

## **Appendix C**

### **Details of Standard Canisters**

#### **Instructions for Use**



## Appendix C

### Details of Standard Canisters Instructions for Use

#### Status

The National Spent Nuclear Fuel Program is working with OCRWM, INEEL, Hanford, and SRS to develop a set of standard canisters for transport, storage, and deposition of DOE SNF in a national repository. A variety of designs are under evaluation in order to maximize the usefulness of these canisters to all of the custodians of SNF in the DOE complex. Preliminary designs are provided from the **Preliminary Design Specification for DOE SNF Canisters**, DOE/SNF/REP-011, Revision 0, August 19, 1998. In addition, preliminary design for the “Small Com” are provided.

#### Standard Canisters for Shipping and Storage of DOE SNF

#### Requirement

Standardized canisters are recommended for use, where possible, for DOE SNF for the following reasons:

1. Minimize the number of canisters which must be licensed and qualified for receipt by the repository.
2. Standardize the analysis and evaluation procedure for canister certification parameters, such as, radiation levels, thermal output, fissile loading, criticality, and weight limits.
3. Standardize the handling procedures between labs and with the repository.
4. Develop a minimum set of canister sizes that are compatible with each other and the specific fuels of the DOE SNF inventory.

- 4.1 Small canisters should be of a size to optimally fill (7 per cross section) the next larger size.
  - 4.2 The largest canister should optimally fill a MPC or DPC type canister (~2 meter D)
  - 4.3 The smallest canister should be large enough to contain a quart size steel can containing miscellaneous pieces, and the predominant DOE fuel types such as TRIGA, ATR, MTR, etc., with larger canisters being able to contain such fuels as Fort St. Vrain.
  - 4.4 Canisters should be sized to make optimum use of existing storage facilities and transport equipment.
5. Take advantage of cost benefits from mass production of large numbers of canisters.

## Discussion

Evaluation of the above requirements has resulted in the following recommended standard canister set:

**Small Can:** A nominal 5 inch OD, 1/4 inch wall, hastelloy C22, right circular cylinder, welded caps top and bottom, with redundant handling fixtures on one end, a mating ring at the opposite end (for vertical interlocking with other cans), and an option for a seal weldable, breathable, or future seal weldable end cap fixture. Length would be variable, depending on individual fuel need.

This small can will accommodate 7 TRIGA rods, or an ATR, or an MTR, or a number of other smaller fuels, including a quart can filled with bits and pieces.

The 5 inch can is an inherent Acriticality safe size by itself.

**Large Canisters:** A nominal 18 inch and 24 inch OD, 1/2 inch wall, stainless steel (316L), right circular cylinder, welded caps top and bottom, with redundant handling fixtures at one end, a mating ring at the opposite end (for vertical interlocking with other canisters), and an option for a seal weldable, breathable, or future seal weldable end cap fixture. Length would be variable, up to 180 inches,

depending on individual fuel needs.

The large canister will accommodate an optimum pack of 7 of the 5 inch cans, a Fort St. Vrain assembly, the TMI canisters, as well as **TBD** individual PWR or **TBD** BWR assemblies, depending on fissile and thermal limits.

The large 18 inch canister can be accommodated in the center hole of a 5 pack glass log waste package as well as being able to be interim stored in the IFSF vaults. The 24 inch canister can be substituted for one or more of the 24 inch glass log containers in a 5 pack waste package.

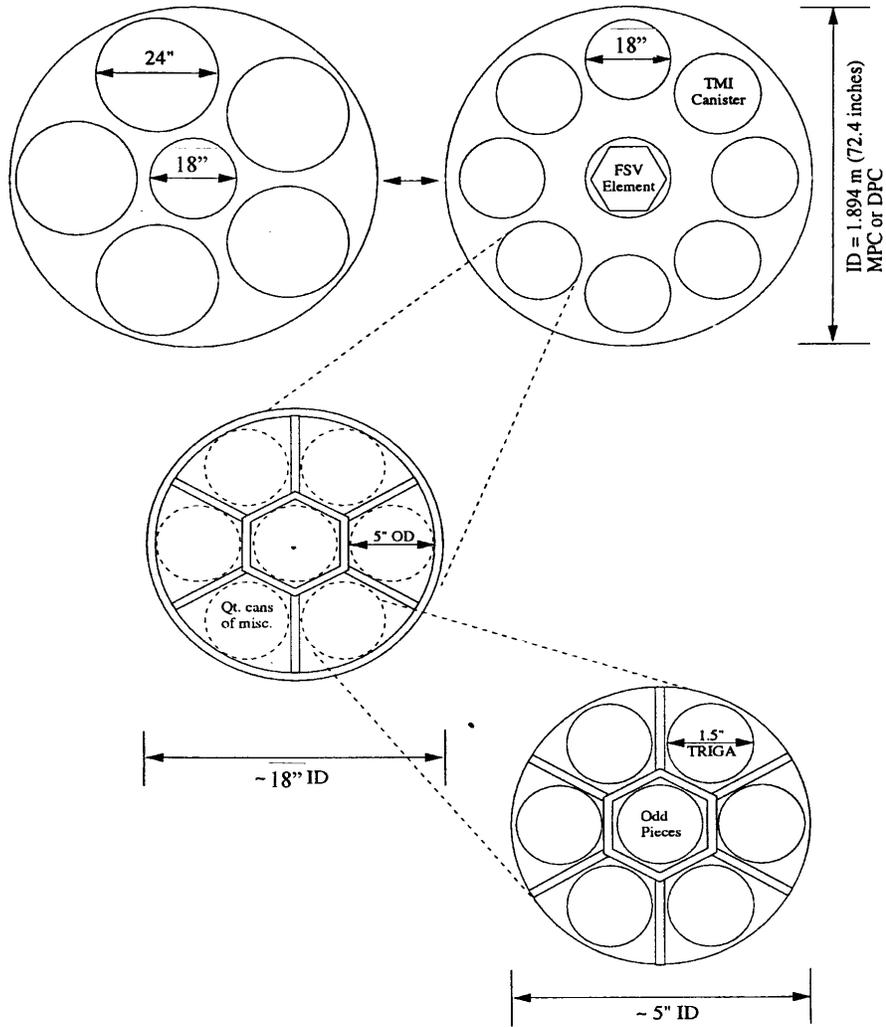
These canisters, their use within the DOE complex, and their use within the repository are presently being evaluated.

