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# Differing Approaches to the Same Destination: SRS vs. Hanford Transportation Safety Document and Onsite Transportation Program – 17142

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## ABSTRACT

The United States Department of Energy, DOE Order 460.1C establishes packaging and transportation requirements to ensure the safety of DOE shipments of hazardous material. In accordance with DOE Order 460.1C, there are two general ways that radioactive material can be transferred if remaining within the boundary of a DOE site (i.e., onsite): 1) Packages can be transferred fully compliant with U. S. Department of Transportation (DOT) requirements; or 2) Packages can be transferred under an appropriately approved site-specific Transportation Safety Document (TSD) DOE G 460.1-1 - *The Implementation Guide for Use with DOE Order 460.1A Packaging and Transportation Safety* specifies the required format, content, and approval process for TSDs, but also allows great flexibility. Although developed using the same guidance, both the Savannah River Site and Hanford Site TSD programs were developed largely independent of each other. This paper compares both programs. Although at first glance the approaches seem dauntingly different, both result in surprisingly similar equivalent safety.

## INTRODUCTION

Both the *SRS Transportation Safety Document* (TSD) (Ref. 1) and the Hanford TSD (Ref. 2) were developed in accordance with DOE G 460.1 (Ref. 3), following a thirteen-chapter format. The SRS TSD is about 40 pages long, while the Hanford TSD is approximately 650 pages. While about 350 plus pages in the Hanford TSD are appendices/attachments, there are still 300 pages comprising the 13-chapter format that directly compares with the 40 pages in the SRS TSD. In addition, different mechanisms and nomenclature are used for implementing each of the programs. Because of the overwhelming visual differences between the TSD, interaction and benchmarking between the programs has been mostly limited.

The goal of this paper is to: 1) show the underlying/hidden similarities between both programs, 2) allow for greater ease when interacting between the programs, and 3) show how both result in equivalent safety.

## DISCUSSION

The stated purpose of the SRS TSD is stated as (Ref. 1):

> "TSD defines the onsite packaging and transportation safety program at the Savannah River Site (SRS) and demonstrates its compliance with DOE transportation safety requirements, to include DOE Order 460.1C (Ref. 1), DOE Order 461.2 *Onsite Packaging and Transfer of Materials of National Security Interest* (Ref. 4), and 10 CFR 830-*Nuclear Safety Management* (Ref. 5) Subpart B. This TSD is further implemented in SRS Manual 19Q - *Transportation Safety Manual* (Ref. 6)."

While the purpose of the Hanford TSD is (Ref. 2):

> "This TSD defines the onsite packaging and transportation program at the Hanford Site, which complies with the transportation safety requirements specified in DOE Order 460.1C- *Packaging and Transportation Safety* (Ref. 4). This TSD is the onsite documented safety analysis (DSA) for packaging and transportation activities. Package-specific safety documents (PSSD) demonstrate compliance with the DSA for specific packages used onsite, and are considered to be part of the packaging and transportation safety basis. The TSD complies with the safe harbor methodology prescribed in Title 10 CFR 830 - *Nuclear Safety Requirements* (Ref. 4), documenting compliance with the nuclear safety rule for packaging and transportation activities."

As seen by comparing the two the purposes of each site's TSD, the SRS TSD is also further implemented through SRS Manual 19Q (Ref. 6), the *SRS Transportation Safety Manual*. The Hanford TSD on the other hand, is more descriptive and requires no further site implementation documents.

### Difference in Definitions of Onsite Transfers

Also according to Chapter 1, the SRS TSD cover all onsite transfers, with onsite transfers defined as staying within the contiguous fenced, access controlled, outer perimeter of SRS and do not cross or travel along a public access road and travel outside the boundary of a facility documented safety analyses. Slightly different, the Hanford TSD applies to the movement by rail or vehicle of DOE owned materials within and between onsite facilities. The difference between both TSDs is required because the supporting facilities at Hanford may not be contiguous. Both require annual reviews, with revisions made as necessary.

