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| **SUBISSUE 1 - System Description and Demonstration of Multiple Barriers** | | | |
| **Transparency and Traceability of the Analysis** | | | |
| **TSPA Documentation Style, Structure, and Organization** | | | |
| T1) Documents and reports are complete, clear, and consistent. | All PMRs, TSPA-SR | Largely Resolved | The TSPA-SR is currently being performed. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| T2) Information is amply cross referenced. | All PMRs, TSPA-SR | Largely Resolved | The TSPA-SR is currently being performed. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| **Features, Events, and Processes Identification and Screening** | | | |
| T1) The screening process by which FEPs were included or excluded from the TSPA is fully described. | All PMRs, FEP AMRs, TSPA-SR Section 1.6 | Largely Resolved | Each TSPA-SR component will include a table of included FEPs. A table of excluded FEPs will be in an appendix to the TSPA-SR. The screening process utilized to include or exclude FEPs is described in various documentation including the TSPA-SR Technical Report and the FEP AMRs. The TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by NRC to close this acceptance criteria. |
| T2) Relationships between relevant FEPs are fully described. | FEP AMRs, TSPA-SR Section 3 | Partially Resolved | Each TSPA-SR component will include a table of included FEPs. A table of excluded FEPs will be in an appendix to the TSPA-SR. This approach needs to be reviewed by the NRC to determine if the acceptance criteria has been satisfied**.** |
| **Abstraction Methodology** | | | |
| T1) The levels and method(s) of abstraction are described starting from assumptions defining the scope of the assessment down to assumptions concerning specific processes and the validity of given data. | All PMRs, TSPA-SR Section 3 | Largely Resolved | For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. These documents provide detailed descriptions of the levels and methods of abstraction. |
| T2) A mapping (e.g., a road map diagram, a traceability matrix, a cross-reference matrix) is provided to show what conceptual features (e.g., patterns of volcanic events) and processes are represented in the abstracted models, and by what algorithms. | TSPA-SR Section 3 | Partially Resolved | The TSPA-SR is currently being performed. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |

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| T3) An explicit discussion of uncertainty is provided to identify which issues and factors are of most concern or are key sources of disagreement among experts. | All PMRs, TSPA-SR Section 3, TSPA-SR Section 5 | Largely Resolved | The TSPA-SR is currently being performed. This document provides descriptions of the treatment of uncertainty for each component model and describes uncertainty importance analysis results. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| **Data Use and Validity** | | | |
| T1) The pedigree of data from laboratory tests, natural analogs, and the site is clearly identified. | | | To be discussed at PMR Technical Exchanges. |
| T2) Input parameter development and basis for their selection is described. | | | To be discussed at PMR Technical Exchanges. |
| T3) A thorough description of the method used to identify performance confirmation program parameters. | | | To be discussed in the Performance Confirmation Plan. |
| **Assessment Results** | | | |
| T1) PA results (i.e., the peak expected annual dose within the compliance period) can be traced back to applicable analyses that identify the FEPs, assumptions, input parameters, and models in the PA. | All PMRs, TSPA-SR Section 4 | Partially Resolved | The TSPA-SR is currently being performed. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| T2) The PA results include a presentation of intermediate results that provide insight into the assessment (e.g., results of intermediate calculations of the behavior of individual barriers). | All PMRs, TSPA-SR Section 4 | Partially Resolved | The TSPA-SR is currently being performed. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| **Code Design and Data Flow** | | | |
| T1) The flow of information (input and output) between the various modules is clearly described. | TSPA-SR Section 2.2 | Largely Resolved | The TSPA-SR is currently being performed. For this acceptance criteria to be closed, the TSPA-SR Technical Report will need to be reviewed by the NRC. |
| T2) Supporting documentation (e.g., user's manuals, design documents) clearly describes code structure and relationships between modules. | TSPA-SR | Partially Resolved | The TSPA-SR is currently being performed. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting documentation will need to be reviewed by the NRC. |
| **Demonstration Of Multiple Barriers** | | | |
