

10A NCAC 15 .1206 SPECIFIC TECHNICAL INFORMATION

(a) The specific technical information shall include the following information needed for demonstration that the performance objectives and the applicable technical requirements of this Section will be met:

- (1) a description of the principal design criteria and their relationship to the performance objectives, along with identification of operating facilities of the same or similar design;
- (2) a description of the design basis natural events or phenomena and their relationship to the principal design criteria;
- (3) a description of codes and standards which the applicant has applied to the design and which will apply to construction of the land disposal facility;
- (4) a description of the design features of the land disposal facility, the disposal units and engineered barriers, to include those design features related to:
 - (A) infiltration of water;
 - (B) leachate collection and removal;
 - (C) integrity of covers for disposal units and structural stability of backfill, engineered barriers, and covers;
 - (D) contact of wastes with standing water and groundwater;
 - (E) disposal site drainage;
 - (F) disposal site closure and stabilization;
 - (G) elimination to the extent practicable of long-term disposal site maintenance, inadvertent intrusion, occupational exposures, and disposal site monitoring;
 - (H) adequacy of the size of the buffer zone for monitoring and potential mitigative measures; and
 - (I) retrieval;
- (5) a description of the construction and operation of the land disposal facility, to include, as a minimum:
 - (A) the methods of construction of disposal units and engineered barriers;
 - (B) waste emplacement;
 - (C) the procedures for and areas of waste segregation;
 - (D) accurate drawings and descriptions of on-site buildings including, but not limited to, construction, foundation details, ventilation, plumbing and fire suppression systems, and proximity to creeks or culverts;
 - (E) types of intruder barriers;
 - (F) on-site traffic and drainage systems;
 - (G) physical security system;
 - (H) survey control program;
 - (I) methods and areas of waste storage;
 - (J) facilities for and methods of handling waste including improperly packaged shipments;
 - (K) methods to control surface water and groundwater access to the wastes;
 - (L) methods to be employed in the handling and disposal of wastes containing chelating agents or other nonradiological substances that might affect the meeting of the performance objectives of this Section; and
 - (M) a flow diagram of waste handling and disposal operations, a description and accurate drawings of handling equipment, and any special handling techniques to be employed;
- (6) a description of the types, chemical and physical forms, quantities, classification, and specifications of the radioactive material proposed to be received, possessed, handled, and disposed of at the land disposal facility, which shall include:
 - (A) estimated volume and activity of each waste class to be received annually at the facility, and
 - (B) method for control of the rate at which waste is received;
- (7) a description of the quality control program, including audits and managerial controls, for the determination of natural disposal site characteristics and for quality control during the design, construction, operation, and closure of the land disposal facility and during the receipt, handling, and emplacement of waste;
- (8) a description of the radiation safety program for control and monitoring of radioactive effluents to ensure compliance with the performance objective in Rule .1223 of this Section and occupational radiation exposure to ensure compliance with the requirements of Section .1600 of this Chapter and to control contamination of personnel, vehicles, equipment, buildings, and the disposal site; which description shall address
 - (A) both routine operations and accidents; and