## Difference in Package Evaluations and Terminology

Comparison of the TSD Chapter 2 acronyms shows some key differences in terminology between the TSDs. For SRS the evaluation of onsite packages is documented in Onsite Safety Assessments (OSAs), while Hanford uses *Package-Specific Safety Document (PSSD). At Hanford Special Packaging Authorizations (SPAs)* provide DOE preapproved packaging solutions for routine on-site payloads, such as building debris, soil, rock, and limited building debris, retrieval packages (both drum and non-drum). The SPA provides the transportation safety basis and pre-approved packaging configurations with controls matched to applicable payloads.

Hanford DOT-equivalent packagings (performance-based packagings) must comply with Hanford-defined performance standards based on the Hanford Site transportation environment. Although slightly different, SRS allows for deterministic-based packaging assessments for Type B material quantities where the transport system is expected to prevent loss of containment for both normal handling and for site-specific Credible Abnormal Conditions (CAC), but for Type A or lesser material quantities, for performance-based packaging not meeting NRC/DOE/DOT requirements, SRS assumes that the packaging fails under abnormal conditions, and the quantities of material transported are limited such that no offsite receives more than 5 rem exposure from an accident.

If the packages do not meet DOT equivalencies, DOE Guide 460.1-1(Ref. 3) allows use of risk-based methodologies to demonstrate safety equivalency, but does not specify, nor restrict the methodologies to be used, or the conditions for acceptability, but simply requires that the methodologies are described in the TSD. Hanford non-DOT-equivalent packagings (risk-based packagings) are Hanford non-DOT-equivalent packagings authorized under a dose consequence/risk assessment methodology, where the receptor at the site boundary would receive more than 5 rem exposure from an accident. For SRS onsite risk-based transfers, the maximum exposure shall be less than or equal to 5 rem at the site boundary, and as well as less than or equal to 100 rem at 100 meters from the accident, with a maximum risk criterion set at 5E-2 rem/yr.

## Differences in Organizational Responsibilities

Chapter 4 of both TSDs shows the lines of authority, also called organizational responsibilities. For Hanford, the DOE has site wide responsibility for onsite packaging and transportation activities, while responsibility at SRS lies with the site Management and Operations contractor.

## Differences in Site Specific Standards, Procedures and Instructions

Although Chapter 6 is entitled *Site-Specific Standards, Procedures, and Instructions*, Hanford restates specific sections of federal regulations, codes and

standards, as well as DOE orders, standards, and guides, procedures are to be followed when conducting onsite shipments at the Hanford Site, with a detailed delineation of the Hanford packaging performance standards. With SRS, various SRS site level manuals and procedures are referenced.

In an almost checklist type of approach, Chapter 6 of the Hanford TSD allows for a criteria-by-criteria review of the package requirements that must be evaluated. Implicit in the SRS TSD, the package reviewer will rely on guidance such as that from NuReg1609 - *Standard Review Plan for Transportation Packages for Radioactive Material* (Ref. 16).

## Safety Assessment Methodology

Chapter 7 is Safety Assessment Methodology and is a key chapter in understanding any substantial differences between TSD programs.

At SRS, an OSA is written to demonstrate safety equivalence. SRS Manual 19Q, Procedure 4.04 - *Development of Onsite Safety Assessments for Radioactive Material Transfers* provides guidelines for creation of these documents. Equivalence is frequently demonstrated through an evaluation of packaging performance that shows requirements are met deterministically. However, at both SRS and Hanford a risk-based approach is used. As previously discussed at SRS for onsite risk-based transfers, dose criteria of both less than or equal to 5 rem at the site boundary and less than or equal to 100 rem at 100 meters.