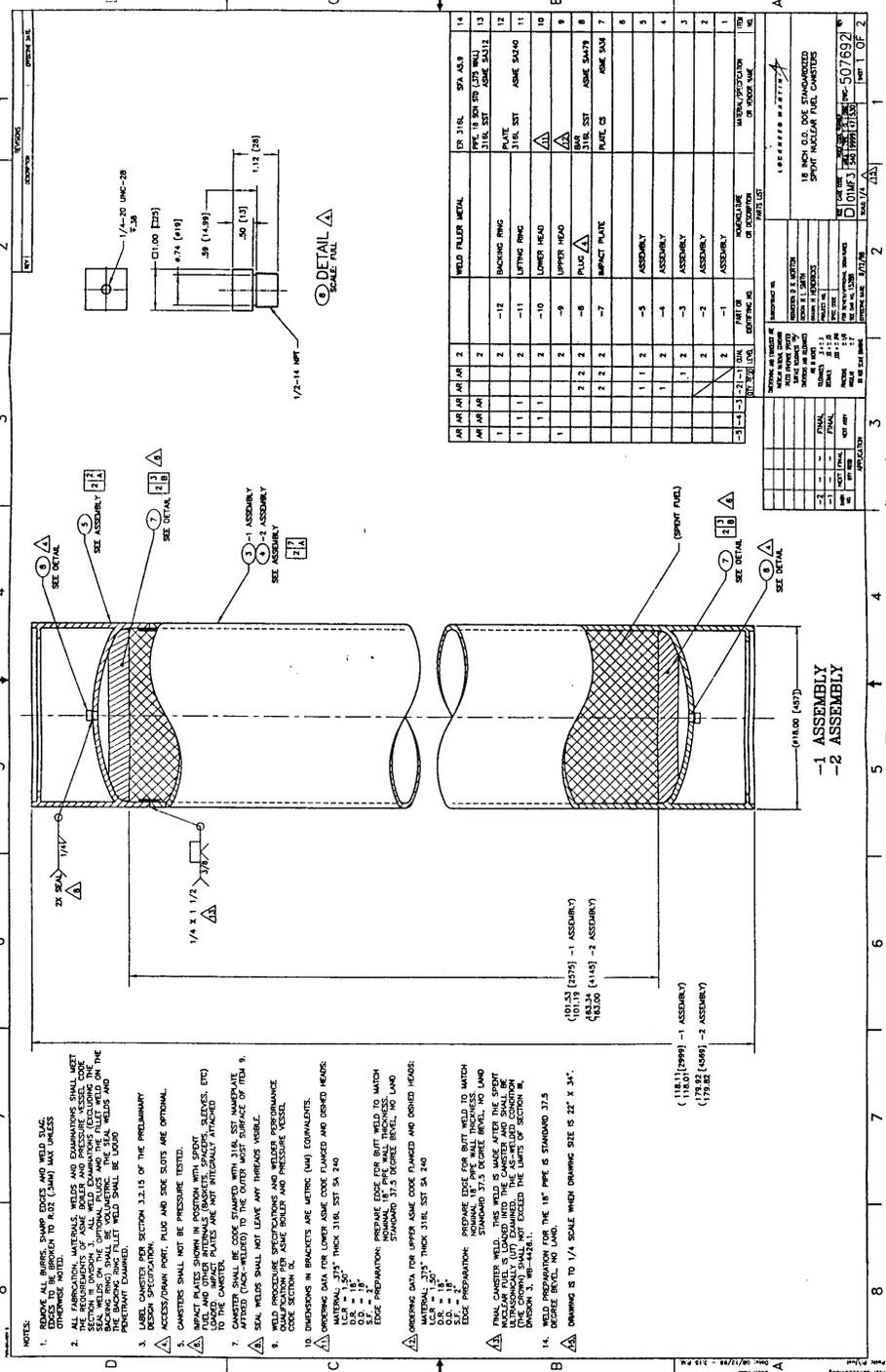
### **GuidanceXAnalysis and Evaluation Methodology**

The fuel custodian shall select those canisters, or combinations of canisters, that provide an optimum packing configuration for the custodian=s fuel. The required number of canisters will be ordered through the production process and delivered to the fuel custodian for their loading operation. If the canisters cannot be loaded at the custodians facility, the custodian=s fuel will be transferred to another DOE facility for that operation.

The above implementation activities can be coordinated through the National Spent Nuclear Fuel Program Office.

### Loading Options for Standard Canisters



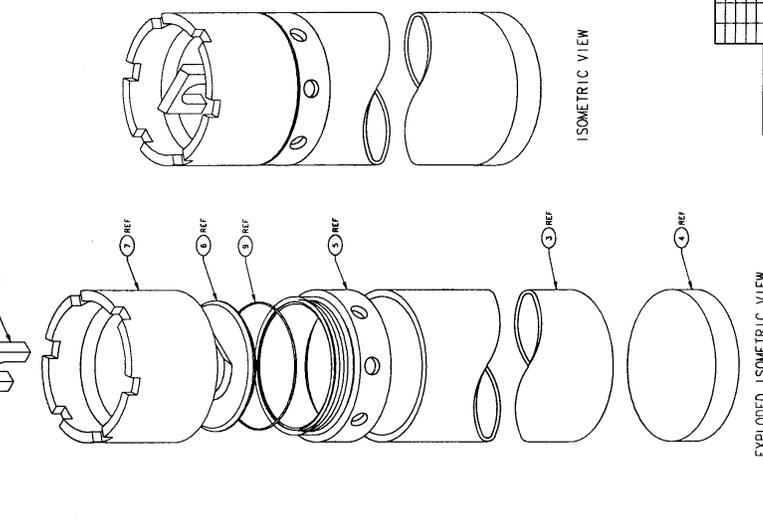
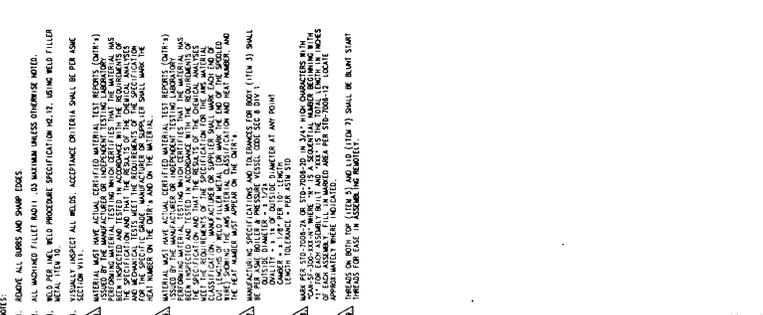








DRAFT

EXPLODED ISOMETRIC VIEW      ISOMETRIC VIEW

**NOTES:**

- REMOVE ALL BURRS AND SHARP EDGES.
- ALL MACHINED/FILLET RADIUS TO MATCH UNLESS OTHERWISE NOTED.
- WELD PER WELD PROCEDURE SPECIFICATION W-12, USING WELD FILLER AS SPECIFIED.
- VISUALLY INSPECT ALL WELDS. ACCEPTANCE CRITERIA SHALL BE PER ASME SECTION VIII.