| Will be developed in Revision 3 of the IRSR | TSPA-SR | Partially Resolved | |

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| **SUBISSUE 2 - Scenario Analysis** | | | |
| **Identification of an Initial Set of Processes and Events Data** | | | |
| 1) DOE has identified a comprehensive list of processes and events that: (1) are present or might occur in the Yucca Mountain region and (2) includes those processes and events that have the potential to influence repository performance. | FEP AMRs, TSPA-SR | Largely Resolved | Each TSPA-SR component will include a table of included FEPs. A table of excluded FEPs will be in an appendix to the TSPA-SR. The TSPA-SR Technical Report and supporting PMRs and FEPs AMRs will need to be reviewed for comprehensiveness by the NRC to close this acceptance criteria. |
| **Classification of Processes and Events** | | | |
| 1) DOE has provided adequate documentation identifying how its initial list of processes and events has been grouped into categories. | FEP AMRs, TSPA-SR Section 1.6, TSPA-SR Section 3 | Largely Resolved | The TSPA-SR Technical Report, supporting PMRs, and FEPs AMRs will need to be reviewed by the NRC to close this acceptance criteria. |
| 2) Categorization of processes and events is compatible with the use of categories during the screening of processes and events. | FEP AMRs, TSPA-SR Section 1.6, TSPA-SR Section 3 | Largely Resolved | The TSPA-SR Technical Report, supporting PMRs, and FEPs AMRs will need to be reviewed by the NRC to close this acceptance criteria. |
| **Screening of Processes and Events** | | | |
| 1) Categories of processes and events that are not credible for the YM repository because of waste characteristics, repository design, or site characteristics are identified and sufficient justification is provided for DOE's conclusions. | FEP AMRs, TSPA-SR | Largely Resolved | A table of excluded FEPs will be in an appendix to the TSPA-SR. The TSPA-SR Technical Report, supporting PMRs, and FEPs AMRs will need to be reviewed by the NRC to close this acceptance criteria. |
| 2) The probability assigned to each category of processes and events not screened based on criterion T1 or criterion T2 is consistent with site information, well documented, and appropriately considers uncertainty. | FEP AMRs, TSPA-SR | Largely Resolved | Each TSPA-SR component will include a table of included FEPs. The TSPA-SR Technical Report, supporting PMRs, and FEPs AMRs will need to be reviewed by the NRC to close this acceptance criteria. |
| 3) DOE has demonstrated that processes and events screened from the PA on the basis of their probability of occurrence, have a probability of less than one chance in 10,000 of occurring over 10,000 years. | FEP AMRs, TSPA-SR | Largely Resolved | A table of excluded FEPs will be in an appendix to the TSPA-SR. The TSPA-SR Technical Report, supporting PMRs, and FEPs AMRs will need to be reviewed by the NRC to close this acceptance criteria. |
| 4) DOE has demonstrated that categories of processes and events omitted from the PA on the basis that their omission would not significantly change the calculated expected annual dose, do not significantly change the calculated expected annual dose. | FEP AMRs, TSPA-SR | Largely Resolved | A table of excluded FEPs will be in an appendix to the TSPA-SR. The TSPA-SR Technical Report, supporting PMRs, and FEPs AMRs will need to be reviewed by the NRC to close this acceptance criteria. |

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| **Formation of Scenarios** | | | |
| 1) DOE has provided adequate documentation identifying: (i) whether processes and events have been addressed through consequence model abstraction or scenario analysis and (ii) how the remaining categories of processes and events have been combined into scenario classes. | FEP AMRs, TSPA-SR | Largely Resolved | Documentation pertaining to FEPs screening is contained primarily in the FEP AMRs and the TSPA-SR Technical Report. The TSPA-SR Technical Report, supporting PMRs, and FEPs AMRs will need to be reviewed by the NRC to close this acceptance criteria. |
| 2) The set of scenario classes is mutually exclusive and complete. | FEP AMRs, TSPA-SR | Largely Resolved | Documentation pertaining to FEPs screening is contained primarily in the FEP AMRs and the TSPA-SR Technical Report. The TSPA-SR Technical Report, supporting PMRs, and FEPs AMRs will need to be reviewed by the NRC to close this acceptance criteria |
| **Screening of Scenario Classes** | | | |
| 1) Scenario classes that are not credible for the YM repository because of waste characteristics, repository design, or site characteristics, individually or in combination, are identified and sufficient justification is provided for DOE's conclusions. | FEP AMRs, TSPA-SR | Largely Resolved | All scenario classes generated by the FEP screening process were retained for the TSPA-SR. Documentation pertaining to FEPs screening of scenario classes is contained primarily in the FEP AMRs and the TSPA-SR Technical Report. The TSPA-SR Technical Report, supporting PMRs, and FEPs AMRs will need to be reviewed by the NRC to close this acceptance criteria. |