In Chapter 7, SRS addresses:

- General Information
- 10 CFR 830 (Ref. 5)
- DOE Order 460.1C (Ref. 3)
- OSA methodology
    - Dose criteria
    - Calculations for airborne release dose
    - calculations for direct shine dose
    - calculations for airborne release and direct shine dose
    - nuclear criticality safety methodology
    - risk-based methodology
    - additional considerations
        - Special packaging requirements and packaging design features
        - normal and routine conditions of transport
        - credible abnormal (rather than hypothetical) accident conditions
- Emergency response
- OSA controls and programmatic attributes
- Performance graded closure instructions for packagings
- OSA implementation process
- Transportation onsite transportation report methodology (for packages containing less than hazard category 3 quantities of radioactive materials)

In Chapter 7, Hanford addresses:

- Methodology for equivalent safety
- Compliance methods
  - DOT compliance
  - DOT-equivalent packaging
  - Risk based packaging (risk based equivalent radiological and toxicological protection)
- Evaluation and acceptance criteria
  - DOT-equivalent packagings
    - Evaluation requirements and acceptance criteria for IP-2, IP-3, and Type A packagings
    - Evaluation requirements and acceptance criteria for fissile and Type B packagings
  - Risk based packagings
    - Evaluation requirements and acceptance criteria for risk based packages
    - Frequency analysis methodology

To determine the Source Term (ST), or radioactive material released into the atmosphere, the "five factor formula" from DOE-HDBK-3010-94(7), *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities*, is used at SRS.

$$ST = MAR*DR*ARF*RF*LPF \quad \text{(Equation 1)}$$

Where:

MAR = Material at Risk (curies or grams)
DR = Damage Ratio
ARF = Airborne Release Fraction
RF = Respirable Fraction
LPF = Leak Path Factor
Once the source term has been determined, the dose can be calculated.

$$Dose = ST*\chi/Q*BR*DCF \quad \text{(Equation 2)}$$

Where:

$\chi/Q$ = relative dispersion (sec/cubic meter) calculated from atmospheric modeling
BR = Breathing Rate (cubic meters/sec)
DCF = Dose Conversion Factor (Sv/Bq), usually obtained from ICRP-68, *Dose Coefficients for Intakes of Radionuclides by Workers*, and ICRP-72, *Age-dependent Doses to the Members of the Public from Intake of Radionuclides*.

Frequently, unit doses are calculated per isotope that combine [$\chi/Q*BR*DCF$] into one single Total Effective Dose (TED) value (Rem/Ci). However, there is a separate TED unit dose for each receptor of interest (i.e., offsite and onsite). For derivation

of OSA limits, it is typical to start with the maximum dose allowable and work backward to compute an acceptable MAR limit in either dose equivalent curies (DEC) or plutonium equivalent curies (PEC).

Liquid pathway route calculations should not be used for acute releases as they do not make a significant contribution to the dose from the initial airborne release. Airborne inhalation dose is the dominant short-term dose pathway to both the onsite and offsite receptors.

Table 7-1 in the SRS TSD includes additional considerations for dose calculations.