- (B) procedures, instrumentation, facilities, and equipment;
- (9) an emergency response plan which addresses:
 - (A) on-site response;
 - (B) public alert and notification;
 - (C) roles of local, county, state and regional agencies;
 - (D) training and public information; and
 - (E) if available, copies of most current emergency response plans submitted to the U.S. Nuclear Regulatory Commission or an agreement state;
- (10) a manual of operating procedures and emergency procedures including, but not limited to, those for fires, spills or other events which result in contamination;
- (11) a description of the administrative procedures that the applicant will apply to control activities at the land disposal facility including hours of proposed operation;
- (12) a description of the radiation protection program including provisions for keeping radiation doses to workers and to members of the public as low as reasonably achievable (ALARA) and within applicable limits specified in the rules of this Chapter;
- (13) a description of the natural and demographic disposal site characteristics as determined by disposal site selection and characterization activities where the description must include geologic, geotechnical, hydrologic, meteorologic, climatologic, air quality, natural radiation background and biotic features of the disposal site and vicinity; where the site characterization shall include sufficient and suitable data for design and performance analysis; and where the minimum requirements include, but are not limited to, the following:
 - (A) geologic description to include:
 - (i) regional geologic framework including stratigraphy, tectonics, structure, physiography, seismology and geomorphology;
 - (ii) site specific stratigraphy, lithology, structural geology, geochemistry, topography, and an analysis of landforms including any evidence of destructive geomorphic processes;
 - (iii) a regional geologic map at a scale of 1:62,500;
 - (iv) a site specific topographic map at a scale of 1:1,200; and
 - (v) a site specific geologic map at a scale of 1:1,200 with accompanying cross-sections;
 - (B) geotechnical description to include:
 - (i) soil and saprolite characteristics related to slope stability, cover integrity, erosion, compaction characteristics for backfill materials, foundation analyses, gradations for proposed filler material, and possible interactions between the soils and waste containers; and
 - (ii) bedrock characteristics related to foundation analyses and hydrology;
 - (C) hydrologic description to include:
 - (i) surface water hydrology including the upstream drainage area contributing flow across the site and the downstream drainage area to a distance of approximately ten miles;
 - (ii) an inventory of existing surface water users and public water supplies within approximately ten miles downstream of the site;
 - (iii) an inventory of potential surface water impoundments that will be precluded by siting of a disposal facility;
 - (iv) an inventory and description of all significant hydrologic units underlying the site to a depth of 100 feet below the level of waste disposal;
 - (v) site specific data sufficient to describe the characteristics, present water quality, occurrence and movement of water in both the unsaturated and saturated zones;
 - (vi) an inventory of existing groundwater users within approximately two miles of the site, both from groundwater wells and at points of groundwater discharge, e.g. springs;
 - (vii) identification of the nearest downgradient groundwater users and the nearest municipal supply relying on groundwater; and
 - (viii) an inventory of potential groundwater supplies that will be precluded by siting of a disposal facility;
 - (D) meteorologic description to include:

- (i) determination of a water budget for the disposal site;
 - (ii) typical weather patterns; and
 - (iii) determination of the frequency, probability, and potential consequences of severe meteorological phenomena;
- (E) climatologic description to include:
 - (i) normal seasonal fluctuations and extremes predicated from historical records;
 - (ii) air temperatures and soil temperatures;
 - (iii) frost penetration; and
 - (iv) solar radiation;
- (F) air quality description to include:
 - (i) measurement of suspended particulates; and
 - (ii) the level of airborne radionuclides contributed by atmospheric fallout, natural radiation released from the soil, and agricultural activities;
- (G) natural radiation background description to include:
 - (i) sampling of air, soil (both on and off site), water (both on and off site), flora, fauna, and farm products (including grains and milk); and
 - (ii) both total background and contribution from individual radionuclides; and
- (H) biotic description to include:
 - (i) an accurate, site-specific inventory of flora and fauna in and within three miles of the site;
 - (ii) inventory and distribution of livestock and crops within three miles of the site;
- (14) an identification of the known natural resources at the disposal site, whose exploitation could result in inadvertent intrusion into the wastes after removal of active institutional control;
- (15) a description of baseline, operational, and long-term environmental monitoring programs to include:
 - (A) inspection and monitoring of waste packages prior to disposal;
 - (B) criteria and procedures to stop acceptance of waste at the facility, including action levels; and
 - (C) if available, a copy of the last environmental monitoring reports filed with the U.S. Nuclear Regulatory Commission or agreement state program or other authorities;
- (16) decontamination, decommissioning and site closure plans, including:
 - (A) those design features which are intended to facilitate disposal site closure and to eliminate the need for ongoing active maintenance;
 - (B) schedule;
 - (C) procedure, including documentation that procedure is effective; and
 - (D) radioactive waste disposal plan; and
- (17) a description of an action plan which would be implemented in the event of unforeseen differences between expected and actual behavior of the disposal system and which includes:
 - (A) a description of conditions which require remedial action, such as:
 - (i) erosion and other damage to the stability of the site;
 - (ii) failure of physical security features, equipment or procedures;
 - (iii) deterioration of trench or disposal unit covers;
 - (iv) deterioration of leachate collection system;
 - (v) clogging or siltation of monitoring and observation wells;
 - (vi) the presence of leachate in individual disposal units;
 - (vii) the migration of disposed radioactive material;
 - (viii) changes in site characteristics or other events which cause or threaten to cause failure of the facility to meet the performance objectives of this Section;
 - (ix) specific action levels, events or other conditions for which the licensee will institute specific remedial actions; and
 - (x) presence of radioactive concentrations in groundwater above preoperationally determined background;
 - (B) provisions for early identification of conditions requiring remedial action, such as:
 - (i) detection of water in any disposal unit;
 - (ii) detection of radioactive contamination in groundwater with sufficient sampling locations and frequencies to permit identification of the disposal unit(s) causing the contamination;