△ MATERIALS MUST BE ACTUALLY CERTIFIED WATER TEST REPORTS (QWP-1) FOR ALL WELDS AND TESTED TO W-12. THE INSPECTION AND ACCEPTANCE CRITERIA SHALL BE PER ASME SECTION VIII. THE WELDING PROCEDURE SPECIFICATION (WPS) SHALL BE W-12. THE WELDING PROCEDURE SPECIFICATION (WPS) SHALL BE W-12.

△ MATERIAL MUST HAVE ACTUAL CERTIFIED MATERIAL TEST REPORTS (QWP-1) FOR ALL WELDS AND TESTED TO W-12. THE INSPECTION AND ACCEPTANCE CRITERIA SHALL BE PER ASME SECTION VIII. THE WELDING PROCEDURE SPECIFICATION (WPS) SHALL BE W-12. THE WELDING PROCEDURE SPECIFICATION (WPS) SHALL BE W-12.

△ UNDESIRABLE SURFACE DEFECTS (SCUFFS, SCRATCHES, ETC.) SHALL BE PER ASME SECTION VIII. THE WELDING PROCEDURE SPECIFICATION (WPS) SHALL BE W-12. THE WELDING PROCEDURE SPECIFICATION (WPS) SHALL BE W-12.

△ MAX. SURFACE DEFECTS SHALL BE PER ASME SECTION VIII. THE WELDING PROCEDURE SPECIFICATION (WPS) SHALL BE W-12. THE WELDING PROCEDURE SPECIFICATION (WPS) SHALL BE W-12.

△ APPROXIMATELY THESE INDICATED. THE WELDING PROCEDURE SPECIFICATION (WPS) SHALL BE W-12. THE WELDING PROCEDURE SPECIFICATION (WPS) SHALL BE W-12.

NO.	DESCRIPTION	QTY.	UNIT	REVISION
1	WELD FILLER METAL	10	LB	
2	ECI METAL CHIMING # 1/16	10	EA	
3	LIFTING LUG	8	EA	
4	PLATE/GRD. INSTELOLOY C22	7	EA	
5	PLATE/GRD. INSTELOLOY C22	8	EA	
6	PLATE/GRD. INSTELOLOY C22	5	EA	
7	PLATE/GRD. INSTELOLOY C22	4	EA	
8	PLATE/GRD. INSTELOLOY C22	1	EA	

**INTERIM DRAWING**

REVISIONS:

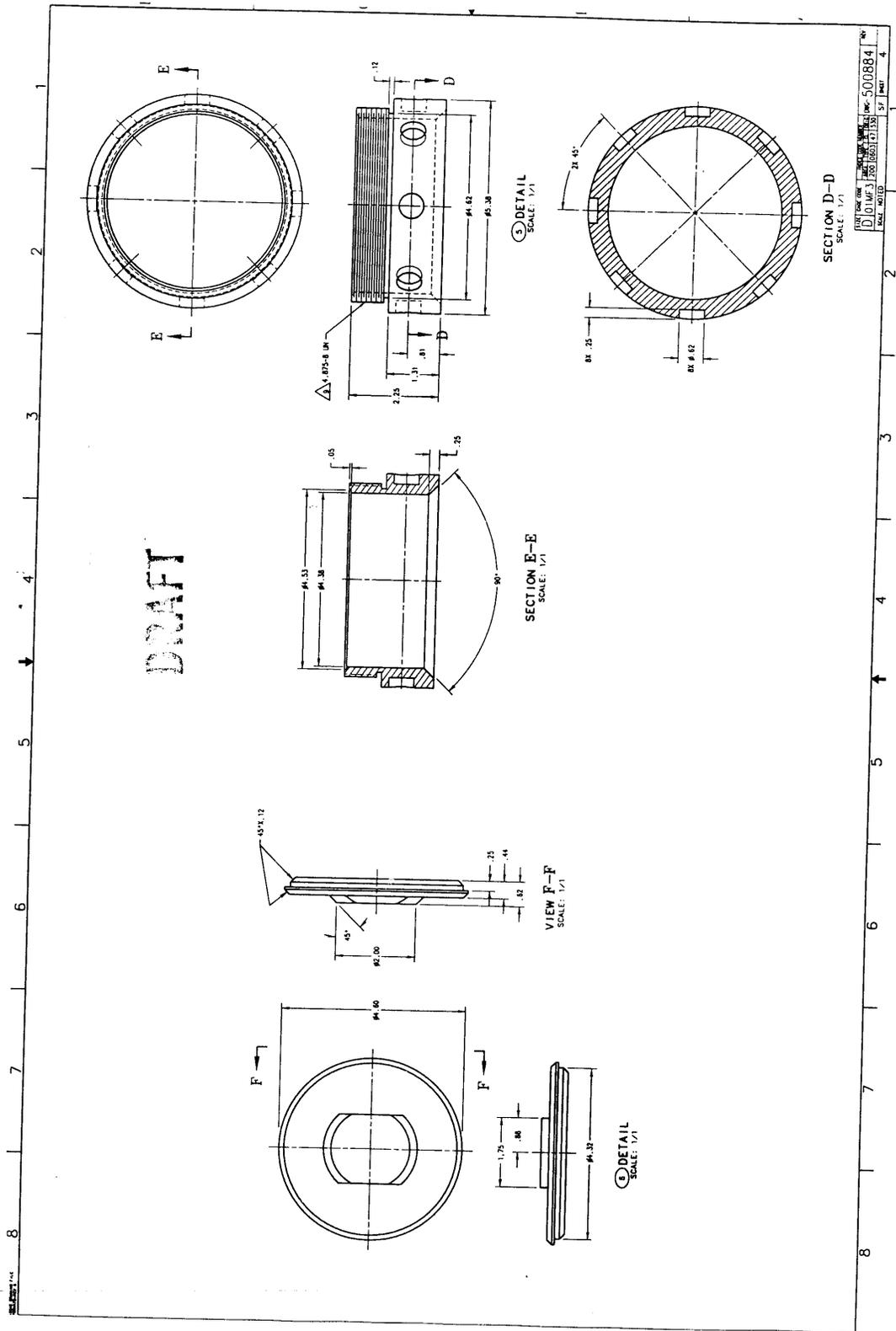
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**DESIGNED BY:** [Signature]  
**CHECKED BY:** [Signature]  
**APPROVED BY:** [Signature]