| 2) The probability assigned to each scenario class is consistent with site information, well documented, and appropriately considers uncertainty. | FEP AMRs, TSPA-SR | Largely Resolved | Documentation pertaining to FEPs screening is contained primarily in the FEP AMRs and the TSPA-SR Technical Report. The TSPA-SR Technical Report, supporting PMRs, and FEPs AMRs will need to be reviewed by the NRC to close this acceptance criteria. |
| 3) Scenario classes that combine categories of processes and events may be screened from the PA on the basis of their probability of occurrence, provided: (i) the probability used for screening the scenario class is defined from combinations of initiating processes and events and (ii) DOE has demonstrated that they have a probability of less than one chance in 10,000 of occurring over 10,000 years. | FEP AMRs, TSPA-SR | Largely Resolved | All scenario classes generated by the FEP screening process were retained for the TSPA-SR. Documentation pertaining to FEPs screening is contained primarily in the FEP AMRs and the TSPA-SR Technical Report. The TSPA-SR Technical Report, supporting PMRs, and FEPs AMRs will need to be reviewed by the NRC to close this acceptance criteria. |
| 4) Scenario classes may be omitted from the PA on the basis that their omission would not significantly change the calculated expected annual dose, provided DOE has demonstrated that excluded categories of processes and events would not significantly change the calculated expected annual dose. | FEP AMRs, TSPA-SR | Largely Resolved | All scenario classes generated by the FEP screening process were retained for the TSPA-SR. Documentation pertaining to FEPs screening is contained primarily in the FEP AMRs and the TSPA-SR Technical Report. The TSPA-SR Technical Report, supporting PMRs, and FEPs AMRs will need to be reviewed by the NRC to close this acceptance criteria. |

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| **SUBISSUE 3 - Model Abstraction** | | | |
| **Generic Acceptance Criteria** | | | |
| T1) Data and Model Justification - Sufficient data (field, laboratory, or natural analog data) are available to adequately support the conceptual models, assumptions, and boundary conditions and to define all relevant parameters implemented in the TSPA. Where adequate data do not exist, other information sources such as expert elicitation have been appropriately incorporated into the TSPA. | All PMRs | This will be discussed at the PMR Technical Exchanges | |
| T2) Data Uncertainty - Parameter values, assumed ranges, probability distributions, and bounding assumptions used in the TSPA are technically defensible and reasonably account for uncertainties and variability. | All PMRs | This will be discussed at the PMR Technical Exchanges | |
| T3) Model Uncertainty - Alternative modeling approaches consistent with available data and current scientific understanding are investigated and results and limitations appropriately considered in the abstractions. | All PMRs | This will be discussed at the PMR Technical Exchanges | |
| T4) Model Support - Models implemented in the TSPA provide results consistent with output of detailed process models or empirical observations (laboratory testing, natural analogs, or both). | All PMRs | See Criterion T4 of the integrated subissue acceptance criterion | |
| T5) Integration – TSPA adequately incorporates important design features, physical phenomena, and couplings and uses consistent and appropriate assumptions throughout the abstraction process. | All PMRs | See Criterion T5 of the integrated subissue acceptance criterion | |
| **Engineered Barrier Degradation** | | | |
| T1) Sufficient data (field, laboratory or natural analog data) are available to adequately define relevant parameters and conceptual models necessary for developing the WP corrosion abstraction in TSPA. Where adequate data do not exist, other information sources such as expert elicitation have been appropriately incorporated into the TSPA. | WP PMR, TSPA-SR Section 3.4 | This will be discussed at the PMR Technical Exchanges | |
| T2) Parameter values, assumed ranges, probability distributions, and bounding assumptions used in the WP corrosion abstraction, such as the critical relative humidity (RH), material properties, pH, and chloride concentration are technically defensible and reasonably account for uncertainties and variabilities. | WP PMR, TSPA-SR Section 3.4 | This will be discussed at the PMR Technical Exchanges | |
