall evaluate the benefit and detriment of engineered barrier alternatives including but not limited to such engineered barriers as cementation, shredding, supercompaction, incineration, vitrification, improved waste canisters, grout and bentonite backfill, melting of metals, alternative