- (iii) establishment of specific sampling locations, sampling frequencies and sample types as part of the licensee's environmental monitoring program;
 - (iv) methods and frequencies for detection of water or leachate in disposal units or trenches;
 - (v) any methods and associated frequencies for inspecting, testing, maintaining or otherwise assessing the condition and performance of disposal units, trenches and covers;
 - (vi) method and frequency for monitoring condition and physical stability of the site;
 - (vii) any special monitoring, inspection or testing which the licensee will institute in response to specific natural or man-made occurrences which may affect the ability of the facility to meet the performance objectives of this Section; and
 - (viii) any periodic or ongoing evaluation of site characteristics or changes in site characteristics which relate to the ability of the facility to meet the performance objectives of this Section;
- (C) a description of the corrective measures that will be taken to correct the condition and otherwise assure compliance with the performance objectives and technical requirements of this Section, such as:
- (i) continued vigilance;
 - (ii) water and leachate detention;
 - (iii) pumping or repair of the disposal unit;
 - (iv) procedures for timely repair or waste retrieval after problem detection;
 - (v) redesign of disposal units;
 - (vi) repair or redesign of engineered barriers;
 - (vii) revision of site operating procedures, site personnel training, waste segregation practices, and monitoring and testing programs;
 - (viii) revision of disposal methodology; and
 - (ix) revision of site waste acceptability criteria; and
- (D) identification of facility features which facilitate remedial actions, such as:
- (i) design of disposal units and engineered barriers which allows access for remedial action; and
 - (ii) other features necessary to implement the action plan.

(b) Prior to implementation of detailed site investigations, the applicant or the North Carolina Low-Level Radioactive Waste Management Authority shall develop a site characterization plan and submit it for approval by the agency to ensure that:

- (1) all available data on the site is obtained;
- (2) unnecessary laboratory and field investigations are not done;
- (3) required or desired data is obtained;
- (4) a proper sequencing and timely acquisition of the required or desired data is planned and executed;
- (5) site survey data stations will be designed and located, insofar as feasible, so as to serve as planned permanent monitoring stations as necessary; and
- (6) technical and administrative coordination of laboratory and field efforts is planned and executed.

(c) As site characterization proceeds, the applicant or the North Carolina Low-Level Radioactive Waste Management Authority and the agency shall together review the site characterization results and the site characterization plan at least once every 90 days to ensure that the plan is still valid. The site characterization plan shall be modified as required by the agency.

(d) Time-variant site characteristics that require site-specific measurements shall be measured at such frequency and duration so as to adequately define the seasonal range of the values. The minimum period of measurement shall be one year and shall be supplemented, where possible, with regional data covering a longer time period.

History Note: Authority G.S. 104E-7; 104E-9(3); 104E-10(b); 104E-25; 104E-26; Eff. December 1, 1987; Amended Eff. January 1, 1994; May 1, 1992; Transferred and Recodified from 15A NCAC 11 .1206 Eff. February 1, 2015.