| T3) Alternative modeling approaches consistent with available data and current scientific understanding are investigated and results and limitations appropriately factored into the WP corrosion abstraction. | WP PMR, TSPA-SR Section 3.4 | This will be discussed at the PMR Technical Exchanges | |
| T4) WP corrosion abstraction output is justified through comparison to output of detailed process models or empirical observations (laboratory testings, natural analogs, or both). | WP PMR, TSPA-SR Section 3.4 | Partially Resolved | Waste package and drip shield degradation will be described in Section 3.4 of the TSPA-SR Technical Report and in the Waste Package Degradation PMR and supporting AMRs. The TSPA-SR is currently being performed. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |

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| T5) Important design features, physical phenomena and couplings, and consistent and appropriate assumptions are incorporated into the WP corrosion abstraction. | WP PMR, TSPA-SR Section 3.4 | Partially Resolved | The waste package corrosion abstraction will be described in Section 3.4 of the TSPA-SR Technical Report. This report will also provide a description of the development of the integrated TSPA-SR model and development of the components of the model. The TSPA-SR is currently being performed. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| **Mechanical Disruption of Engineered Barriers** | | | |
| T1) Sufficient data (field, laboratory or natural analog data) are available to adequately define relevant parameters and conceptual models necessary for developing mechanical disruption of the engineered barriers abstraction in TSPA. Where adequate data do not exist, other information sources such as expert elicitation have been appropriately incorporated into the TSPA. | DE PMR, TSPA-SR Section 4.2 | This will be discussed at the PMR Technical Exchanges | |
| T2) Parameter values, assumed ranges, probability distributions, and bounding assumptions used in the mechanical disruption of the engineered barriers abstraction, such as probabilistic seismic hazard curves, probability of dike intrusion, and the probability and amount of fault displacement, are technically defensible and reasonably account for uncertainties and variabilities. | DE PMR, TSPA-SR Section 4.2 | This will be discussed at the PMR Technical Exchanges | |
| T3) Alternative modeling approaches consistent with available data and current scientific understanding are investigated and results and limitations appropriately factored into the mechanical disruption of the engineered barriers abstraction. | DE PMR, TSPA-SR Section 4.2 | This will be discussed at the PMR Technical Exchanges | |
| T4) Mechanical disruption of the engineered barriers abstraction output is justified through comparison to output of detailed process models or empirical observations (laboratory testing, natural analogs, or both). | DE PMR, TSPA-SR Section 4.2 | Partially Resolved | The TSPA-SR is currently being performed. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| T5) Important design features, physical phenomena and couplings, and consistent and appropriate assumptions are incorporated into the mechanical disruption of the engineered barriers abstraction. | DE PMR, TSPA-SR Section 4.2 | Partially Resolved | The TSPA-SR is currently being performed. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| **Quantity and Chemistry of Water Contacting WPs and WFs** | | | |
| T1) Sufficient data (field, laboratory, or natural analog data) are available to adequately define relevant parameters and conceptual models necessary for developing the quantity and chemistry of water contacting WPs and waste forms abstraction in a TSPA. Where adequate data do not exist, other information sources such as expert elicitation have been appropriately incorporated into the TSPA. | WF PMR, TSPA-SR Section 3.2 | This will be discussed at the PMR Technical Exchanges | |

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| T2) Parameter values, assumed ranges, probability distributions, and bounding assumptions used in the quantity and chemistry of water contacting WPs and waste forms abstraction, such as the pH, carbonate concentration, chloride concentration, and amount of water flowing in and out of the breached WP, are technically defensible and reasonably account for uncertainties and variability. | WF PMR, TSPA-SR Section 3.2 | This will be discussed at the PMR Technical Exchanges | |
| T3) Alternative modeling approaches consistent with available data and current scientific understanding are investigated and results and limitations appropriately factored into the quantity and chemistry of water contacting WPs and waste forms abstraction. | WF PMR, TSPA-SR Section 3.2 | This will be discussed at the PMR Technical Exchanges | |