**PROJECT NO.:** 500884  
**REV.:** 1 OF 4







## **Appendix D**

### **Procedures for Characterization of Fuel Parameters**

## Appendix D

### Procedures for Characterization of Fuel Parameters

This appendix contains specific procedures which can be used to satisfy RW repository characterization requirements. Those procedures that are still being developed are stated and listed as (TBD).

The requirements covered in this Appendix are:

**D.1 Stabilization of Particulate Fuels.** A research and development program is in progress to develop a particulate stabilization process using sodium silicate as a binding agent. A draft procedure for stabilization of particulates is presented .

**D.2 Pyrophoric, Combustible, and Explosive Fuels.** Some research has been performed on the characterization and treatment of pyrophoric and combustible fuels, but no preliminary processes have been defined to prepare these fuels for the repository. The procedure for satisfying the requirements regarding pyrophoric, combustible, and explosive fuels are (TBD).

**D.3 Criticality.** Evaluation of criticality parameters (i.e., internal waste package geometry over time, corrosion and leaching effect, and water intrusion rates and effects) is ongoing. Specific procedures for addressing criticality requirements are (TBD).

**D.4 DOE SNF Standard Drying Guidelines.** A number of drying techniques are presently being used at DOE laboratories and commercial facilities, and additional techniques are being developed (Hanford). Testing of drying techniques on different types of fuels is on-going at INEEL. A preliminary procedure based on present practices and research results to date is presented.

**D.5 Gas Generation.** It is assumed that any gas of significant quantity or effect will come from the radiologic decomposition of water in the fuel or fuel package. Therefore, the repository requirements regarding gas generation should be satisfied by satisfying the requirements regarding liquids (Section D.4). Any additional procedures required regarding Gas Generation are (TBD).

**D.6 RCRA Materials.** A procedure for decisions on and treatment of RCRA materials is (TBD).

**D.7 Material Compatibility.** No procedure is planned for addressing the requirement of material compatibility. This issue is to be addressed as part of the Fuel Data Form shown in Appendix B.

**D.8 Radiation Level.** A draft procedure for evaluating the radiation level of a DOE-SNF canister is presented in this Section.

**D.9 Heat Generation.** A draft procedure for evaluating the heat generation rate of a DOE-SNF canister is presented in this Section.

**D.10 Isotope Content & Leachability.** The procedure for meeting the repository requirements on material leachability and isotope transport is (TBD).

## **Procedure D.1 Stabilization of Particulate Fuels**

The following procedure is recommended for the stabilization of particulate fuel, ranging in **particle** size from 1.0 mm down to powder.

Material required:      Sodium Silicate - Weight equal to weight of SNF fuel to be stabilized

                                    Quart size automotive paint cans - Sufficient number to provide twice the volume of SNF to be stabilized

                                    Heavy Duty Aluminum Foil - purchase as required

                                    Pouring Rack - Obtain design from National Spent Nuclear Fuel Program

Preparation:              SNF to be stabilized should be transferred to a hot cell with sufficient room, equipment, and table space to carry out stabilization process.

1. Place layer of Al foil on pouring rack and press foil down into rack cells.

2. Fill a quart can 1/4 full of particulate SNF.
3. Slowly pour sodium silicate (SS) into can until SNF is just covered. Intermittent stirring may be required.
4. Stir mixture until all SNF is covered with SS.
5. Pour mixture into pouring rack molds. Mixture should not overflow individual molds.
6. Pour mixture from can until flow stream separates into drips.
7. Repeat steps 1 through 6 until SNF is depleted or process is to be halted for time being.
8. Allow mixture to dry in molds and mixing can for (TBD) hours.
9. Remove solidified mixture and Al foil backing from pour rack and fold accordion-like, leaving Al foil attached to solidified mixture. Fold excess Al foil on each end down onto solidified sections.
10. Arrange solidified sections and Al foil into rough cylindrical shape and insert into quart can used as mixing can (which also has dried mixture residue in it).
11. Seal and label can.

## **Procedure D.2 Pyrophoric, Combustible, and Explosive Fuels**

The procedure for preparation of pyrophoric, combustible, or explosive fuel for deposition in a national repository is [UNDER DEVELOPMENT]

## **Procedure D.3 Criticality**

The procedure for preparation and packaging of fuels to meet repository criticality requirements is [UNDER DEVELOPMENT].

## **Procedure D.4 DOE SNF Standard Drying Guidelines**

The following drying procedure is designed for use with the DOE Standard canisters and uses a proposed DOE Vacuum Drying Kit. This procedure is derived from the commercial SNF drying technique and the process used at the INEEL INTEC IFSF Fuel Canning Station.

### **Preparation for Procedure**

Insure that all of the equipment required for the process is available and accessible by the tools to be utilized in handling the fuel, moving the vacuum equipment components, moving the fuel into and out of the vacuum equipment, and activating all of the switches and valves required for operation of the equipment. (see operating instructions for DOE Vacuum Drying Kit TBD).

### **Drying Process**

1. Pick up fuel to be dried and place in vacuum drying chamber (VDC).
2. Place lid to VDC in closure position.

3. Start vacuum pump.
4. Close isolation valve of lid.
5. Ensure canister pressure is dropping at an initial rate of approximately TBD psi per minute. If pressure drop is substantially less than TBD, lid may not be sufficiently sealed. Allow vacuum pump to operate until pressure stabilizes. If pressure is above TBD, stop vacuum pump, open isolation valve, remove lid and clean sealing surfaces. Repeat process from step 2.
6. If pressure on canister drops to less than 10 torr, then select pressure control screen and lower pressure PID output to maintain 5B15 torr.