**Table 1. Dose Calculation Considerations**

| Parameter | Criteria |
|---|---|
| MAR | Constituency (e.g., Curies/gal, Curies/kg, specific gravity, density) should provide reasonable bound of process being evaluated. |
| DR | Normally, DR = 1.0. |
| ARF or RF | Should be bounding value from DOE-HDBK-3010 for type of material (liquid, powder, solid, etc.) and type of stress applicable (free fall, evaporation, rigorous boiling, etc.) to scenario being evaluated. |
| LPF | Calculation should use 1.0. |
| ST = MAR*DR*ARF* RF*LPF | Ensure math done properly to calculate the source term. |
| Atmospheric Dispersion ($\chi$/Q) *[The $\chi$/Q takes the ST at the point of release and determines how much is remaining at the receptor location.]* | Onsite co-located receptor should be assumed to be at 100 meters from point of release. Normally a ground-level release is assumed. |
| | Onsite $\chi$/Q must be 3.5E-3 sec/cubic meter per DOE-STD-1189, Appendix A. |
| | Offsite $\chi$/Q must use 95$^{th}$ percentile value from a 5-year meteorology data set. |
| | The $\chi$/Q must be appropriate/conservative to the release time (e.g., explosion event would use a 3-minute $\chi$/Q; a 2-hour spill would use a 2-hour $\chi$/Q). |
| | The model should factor in a site specific dry deposition velocity, but no wet deposition (from rainfall) should be included per S-ESR-G-00034, Revision 0, *PNNL-22736: Dry Deposition Velocity Estimation for the Savannah River Site, Part 2 – Parametric and Site-Specific Analysis.* |
| | The model should factor in an appropriate surface roughness. For the offsite $\chi$/Q, this is normally set at 160 cm, per SRNL-STI-2012-00016, Revision 1, *Roughness Lengths for the Savannah River Site*. |
| BR | The assumed BR in the model should be 3.3E-4 m$^3$/sec per DOE-HDBK-3010-94. |
| DCF *[The DCF takes the ST (in Curies or Kg) and converts to REM.]* | The DCF should be the 50-year Committed Effective Dose (CED) taken from ICRP-68 (for 100 m co-located workers) and ICRP-72 (for offsite). |
| Dose = ST* $\chi$/Q*BR*DCF | Ensure math done properly to calculate resulting dose to 100 m and offsite receptor. |

SRS OSAs require detailed evaluation for the case of transfers that contain sufficient curies to produce a meaningful direct shine dose (unshielded) contribution at 100 meters

As allowed by the Orders and DOE guidance, credit is taken for the controlled transportation environment of SRS. Thus, in the context of CAC, equivalent safety shall be achieved by evaluating only credible abnormal accident condition scenarios. The threshold of credibility is 1E-6/yr. (once in a million years). Frequency analyses may be conducted to determine the probability of accident events during a transfer campaign. If an event is shown to be “beyond extremely unlikely” (less probable than 1E-6/yr.), the event is not credible and need not be evaluated further. Design basis condition scenarios or relevant events not evaluated probabilistically (risk-based) shall be evaluated deterministically (i.e., considering package performance under actual site conditions). Source terms shall be established and packaging performance evaluated. Package content limits for risk-based/deterministic technical safety bases documents (for accident scenarios) are the maximum allowed to meet the dose criteria (risk-based) or CAC limits (deterministic). This methodology does not invoke a “margin of safety” into the accident content limits. “Risk” is the relevant basis for determining equivalent safety associated with CACs.

Chapter 7 of the Hanford TSD instead focuses on delineating NuReg 1609 (Ref. 8) type evaluation/acceptance of packages. Risk-based methodology similar to SRS Chapter 7 is instead found in Appendix G of Hanford’s TSD (addressed in Section 3.1.10).

## Routine and Non-Routine Onsite Transfers

At SRS both Non-Routine and Routine Onsite Transfers of hazardous material onsite are governed by Manual 19Q, and discussed in the SRS TSD Chapters 8 and 9 respectively. Radioactive materials, including mixed waste, are transferred onsite either in DOT compliant packaging or in a safety-equivalent manner as described in Chapter 7 of the TSD. Radioactive packaging authorized for use onsite is listed on the SRS Radioactive Packaging Approval Log.

For Hanford, Chapter 8 describes the processes and procedures used to make routine onsite shipments. All packagings prepared and shipped as routine must be authorized and fully comply with the provisions of the TSD. Basic procedures and processes, as well as general requirements for all onsite shipments are included in Chapter 8. Chapter 9 discusses how non-routine transfer is sub-divided into two categories: Exemption Requests and Emergency Transfers. One Time Request for Shipment (OTRSs) are exemption requests and are risk based following the risk methodology in this TSD. As an exemption, they are not subject to the $USQ_T$ program.

