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## ENVIRONMENTAL QUALIFICATION AT SAVANNAH RIVER SITE (U)

by

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The objective of Environmental Qualification (EQ) is to demonstrate that equipment essential to the mitigation of consequences from, and monitoring of plant conditions following Design Basis Accidents (DBAs) will operate as intended under normal/abnormal and accident environmental conditions over the installed life. For example, if a component is needed to maintain the reactor in a safe shutdown condition during an accident, and if the component is subjected to a harsh environment during that accident, then documentation must be prepared addressing the ability of the equipment to work properly in the accident environment.

The required documentation and the qualification methods involved in the EQ process are: 1) Determining the DBAs for which the equipment is required to function to mitigate the accident; 2) Determining the environmental conditions resulting from the DBAs; 3) Identifying the systems components that are required to function during the DBAs; 4) Evaluating and qualifying the equipment to assure the equipment will not fail in a manner detrimental to plant safety or accident mitigation; 5) Preparing documentation demonstrating the qualification of equipment; and 6) Maintaining the documentation and design basis.

The Savannah River Site (SRS) EQ program has its origin in the commercial nuclear industry, paralleling Nuclear Regulatory Commission dictated program typical of "older" commercial light water reactors.

The requirement for an EQ program at SRS was mandated by the Department of Energy (DOE) K-Reactor Safety Evaluation Report (SER) which requires SRS to: 1) provide a long term plan for an EQ program with DOE approval prior to restart and 2) prepare and submit to DOE, Justifications for Continued Operations, that justify restarting and operating the K-Reactor until a long term compliance can be achieved with DOE approval.

An interim EQ program was established for reactor restart and documented in the K-Reactor Environmental Qualification Justification for Continued Operation (EQ JCO). The additional requirements of the SER were met by the establishment of the Long Term Environmental Qualification Program (LTEQP).

The purpose of the Restart EQ JCO is to provide reasonable assurance that, from an EQ standpoint, the K-Reactor can be operated on an interim basis with no adverse health or safety consequences until this JCO is superseded by the LTEQP.

The objectives of the EQ JCO consisted of: 1) defining bounding harsh environmental parameters; 2) determining plant areas affected by the bounding environmental parameters; 3) identifying equipment exposed to harsh environments that are essential to safe shutdown; 4) evaluating essential equipment operability under harsh environmental conditions; and 5) determining if the JCO purpose is met.

The JCO objectives have been accomplished by preparation and approval of the SRS K-Reactor EQ JCO.

Based on the requirements of the SER for an EQ program, a long term plan (the LTEQP) has been developed for the K-Reactor facility which is intended to meet all the applicable DOE orders and the intent of applicable commercial nuclear guidelines for the life of the plant operation. This LTEQP will provide documented evidence in the form of Environmental Qualification Documentation Packages, containing vendor tests, analysis reports and the evaluation of components on a DBA basis, which will be maintained for the operational life of the plant. This program can be subdivided into two phases, the Compliance phase and the Control phase.

The compliance phase addresses the identification of all equipment important to safety that requires qualification, the evaluation of existing qualification status, and the completion of qualification packages of equipment for its installed life.

The goal of the Control phase is to maintain the equipment requiring qualification in a configuration that is qualified over its installed life, including the performance of surveillance and maintenance activities required to maintain the qualified status. This is an ongoing phase that continues as long as the plant is in operation or in a stand-by status. The control phase consists of establishing Interim Controls, Design Control, Material control and Procedural changes control. These control elements are to ensure that any changes that occur will be evaluated for impact on the EQ program.

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