**NOTE:** When all water has evaporated, pressure will drop to the minimum capacity of vacuum pump (0.8 torr) and pressure will not increase by use of throttling valve.

7. When canister pressure drops to vacuum pump minimum (0.8 torr) and pressure cannot be increased by use of throttling valve, then record time, date, and pressure. (TBD / TBD / TBD )
8. Close vacuum pump isolation valve and monitor canister pressure for two hours.
9. If pressure rises slowly to corresponding saturation pressure (app: 20 torr), go to step 3 and repeat steps 3 to 8.
10. If pressure remains constant or increases less than 10 torr per hour, then fuel is dry, and proceed to step 11.
11. Open isolation valve to equalize pressure inside VDC.
12. Remove lid and place in holder.

13. Remove SNF and place in storage canister.
14. When storage canister is full, then initiate canister sealing process (see section TBD).
15. Repeat process from step 1.

### **Procedure D.5 Gas Generation**

No Procedure for this fuel parameter is planned for development.

### **Procedure D.6 RCRA Materials**

No Procedure for this fuel parameter is planned for development.

### **Procedure D.7 Material Compatibility**

No Procedure for this fuel parameter is planned for development.

### **Procedure D.8 Radiation Level**

The procedure for measuring and reporting the radiation level of a DOE SNF canister is **[UNDER DEVELOPMENT]**.

## **Procedure D.9 Heat Generation**

The procedure for measuring and reporting the heat generation rate of a DOE SNF canister is **[UNDER DEVELOPMENT]**.

## **Procedure D.10 Isotope Content & Leachability**

The procedure for determining the leach rate and quantity of the isotope content of a DOE SNF canister is **[UNDER DEVELOPMENT]**.

## **Appendix E**

### **Spent Nuclear Fuel Verification Plan**

# Appendix E

## Spent Nuclear Fuel Verification Plan

### Status:

The National Spent Nuclear Fuel Program Quality Assurance staff has prepared guidance for qualifying data for DOE-owned SNF in accordance with OCRWM QA requirements. The guidance should be used for development of site-specific data qualification procedures. The NSNFP QA staff will update the guidance when changes to, or interpretation of requirements are issued by OCRWM.

### Qualification of Data

### Requirements:

DOE/RW-0333P Rev 8

#### III 2.4.B

Data that are directly relied upon to address safety and waste isolation issues shall be qualified from origin, accepted, or undergo a qualification process.

1. Data qualified from origin shall be reviewed by individuals other than those who acquired or developed the data in accordance with established review criteria to ensure technical correctness.
2. Accepted data need not undergo the qualification process. The rationale for considering data to be accepted shall be documented.

3. Existing data may be used in scientific investigation and design activities, provided traceability to its status as existing data is maintained. Existing data directly relied upon to address safety and waste isolation issues shall be qualified in accordance with the QARD at appropriate times during the scientific investigations and design process and before:
  - a. OCRWM acceptance of DOE-owned high-level waste or spent nuclear fuel;
  - b. Submittal of the License Application;
  - c. Relying on the item for which the data were used as design input, to perform its function; or
  - d. Data are relied upon to resolve safety or waste isolation issues.

#### **III.2.4.D**

Existing data directly relied upon to address safety and waste isolation issues shall be qualified by one or a combination of the methods that follow:

1. Determination that the controls under which the data were generated are similar in scope, requirements, and implementation to the QARD.
2. Evaluation of corroborating data – Rationale for selecting one set of data to corroborate another set of data shall be clearly explained and justified.
3. Confirmatory testing.
4. Peer review in accordance with the QARD.
5. Technical Assessment to independently evaluate data which includes one or a combination of the following:
  - a. Determination that the employed methodology is acceptable:

- b. Determination that confidence in the data acquisition or developmental results is warranted; or
- c. Confirmation that the data have been used in similar applications.

Methods 1, 2, and 3 above shall include a review to determine the technical correctness of the data in accordance with established review criteria. The qualification process shall be planned and documented. Documentation shall include the acceptance criteria used to determine if the data are qualified, and rationale for discontinuing any qualification methods abandoned after the initiation of the qualification process.

## **Discussion**

Data concerning DOE-owned spent nuclear fuel will be used to support development of the license application for the geologic repository and for acceptance of DOE-owned SNF for placement in the repository. Those data could be either new data or previously generated data. The data must meet quality assurance requirements established by NRC and OCRWM.

The NRC has established quality assurance requirements for licensing the geologic repository in 10CFR60, Subpart G. Data (including data about DOE-owned SNF) used by the repository program to support safety and waste isolation issues must be either collected under a quality assurance program meeting the requirements Subpart G, or be alternatively qualified for use. The NRC has issued guidance on qualification of data in NUREG 1298, A Generic Technical Position on Qualification of Existing Data for High-Level Nuclear Waste Repositories.≡ Guidance on the use of peer reviews is provided in NUREG 1297, A Peer Review for High-Level Waste Repositories.≡

The requirements of 10 CFR 60, Subpart G, and guidance of NUREG 1297 and 1298 are implemented by RW in the quality assurance program described in DOE/RW-0333P, A Quality Assurance Requirements and Description for the Civilian Radioactive Waste Program.≡ Supplement III of DOE/RW-0333P describes requirements for the collection and the qualification data. Most data concerning DOE SNF were not generated under QA programs meeting requirements of DOE-RW-0333P, and therefore, must undergo qualification if used in support of the repository program.

## Guidance

### Recommended Process for Qualification of SNF Data

#### 1. General

SNF data that will be submitted to OCRWM in support of safety or waste isolation activities must be qualified to requirements of DOE/RW-0333P. That includes data submitted in support of the repository license application and data submitted for acceptance of SNF for storage or disposal by OCRWM.

Data collected under a QA program meeting requirements of DOE/RW-0333P are considered qualified. Data not collected under a QA program meeting requirements of DOE/RW-0333P and used to support safety and waste isolation must be qualified prior to:

- C Acceptance of DOE SNF by OCRWM
- C Submittal of the License Application
- C Relying on an item for which the data were used as design input
- C Relying on the data for resolution of safety or waste isolation issues.

Existing data may be used for planning activities provided traceability to its status as existing data is maintained. Accepted data (see definitions) need not undergo the qualification process. The rationale for considering data to be accepted shall be documented.