## Qualification / Training and Recordkeeping

Chapter 10 of the format addresses Qualification and training requirements. At SRS Qualification and training requirements are addressed in Manual 19Q, Procedure 1.03 - *Packaging and Transportation Personnel Training and Qualification* and Procedure 2.07- *Motor Carrier Safety*. At Hanford, this chapter describes the qualification and training requirements for Hanford Site contractor hazmat personnel, authorized shippers, drivers, and $USQ_T$ evaluators. Individual facilities and organizations, to which personnel may be assigned, may establish additional qualifications and required training based on specific job task analysis, job classification, or individual training plan. Each Hanford Site contractor must have a personnel training and qualification program that emulates the requirements identified in 49 CFR 172, Subpart H –*Training* (Ref. 10).

Chapter 11 of the format addresses documentation and record keeping. At SRS the various documents that are generated and utilized as a part of the TSD are controlled and processed in accordance with SRS Manual 1B, Procedure 3.32 - *Document Control* (Ref. 11) Any records generated as a result of TSD program activities are processed in accordance with SRS Manual 1B, Procedure 3.31- *Records Management* (Ref. 12). For Hanford this document lists the documentation requirements, the packaging documentation requirements, including those for excepted packaging and documents, the industrial packaging Documents, Type A Packaging requirements and Type B and Fissile Packaging Documents, Payload classification of records, training and qualification records including HAZMAT employees, drivers, $USQ_t$ evaluators, vehicle maintenance and inspections records, and shipping papers.

## Incident Reporting and Emergency Response

Chapter 12 of the format addresses incident reporting and emergency response. SRS Manual 19Q, Procedure 1.05*Transportation Emergency Response*, defines the requirements for emergency response during shipment/transfer of hazardous materials (including hazardous and mixed waste). This procedure augments other site manuals, including SRS Manual 6Q - *Emergency Plan Management Program* (Ref. 13); SCD-7, *SRS Emergency Plan*, Section 15, *Emergency Management Program for Transportation* (Ref. 14); and SRS Manual 9B - *Site Item Reportability and Issue Management (SIRIM*) (Ref. 15). In addition, 49 CFR 172 (Ref. 10) specifies emergency response information. Chapter 12 provides a summary of the SRS requirements. For Hanford this chapter describes requirements for incident reporting, emergency response, and references Hanford Site-specific policies, manuals, and procedures for emergency management. It also addresses emergency planning, drills and exercises, and Hanford Site response capabilities. DOE/RL-94-02 - *Hanford Emergency Management* (Ref. 16) details the Hanford Site emergency organization, authorities, and responsibilities for response to and mitigation of emergency events involving facilities and activities on the Hanford Site including

transportation. These events include the full spectrum of operational emergencies, natural phenomena, transportation events, as well as safeguard and security emergencies. The HEMP also describes the authorities, responsibilities, and agreements for response to offsite and near-site facility emergencies that have the potential for detrimentally affecting the health of personnel and safety of operations at the Hanford Site. In addition to the program for response to and mitigation of emergencies, the HEMP also provides direction on the activities necessary to ensure emergency preparedness on the Hanford Site such as training, drills, exercises, and assessments. The authority and responsibility for interfaces with offsite organizations responsible for protecting the public and the environment, including those agencies that may provide or request support in the event of an emergency are also delineated.

## Transport Vehicle Operations

Chapter 13 of the format covers transport vehicle operations. At SRS, this TSD chapter provides a summary of the vehicle operator duties and procedures, maintenance and inspection requirements, and associated procedures is contained in Manual 19Q, as well as Manual D4 -*Transportation Administrative Procedures* (Ref. 17).

For Hanford, this chapter describes the requirements for motor vehicle inspection and maintenance programs for Packaging and Transportation activities on the Hanford Site. References to specific requirements and procedures are provided for use by each contractor or subcontractor conducting transportation operations within Hanford Site boundaries.

DOE-Richland, DOE- Office of River Protection, and their contractors performing transportation operations, fleet operations, or vehicle maintenance for onsite transportation of hazardous material must implement programs, polices, and procedures necessary to meet the provisions of this TSD. Program Requirements address key elements as applicable to the specific onsite transportation operation.