| T4) Output of quantity and chemistry of water contacting WPs and waste forms abstraction are supported by comparison to output of detailed process models or empirical observations (laboratory testing, natural analogs, or both). | WF PMR, TSPA-SR Section 3.2 | Partially Resolved | For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| T5) Important design features, physical phenomena and couplings, and consistent and appropriate assumptions are incorporated into the quantity and chemistry of water contacting WPs and waste forms abstraction. | WF PMR, TSPA-SR Section 3.2 | Partially Resolved | For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| **Radionuclide Release Rates and Solubility Limits** | | | |
| T1) Sufficient data (field, laboratory or natural analog data) are available to adequately define relevant parameters and conceptual models necessary for developing RN release rates and solubility limits abstracted in TSPA. Where adequate data do not exist, other information sources such as expert elicitation have been appropriately incorporated into the TSPA. | WF PMR, TSPA-SR Section 3.5 | This will be discussed at the PMR Technical Exchanges | |
| T2) Parameter values, assumed ranges, probability distributions, and bounding assumptions used in the RN release rates and solubility limits abstraction, such as the pH, temperature, colloidal release, and amount of liquid contacting the waste forms, are technically defensible and reasonably account for uncertainties and variabilities. | WF PMR, TSPA-SR Section 3.5 | This will be discussed at the PMR Technical Exchanges | |
| T3) Alternative waste form dissolution and RN release modeling approaches consistent with available data and current scientific understanding are investigated and results and limitations appropriately factored into the RN release rates and solubility limits abstraction. | WF PMR, TSPA-SR Section 3.5 | This will be discussed at the PMR Technical Exchanges | |
| T4) RN release rates and solubility limits abstraction output is supported by comparison to outputs of detailed process models or empirical observations (field, laboratory, or natural analog data). | WF PMR, TSPA-SR Section 3.5 | Largely Resolved | Section 3.5 of the TSPA-SR Technical Report will describe waste form degradation including radioelement solubility limits. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |

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| T5) Important design features, physical phenomena and couplings, and consistent and appropriate assumptions are incorporated into the RN release rates and solubility limits abstraction | WF PMR, TSPA-SR Section 3.5 | Largely Resolved | Section 3.5 of the TSPA-SR Technical Report will describe waste form degradation including radioelement solubility limits. This section also provides discussion of the implementation of the models into the TSPA-SR model. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| **Spatial and Temporal Distribution of Flow** | | | |
| T1) Sufficient data (field, laboratory, or natural analog data) are available to adequately define relevant parameters and conceptual models necessary for developing the spatial and temporal distribution of flow abstraction in TSPA. Where adequate data do not exist, other information sources such as expert elicitation have been appropriately incorporated into the TSPA. | UZFT PMR, TSPA-SR Section 3.2 | This will be discussed at the PMR Technical Exchanges | |
| T2) Parameter values, assumed ranges, probability distributions, and bounding assumptions used in the spatial and temporal distribution of flow abstraction [such as the effects of climate change on infiltration, near surface influences (e.g., evapotranspiration and runoff) on infiltration, structural controls on the spatial distribution of deep percolation, and thermal reflux owing to repository heat load] are technically defensible and reasonably account for uncertainties and variabilities. | UZFT PMR, TSPA-SR Section 3.2 | This will be discussed at the PMR Technical Exchanges | |
| T3) Alternative modeling approaches, consistent with available data and current scientific understanding, are investigated and results and limitations appropriately factored into the spatial and temporal distribution of flow abstraction. | UZFT PMR, TSPA-SR Section 3.2 | This will be discussed at the PMR Technical Exchanges | |
| T4) Spatial and temporal distribution of flow abstraction output is justified through comparison to output of detailed process models or empirical observations (laboratory testing, natural analogs, or both). | UZFT PMR, TSPA-SR Section 3.2 | Largely Resolved | Section 3.2 of the TSPA-SR Technical Report and the Unsaturated Zone Flow and Transport PMR will provide descriptions of the unsaturated zone flow. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| T5) Important design features, physical phenomena and couplings, and consistent and appropriate assumptions are incorporated into the spatial and temporal distribution of flow abstraction. | UZFT PMR, TSPA-SR Section 3.2 | Largely Resolved | Section 3.2 of the TSPA-SR Technical Report and the Unsaturated Zone Flow and Transport PMR will provide descriptions of the unsaturated zone flow including integration of this component into the TSPA model. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |

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| **Flow Paths in the Unsaturated Zone** | | | |
| T1) Sufficient data (field, laboratory, or natural analog data) are available to adequately define relevant parameters and conceptual models necessary for developing the flow paths in the UZ in the abstraction in TSPA. Where adequate data cannot be readily obtained, other information sources such as expert elicitation or bounding values have been appropriately incorporated into the TSPA. | UZFT PMR, TSPA-SR Section 3.2 | This will be discussed at the PMR Technical Exchanges | |
| T2) Parameter values, assumed ranges, probability distributions, and bounding assumptions used in the flow paths in the UZ in the abstraction, such as hydrologic properties, stratigraphy, and infiltration rate, are technically defensible and reasonably account for uncertainties and variability. | UZFT PMR, TSPA-SR Section 3.2 | This will be discussed at the PMR Technical Exchanges | |
| T3) Alternative modeling approaches consistent with available data and current scientific understanding are investigated and results and limitations appropriately factored into the distribution on mass flux between fracture and matrix in the abstraction. | UZFT PMR, TSPA-SR Section 3.2 | This will be discussed at the PMR Technical Exchanges | |
| T4) Flow paths in the UZ abstraction output are justified through comparison to output of detailed flow process models or empirical observations (laboratory testings, natural analogs, or both). | UZFT PMR, TSPA-SR Section 3.2 | Largely Resolved | Section 3.2 of the TSPA-SR Technical Report and the Unsaturated Zone Flow and Transport PMR will provide descriptions of the unsaturated zone flow. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| T5) Important design features, physical phenomena and couplings, and consistent and appropriate assumptions are incorporated into the flow paths in the UZ abstraction. | UZFT PMR, TSPA-SR Section 3.2 | Largely Resolved | Section 3.2 of the TSPA-SR Technical Report and the Unsaturated Zone Flow and Transport PMR will provide descriptions of the unsaturated zone flow including integration of this component into the TSPA model. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| **Radionuclide Transport in the Unsaturated Zone** | | | |
| T1) Sufficient data (field, laboratory, or natural analog data) are available to adequately define relevant parameters and conceptual models necessary for developing the spatial and temporal distribution of flow abstraction in TSPA. Where adequate data do not exist, other information sources such as expert elicitation have been appropriately incorporated into the TSPA. | UZFT PMR, TSPA-SR Section 3.7 | This will be discussed at the PMR Technical Exchanges | |
| T2) Parameter values, assumed ranges, probability distributions, and bounding assumptions used in the spatial and temporal distribution of flow abstraction [such as the effects of climate change on infiltration, near surface influences (e.g., evapotranspiration and runoff) on infiltration, structural controls on the spatial distribution of deep percolation, and thermal reflux owing to repository heat load] are technically defensible and reasonably account for uncertainties and variabilities. | UZFT PMR, TSPA-SR Section 3.7 | This will be discussed at the PMR Technical Exchanges | |

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| T3) Alternative modeling approaches, consistent with available data and current scientific understanding, are investigated and results and limitations appropriately factored into the RT in the UZ abstraction. | UZFT PMR, TSPA-SR Section 3.7 | This will be discussed at the PMR Technical Exchanges | |
| T4) RT in the UZ abstraction output is justified through comparison to output of detailed process models or empirical observations (laboratory testing, natural analogs, or both). | UZFT PMR, TSPA-SR Section 3.7 | Largely Resolved | Section 3.7 of the TSPA-SR Technical Report and the Unsaturated Zone Flow and Transport PMR will provide descriptions of the unsaturated zone transport. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| T5) Important design features, physical phenomena and couplings, and consistent and appropriate assumptions are incorporated into the consideration of RT in the UZ abstraction. | UZFT PMR, TSPA-SR Section 3.7 | Largely Resolved | Section 3.7 of the TSPA-SR Technical Report and the Unsaturated Zone Flow and Transport PMR will provide descriptions of the unsaturated zone transport including integration of this component into the TSPA model. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| **Flow Paths in the Saturated Zone** | | | |