Data may be qualified by application of one or a combination of the methods provided in DOE/RW-0333P. Those methods are:

- Equivalent QA Program
- Corroborating Data
- Confirmatory Testing
- Peer Review

- Technical Assessment

Data qualification by Equivalent QA Program, Corroborating Data, and Confirmatory Testing shall include a review to determine the technical correctness of the data in accordance with established review criteria.

Peer reviews are performed in accordance with NUREG 1297 as implemented in DOE/RW-0333P. Peer review should be used for data qualification when the adequacy of data cannot be established by testing, alternate calculations, or reference to established standards and practices that can be verified by technical assessment.

In order that independence of the data qualification process is maintained, the process should be managed by an individual or organization independent of the organization that generated the data.

## 2. Definitions

The following terms are used in this document:

Accepted Data	Data considered as established fact (e.g. engineering handbooks, density tables, gravitational laws or other physical constants). Or data generally accepted by the scientific and engineering community and found to be technically defensible by these using it.
Cognizant Technical Person	An individual who is knowledgeable about the specific data to be qualified or who is designated to gather and prepare data qualification documentation.
Confirmatory Testing	An evaluation, subject to implementing documents, that investigates the properties of interest of data in an attempt to confirm the quality of the data.
Corroborative Data	Data that are used to support or substantiate other data.
Data Traceability	The ability to trace the history, application, or location of data using recorded documentation.
Equivalent Quality Assurance (QA) Program	A QA program which is similar in scope requirements and implementation to DOE/RW-0333P.
Existing Data	Data that were not acquired or developed in accordance with an approved QA program that meets 10 CFR Part 60 Subpart G and do not meet the definition of accepted.
Independence Requirement	Person(s) who have not participated in or had direct responsibilities for original work performance as a contributor, designer, reviewer, supervisor, or advisor are considered independent.
Independent Technical Assessment	An assessment of the technical/scientific and quality assurance attributes of data, conducted by persons who are independent of the work being evaluated, performed as an evaluation of the technical merit of existing data against established criteria.
Independent Technical Assessment	A team of two or more independent people meeting the independent

Team	requirements, and who have: 1) extensive technical experience to provide the necessary skills and working knowledge base to allow informed judgment about the technical/scientific protocol of the work performed; 2) extensive quality assurance experience to provide the necessary skills and working knowledge base to allow informed judgments about quality assurance activities applied to the work performed with one member designated as the Team Leader.
Peer	A person having technical expertise in the subject matter to be reviewed to a degree at least equivalent to that needed for the original work.
Peer Review Group	An assembly of peers representing an appropriate spectrum of knowledge and experience in the subject matter to be reviewed. The group may vary in size based on the subject matter and its importance to safety or waste isolation.
Peer Review	A documented, in-depth critique of work by a group of peers independent from the work being reviewed.
Qualified Data	Data acquired or developed under an approved QA program that meets the requirements of 10 CFR Part 60 Subpart G (i.e. qualified from origin) or data that have undergone the qualification process.
Qualification of Data	A formal process intended to provide a desired level of confidence that data is suitable for its intended use.
Site Manager	Person responsible for the execution of the spent nuclear fuel program at a site.

### 3. Process

The following process describes an acceptable method for qualification of SNF data. The process should be used for development of site-specific data qualification procedures. The performers are identified to demonstrate the expected level of management involvement and required levels of independence. The process is illustrated in Figure 1.

#### 3.1 Prepare Data Qualification Packages

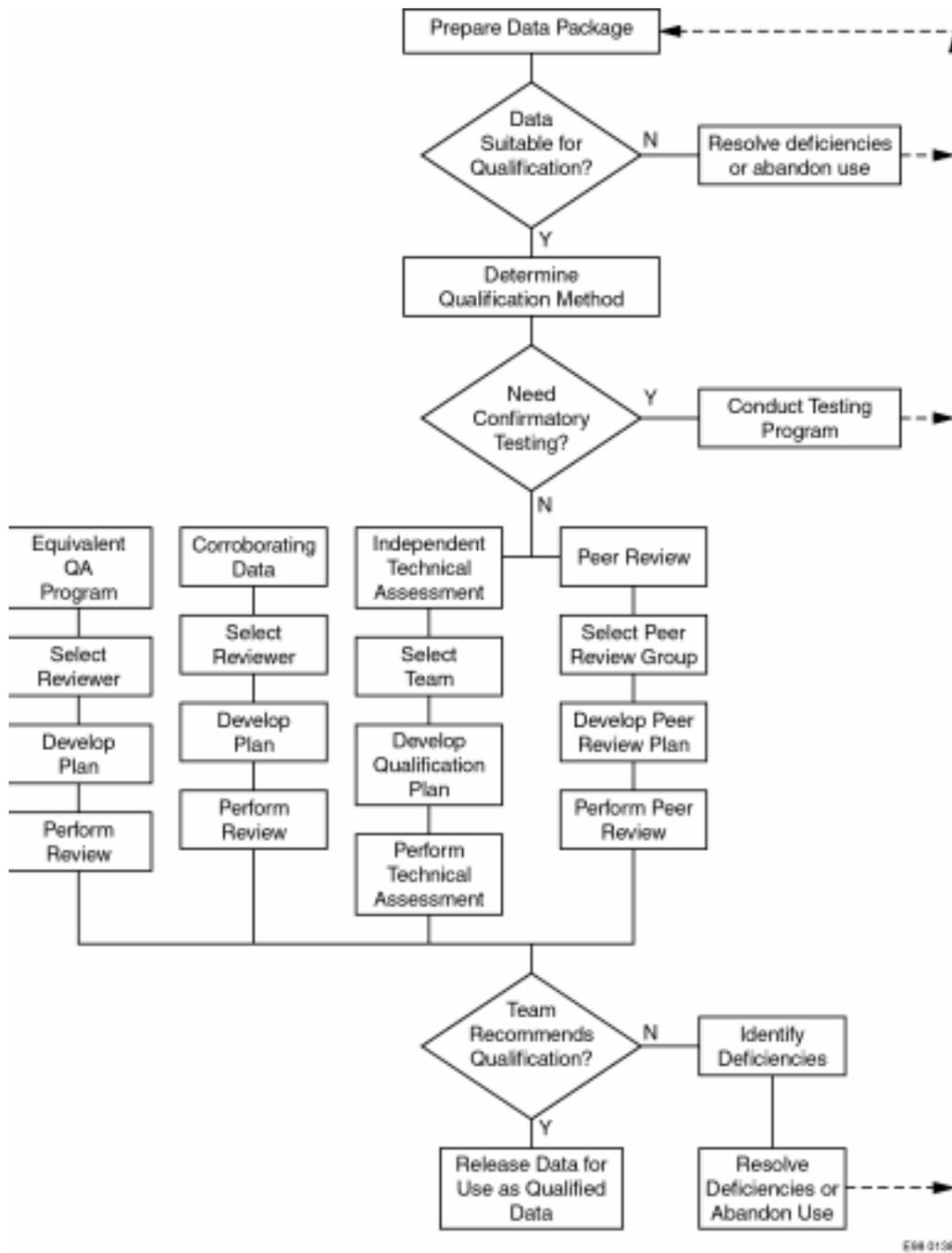
##### **Site SNF Manager:**

Appoints a cognizant technical individual or team, who is knowledgeable about the specific data being investigated, to assemble the data qualification package.