## Hanford TSD Appendices

The SRS TSD contains no appendices, while the Hanford TSD contains Appendices A through J. Appendix A of the Hanford TSD is an approved package transportation safety documents list. Tables it contains:

- DOT Compliant Packages with Approved CoC
- Hanford Site (Onsite) Equivalent PSSDs
- Non TSD Compliant Hanford Site (Onsite) Equivalent PSSDs
- Hanford Site (Onsite) Risk Based PSSDs
- Hanford Site (Onsite) Non TSD Compliant Risk Based PSSDs
- Hanford Site (Onsite) Exempted Packages

At SRS such a list is maintained as part of the online as the *Radioactive Package Authorized List* (RPAL) (Ref. 18).

Appendix B of the Hanford TSD is justification and basis for equivalency to DOT regulations for type b and fissile packages transported on the Hanford site. At SRS, similar information is mostly contained in the Chapter 6 and 7 of the TSD and within the OSA.

Appendix C of the Hanford TSD details the Hanford unreviewed safety question for transportation ($USQ_T$) process. At SRS the requirements of 10 CFR 830 (5) part 203 for USQ for non-DOT-compliant onsite transfers (i.e., transportation safety questions, TSQs) are met by Manual 19Q, Procedure 4.05.

Appendix D of the Hanford TSD details the technical safety requirements for Hanford's onsite transportation and packaging. An overview of TSRS is provided in Chapter 7 of the SRS TSD, with Chapter 7.6 discussing (TSR type) OSA controls and programmatic attributes. Actual controls and programmatic attributes are provided in each of the applicable OSAs.

Appendix E of the Hanford TSD details the package-specific safety document contents and format. No similar guide exists for SRS, instead allowing adaptations of NuReg 1609 (Ref. 8) and similar to be used for a guide.

Appendix F of the Hanford TSD provides additional guidance for preparation of package specific safety documents. This chapter states that DOE has established UCID-21218 - *Packaging Review Guide for Reviewing Safety Analysis Reports for Packagings* (Ref. 19). The evaluation process described in the PRG relies substantially on 10 CFR 71 (Ref. 20) and the following other NRC documents:

- NuReg-1609 - *Standard Review Plan for Transportation Packages for Radioactive Material* (Ref. 8)
- NuReg-1617 - *Standard Review Plan for Transportation Packages for Spent Nuclear Fuel* (Ref. 21)
- Regulatory Guide 7.9 - *Standard Format and Content of Part 71 Applications for Approval of Packaging for Radioactive Material* (Ref. 22)

Other regulatory guides and NUREG reports that provide guidance on criteria for evaluating transportation packages. Additionally, Regulatory Guide 7.10 - *Establishing Quality Assurance Programs for Packaging Use in Transport of Radioactive Material* (Ref. 23), and the (U.S. DOE) *SARP Completeness Checklist* (Ref. 24) provide further details on expected contents of SARPs to demonstrate equivalent safety to full NRC licensing.

Appendix G of the Hanford TSD provides justification and basis for shipment of risk-based packages. Section 1.1 summarizes application of the unreviewed safety

question process for transportation ($USQ_T$) on the approval process for risk-based packages. Section 1.2 summarizes the approach for demonstrating equivalence to U.S. Department of Transportation (DOT) Hazardous Materials Regulations (HMR) for risk-based packages. Section 1.3 describes the methodology to analyze onsite transportation accidents and a typical data set example used to calculate accident release frequencies and consequences from transportation accident scenarios. The Source term methodology found in Section 7.4.2 of the SRS TSD is found in Section 1.3.

