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## Standard Master Matrix for Nuclear Fuel Cycle Standards<sup>1</sup>

This standard is issued under the fixed designation E 669; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 The purpose of this standard is to present a master-matrix approach for the identification and classification of areas in the nuclear fuel cycle in which the development of standards will be needed.

1.2 The master matrix is defined as the array of operations and activities included in the fuel cycle for nuclear reactors. These operations start with the mining, milling, and fuel fabrication, continue with the transportation of spent fuel after discharge from a reactor, and culminate with the shipment of waste to a repository, of refabricated fuel to a reactor station, and of recycled uranium to an enrichment plant (see Fig. 1). Matrix standards dealing specifically with nuclear reactors is the function of other groups as established in Section 10 of Recommended Guide E 584.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

E 583 Practice for Systematizing the Development of (ASTM) Voluntary Consensus Standards for the Solution of Nuclear and Other Complex Problems<sup>2</sup>

E 584 Recommended Guide for Developing the (ASTM) Voluntary Consensus Standards Required to Help Implement the National Energy Plan<sup>2</sup>

E 846 Matrix for Light-Water Reactor Spent-Fuel Transportation<sup>2</sup>

### 3. Significance and Use

3.1 The nuclear fuel cycle is an important segment of the nuclear energy production system, and perhaps its most complex one. As the fuel cycle industry develops, many ramifications of practices, procedures, and definitions will occur, and standards will be needed. To provide a framework for early organization of these needs, Practice E 583 and Recommended Guide E 584 were devised. The intent of this nuclear fuel cycle standard is to provide the framework, by using a matrix, for the identification and classification of areas where consensus standards potentially will be needed. This standard will provide guidance for establishing priori-

ties, unambiguous assignments, and reporting and coordinating progress. This standard arranges the nuclear fuel cycle complex into manageable packages so that standards can be developed by a number of groups simultaneously, or in a disparate time frame, in response to the urgency of the need.

### 4. Master Matrix

4.1 It is the purpose of this master matrix (Table 1) to identify a series of matrices to cover the various steps in the fuel cycle from the fission reactor types set forth in Recommended Guide E 584, namely: light-water reactors (LWR), gas-cooled reactors, fast reactors, and other reactors.

### 5. Summary of Standard

5.1 *Generic Matrix (Table 2)*—The intersections in the master matrix (Table 1) identify generic subject matrices, whose intersections in turn represent and identify areas that may require subordinate matrices or specific standards. Those functional activities for the systems and components to be considered in the generic matrix for the receipt and storage of light-water reactor spent fuel are given in Table 2 as an example.

#### 5.2 Work Plan:

5.2.1 Subcommittee C26.91 on Long Range Planning shall establish a priority plan for the development of subordinate matrices as delineated by the intersections of the master matrix. The priority establishment shall be an evolutionary process based on the state of development and the commercial viability of the particular reactor type and its fuel cycle, in accordance with the national policy.

5.2.2 The matrix shall be developed in sufficient detail to identify the systems and components and their respective functional activities.

5.2.3 The task group shall expand the generic matrix in accordance with 5.2.2 in sufficient detail to permit identification of the potential need for standards. The categories of potentially needed standards are identified as follows: (1) measurement/test procedure, (2) performance, (3) process/methods, (4) materials, and (5) nomenclature and definitions. The task group shall also identify "need areas" based upon the following criteria: (1) safety, (2) safeguards, (3) facilitation of licensing process, (4) standardization of procedures, methods, terminology, and (5) facilitation of equipment and material interchangeability. Existing standards will be reviewed for applicability and to identify the need for modification of existing standards, and the need for preparation of new standards or new technology. This will be accompanied by a recommendation of priority.

<sup>1</sup> This matrix is under the jurisdiction of ASTM Committee C-26 on Nuclear Fuel Cycle, and is the direct responsibility of Subcommittee C26.91 on Long Range Planning.

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<sup>2</sup> Annual Book of ASTM Standards, Vol 12.02.