##### **Cognizant Technical Person:**

- C Identifies the procedural, documentation, and quality assurance requirements utilized when data were generated.
  
- C Identifies controls that were implemented during collection of the data that could affect the technical quality of the data, such as measuring and test equipment calibration, test procedures, verification of key test components, qualifications of test personnel, technical reviews, and test documentation.
  
- C Identifies and documents current procedural, documentation, and quality assurance requirements pertinent to the use of the data.
  
- C Identifies a list of data, design, performance, or other information anticipated to be used for qualifying data.
  
- C Obtains supporting quality assurance records to be included with the data package.

- C Collects potential corroborative data, any results of confirmatory tests and independent technical assessments performed previously on the data.
  
- C Reviews data and all available supporting documentation. Makes a determination regarding suitability of data for qualification. If a determination is made that data are not suitable for qualification, identifies additional information needed or recommends use of data be abandoned and obtains SNF Site Manager concurrence.
  
- C Determines if data are suitable for qualification and assembles data and associated documents into the data qualification package. The data package should contain all information necessary for qualification of the data. (An example data package format is in Attachment 1 of this Appendix.)
  
- C Prepares a table of contents for the data qualification package. The table of contents may require updating as data are added such as data obtained during confirmatory testing.
  
- C Ensures steps are taken to maintain the traceability of data throughout qualification process.
  
- C Identifies data in a manner to enable traceability both backward (trace the history) and forward (trace the use and application.)



**Figure E-1.** Data qualification process.

### 3.2 Determine Data Qualification Method

Acceptable methods of data qualification are:

- Equivalent QA Program
- Corroborating Data
- Confirmatory testing.
- Peer review
- Technical Assessment

Combination of any of the above may be used.

#### **Cognizant Technical Person:**

- Determines the method of data qualification appropriate for use with the data package.
- Selects data qualification by Equivalent QA program, Corroborating Data, and Confirmatory Testing methods when adequacy of the data can be established by those methods.
- Selects data qualification by peer review when:

Novel or beyond state-of-the-art methods have been used.

Detailed technical criteria or standard industry procedures are not available.

Test results are not reproducible or repeatable.

Data or interpretations are ambiguous.

The adequacy of information or the suitability of implementing documents and methods essential to meet specific objectives cannot be established through testing, alternate calculations, or reference to previously established standards and practices.

There is significant disagreement regarding applicability or appropriateness of other methods of qualifying the data.

- Selects Technical Assessment as data qualification method if independent evaluation of the data by one or a combination of the following appears to be most effective:
  - Determination that the employed methodology is acceptable
  - Determination that confidence in the data acquisition or developmental results is warranted
  - Confirmation that the data have been used in similar applications.
- Documents the recommended data qualification method(s) and the factors considered in arriving at the choice(s) and includes with the data package. Documentation include the acceptance criteria used to determine if the are qualified and nationals for discontinuing any qualification methods abandoned after initiation of the qualification process.
- Obtains SNF Site Manager concurrence with data qualification method(s) recommendation.

# Attachment 1

## Suggested Data Qualification Records Package

1. Table of Contents
2. Data summary sheet, technical report, or other format in which the subject data are presented
3. List of current procedural, documentation, and quality assurance requirements
4. List of data, design, performance, or other requirements used for data qualification
5. Background information regarding the data:

Location where data were collected

Person or organization who collected the data

Conditions under which the data were collected

Methodology used to collect data

List of procedural, documentation, and QA requirements in place when the data were generated

Previous reviews or assessments of the data

Information regarding previous uses of the data.

6. Data Source Records

Location of data source records

Information regarding the traceability of data to the source

Raw data (notebooks, lab sheets, inspection travelers, etc.)

Completed data reports.

7. Corroborating Data

8. Confirmatory test reports

9. Similar applications records used to confirm the data during technical assessment

10. Supporting quality assurance records

11. Independent assessment team leader and assessment team indoctrination, training, and qualification records

12. Peer review group indoctrination, training, and qualification records

13. Statement of evaluation and acceptance of qualification and experience for each peer reviewer

14. Data qualification plan

15. Correspondence

16. Equivalent QA program assessment report

17. Confirmatory Test assessment report
18. Corroborating Data assessment report
19. Technical assessment report
20. Peer review report
21. Statement of data qualification by Site SNF manager or other authorized person
22. Other documents as prescribed by site specific procedures.

### **3.3 Data Qualification Processes**

#### **Site SNF Manager**

Appoints an independent team leader to manage the data qualification process. The independence requirements are described in the Definitions section. (An outside consultant is highly recommended.)

#### **Team Leader**

- Develops the Data Qualification Plan including qualification criteria for the data.

**Note:** If peer review is identified for data qualification, ensure the plan addresses the DOE/RW-0333P requirement for planning, conduct, and reporting of peer reviews. The plan must address the following items:

- ◆ Identification of work to be reviewed

- ◆ Size and spectrum of the peer review group
  
- ◆ Expected methods and reporting schedule
  
- ◆ Review criteria that include
  - Validity of assumptions
  
  - Alternate interpretations
  
  - Adequacy of requirements and criteria
  
  - Appropriateness and limitations of methods and procedures used to complete the work under review
  
  - Adequacy of application
  
  - Accuracy of calculations
  
  - Validity of conclusions
  
  - Uncertainties of results and impact if wrong
  
- Selects independent team members according to the data qualification plan and a site- specific procedure that meets the requirements of DOE/RW-0333P detailing the team selection process including indoctrination, training and qualification requirements.
  