Appendix H of the Hanford TSD provides example checklists. The examples may be used as a starting point for developing checklists to be used when conducting onsite shipments. They include:

• Hazardous Material/Waste Checklist - Highway Milkrun Shipments
• Checklist for Radioactive Material by Highway
• Radioactive Mixed Waste Checklist
• Non-radioactive Hazardous Waste Checklist, Truck Freight (1162 Bldg. Review)

Appendix I of the Hanford TSD provides TSD evaluated Special Packaging Authorization (SPA) is a specific class of DOE pre-approved packages / packaging systems where the hazard and transportation safety analyses have been conducted and the results included in the TSD as the authorization basis document. SPAs are intended to eliminate the need and cost of conducting multiple One Time Requests for Shipment (OTRSs) for either similar shipments of low activity /high volume payloads, or high activity/ high volume payloads where a Type B package is either unavailable or would be cost prohibitive to produce (e.g. SPAs are risk based). A SPA consists of specific payload(s) and authorized packages / packaging systems, and required Administrative and Engineered Controls. Changes to the SPA are not subject to evaluation and contractor approval under the $USQ_T$ program. The following SPAs are currently authorized:

- Contaminated Equipment (CE)
- Retrieval Packages (R)
- Dirt & Burial Ground Debris (DBGD)
- Monolith (M)
- Fuel (F)

The basic general concept of these SPAs is that the payload to be shipped is contained in multiple packages or confinement layers sufficient to meet normal conditions of transport without failure. Additional layers of confinement are then added to the package to reduce the risk of releases under accident conditions that may be encountered onsite.

Appendix I of the Hanford TSD provides guidance on conducting SPA related, DOE approved packaging evaluations. A SPA consists of specific Packaging(s) and authorized packages / packaging systems, and required Administrative and

Engineered Controls and contains of at a minimum, a Containment Boundary (CtB) and Confinement Boundary (CfB) and associated Administrative Controls. based on the packaging, the packaging system containment system may use Industrial Packages (IP), Type A packages, or Type B Packages for the CtB. Depending upon which SPA is being used and associated Packaging requirements, an authorized Packaging System is determined. This packaging system consists of DOT packages (IP-1, IP-2, Type A or Type B, or DOE-approved equivalents) either singly or as multiple packages. Normally the DOT package is procured with a pedigree (Certificate) that documents that the package meets regulatory performance requirements necessary for the type of DOT package. While the preferred approach is for the offeror to use packages that have been documented as meeting DOT packaging requirements, there are instances where it is necessary to document that a package is equivalent to a particular type of DOT package for compliance with transportation safety requirements (usually SPA requirements). The method for the offeror to request an equivalency to a DOT packaging type is a Packaging Evaluation (PE). DOE-Richland Office approves PEs. A separate PE will be conducted for each package requiring a DOT equivalency for a specific packaging shipping configuration.

PEs may be submitted either for new packaging systems or to evaluate existing packaging systems. For existing packaging systems, care must be taken to ensure that the PE being submitted reflects the actual packaging system being requested. For example, use of as-builts in a PE to analyze a twenty-year-old retrieved container without considering the effects of potential package deterioration due to aging, material degradation, or exposure to the elements would result in a PE that does not adequately reflect the packaging being submitted for approval.

It is the reviewer's responsibility to ensure that the PE is sufficiently detailed and contains adequate analysis and supporting documentation to allow the RL review team to conduct its review. The PE will be submitted sufficiently in advance to provide RL with time to conduct its review, conduct comment resolution and to approve the PE. For a typical PE this is usually a minimum of 20 working days in advance of the proposed shipping date. Longer lead times may be required for more complex or technically challenging packaging systems.

## SUMMARY

The results indicate that both TSDs accomplish the same function, hence provide equivalent safety. The difference between the two documents is the SRS TSD generally references SRS site level guidance, while the Hanford TSD delineates guidance within the body of the document. Much of the variance is explained by the historical difference in document control systems and strategies. SRS has maintained an integrated document control system for all of SRS, including all contractors and DOE organizations supporting SRS, while Hanford's document

control has been less centralized/integrated, driving the desire that the Hanford TSD be an all-inclusive document.

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