- Ensures the size of the team and qualifications of the team members are commensurate with the technical complexity and proposed use of the data.

- Ensures the assessment team includes individuals competent in the technical fields associated with the data and the data qualification process to be used, and knowledgeable about the type of data being reviewed.
  
- Includes a team member competent in the application of DOE/RW-0333P quality assurance requirements.
  
- Ensures indoctrination, training, and qualification of each member is documented and included in the data qualification package.
  
- Ensures the following items are done during the data qualification process:
  - ◆ Full and frank discussions among the reviewers are encouraged.
  
  - ◆ Correspondence, materials, responses to questions and requests for clarifications are distributed to the entire assessment team.
  
  - ◆ Written minutes of meetings, deliberations and review activities are maintained.
  
  - ◆ All review comments are documented and distributed to the entire team.
  
  - ◆ Resolution of review comments is concurred with by the original reviewer.

### **Team Members**

Perform the data qualification as described in the data qualification plan.

### **3.3.1 Equivalent QA Program**

#### **1.1.1.1.1.1.1.1 Team Members**

When equivalent QA Program is one of the data qualification methods invoked in the data qualification plan, the following guidelines are used:

- Determine the technical correctness of the data and document the determination for inclusion in the data package.
- Examine differences between QA controls applied when data was collected and the current DOE/RW-0333P requirements.
- Determine the impact that any differences in QA program could have on the unqualified data.
- Recommend that the data be considered qualified if proof exists that the data were collected and controlled per the existing QA program and any differences between the program and DOE/RW-0333P would have no significant technical effect on the data. The decision to qualify must be unanimous.

### **3.3.2 Corroborating Data**

#### **1.1.1.1.1.1.1.2 Team Members**

- Determine the technical correctness of the data and document the determination for inclusion in the data package.
- Compare unqualified data to independent corroborating data sets.
- Identify source of corroborating data. There must be a strong correlation between data sets. The rationale for selecting one set of data to corroborate another set of unqualified data must be clearly explained and justified. Document data comparisons and conclusions in data assessment report.
- Recommend qualifying data if team concludes unqualified data is consistent with corroborating data set. The decision to qualify must be unanimous.

### **3.3.2 Confirmatory Testing**

#### **1.1.1.1.1.1.1.3 Site SNF Manager**

- If confirmatory testing is needed, initiates a test program in accordance with an approved QA program conforming with DOE/RW-0333P requirements. Testing may be conducted using different test methods and equipment than the original test, but must still investigate the same parameters of interest.
- Ensures test data is transmitted to the Cognizant Technical Person for inclusion in the data qualification package.

#### **1.1.1.1.1.1.1.4 Cognizant Technical Person**

- Ensures confirmatory test data are appropriate for use in the qualification process and included in the data package. Updates the data package for data added as a result of confirmatory tests.
- Transmits the updated package to the Team Leader

#### **1.1.1.1.1.1.1.5 Team Members**

- Determine the technical correctness of the data and document the determination for inclusion in the data package.
- Compares the test results with the data being reviewed.
- Reviews QA controls in place for confirmatory testing.
- Ensures controls meet the requirements of DOE/RW-0333P.
- Recommends qualifying the unqualified data if the data are consistent with the confirmatory test results. The decision to qualify must be unanimous.

### **3.3.4 Peer Review**

#### **Team Members**

- Review data package per the established plan ensuring the following items are addressed:
  - ◆ Validity of assumptions
  - ◆ Alternate interpretations
  - ◆ Adequacy of requirements and criteria
  - ◆ Appropriateness and limitations of methods and procedures used to complete the work under review
  - ◆ Adequacy of application

- ◆ Accuracy of calculations
  - ◆ Validity of conclusions
  - ◆ Uncertainties of results and impact if wrong
- Prepare an in-depth report of the proceedings and conclusions of the peer review, per site specific procedure. Provide a recommendation for the qualification status of the data.
  - Obtain concurrence signature of each reviewer, or list which reviewer(s) has not signed and the reasons for not signing.
  - Include individual statements by peer reviewers reflecting dissenting views or comments.

### **3.3.5 Technical Assessment**

#### ***1.1.1.1.1.1.1.6 Team Members***

- Review the data package per the established plan and procedures by one or a combination of the following methods:
  - ◆ Determine the method used for data collection and review the method for acceptability.
  - ◆ Determine the confidence levels associated with the data acquisition or developmental results
  - ◆ Confirm the similar applications that have previously used the data.
- Prepare an in-depth report of the proceedings and conclusions of the technical assessment, per site specific procedure. Provide a recommendation for the qualification status of the data.
- Obtain concurrence signature of each reviewer, or list which reviewer(s) has not signed and the reasons for not signing.
- Include individual statements by team members reflecting dissenting views or comments.

### **3.4 Data Qualification Reporting**

#### **Team Leader**

- Compiles a data qualification report per the data qualification plan and site specific procedures. The report should include a description of the data qualification methodologies utilized, the results of the assessment and a recommendation that the data should either be qualified or not qualified.
- If the assessment team recommends the data be qualified, transmits the data package and data qualification report to the Site SNF Manager.
- If data cannot be qualified, transmits the data package to the Cognizant Technical Person with recommendations for additional information required to qualify the data or recommendations to abandon use of the data.

#### ***1.1.1.1.1.1.1.7 Cognizant Technical Person***

When the data package is returned with recommendations not to qualify, initiates action necessary to provide additional basis for qualification. If further action cannot be taken, abandons use of the data and obtains SNF Site Manager concurrence.

#### ***1.1.1.1.1.1.1.8 Site SNF Manager***

- Reviews the data qualification report.
- Makes the decision to accept or reject the recommendation of the assessment team.
- Documents the rationale for the decision.

### **3.5 Release Qualified Data Package**

#### **Site SNF Manager**

- Releases qualified data packages for use.
- Ensures that data qualification package is controlled as a QA record.

### **4. Quality Assurance Records**

The qualified data package and supporting documents described in Attachment 1 should be considered quality assurance records.

### **5. References**

DOE/RW-0333P, AOffice of Civilian Radioactive Waste Management Quality Assurance Requirements and Description,≡ Revision 6.

NUREG 1297, APeer Review for High-Level Nuclear Waste Repositories.≡

NUREG 1298, AQualification of Existing Data for High-Level Nuclear Waste Repositories.≡