| T1) Sufficient data (field, laboratory, or natural analog data) are available to adequately define relevant parameters and conceptual models necessary for developing the flow paths in the SZ abstraction in TSPA. Where adequate data cannot be readily obtained, other information sources such as expert elicitation or bounding values have been appropriately incorporated into the TSPA. | | This will be discussed at the PMR Technical Exchanges | |
| T2) Parameter values, assumed ranges, probability distributions, and bounding assumptions used in the flow paths in the SZ abstraction, such as the effect of climate change on the SZ fluxes and water table level and well pumping practices, are technically defensible and reasonably account for uncertainties and variability. | | This will be discussed at the PMR Technical Exchanges | |
| T3) Alternative modeling approaches consistent with available data and current scientific understanding are investigated and results and limitations appropriately factored into the flow paths in the SZ. | | This will be discussed at the PMR Technical Exchanges | |
| T4) Flow paths in the SZ abstraction output are justified through comparison to output of detailed process models or empirical observations (laboratory testing, natural analogs, or both). | SZFT PMR, TSPA-SR Section 3.8 | Partially Resolved | Section 3.8 of the TSPA-SR Technical Report and the Saturated Zone Flow and Transport PMR will provide descriptions of the saturated zone flow. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| T5) Important site (geologic and hydraulic) features, physical phenomena and couplings, and consistent and appropriate assumptions are incorporated into the flow paths in the SZ abstraction. | SZFT PMR, TSPA-SR Section 3.8 | Partially Resolved | Section 3.8 of the TSPA-SR Technical Report and the Saturated Zone Flow and Transport PMR will provide descriptions of the saturated zone flow including integration of this component into the TSPA model. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |

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| **Radionuclide Transport in the Saturated Zone** | | | |
| T1) Sufficient data (field, laboratory, or natural analog data) are available to adequately define relevant parameters and conceptual models necessary for developing the RT in the SZ abstraction in TSPA. Where adequate data do not exist, other information sources such as expert elicitation have been appropriately incorporated into the TSPA. | SZFT PMR, TSPA-SR Section 3.8 | This will be discussed at the PMR Technical Exchanges | |
| T2) Parameter values, assumed ranges, probability distributions, and bounding assumptions used in the RT in the SZ abstraction, such as the sorption on fracture surfaces and Kd for matrix, are technically defensible and reasonably account for uncertainties and variability. | SZFT PMR, TSPA-SR Section 3.8 | This will be discussed at the PMR Technical Exchanges | |
| T3) Alternative modeling approaches consistent with available data and current scientific understanding are investigated and results and limitations appropriately factored into the RT in the SZ abstraction. | SZFT PMR, TSPA-SR Section 3.8 | This will be discussed at the PMR Technical Exchanges | |
| T4) RT in the SZ abstraction output is justified through comparison to output of detailed process models or empirical observations (laboratory testing, natural analogs, or both). | SZFT PMR, TSPA-SR Section 3.8 | Partially Resolved | Section 3.8 of the TSPA-SR Technical Report and the Saturated Zone Flow and Transport PMR will provide descriptions of the saturated zone flow. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| T5) Important physical phenomena and couplings and consistent and appropriate assumptions are incorporated into the consideration of RT in the SZ abstraction. | SZFT PMR, TSPA-SR Section 3.8 | Partially Resolved | Section 3.8 of the TSPA-SR Technical Report and the Saturated Zone Flow and Transport PMR will provide descriptions of the saturated zone flow including integration of this component into the TSPA model. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| **Volcanic Disruption of Waste Packages** | | | |
| T1) Sufficient data (field, laboratory, or natural analog data) are available to adequately define relevant parameters and conceptual models necessary for abstracting the volcanic disruption of WPs in TSPA. Where adequate data do not exist, other information sources such as expert elicitation have been appropriately incorporated into the TSPA. | | This will be discussed at the PMR Technical Exchanges | |
| T2) Parameter values, assumed ranges, probability distributions, and bounding assumptions used in the volcanic disruption of WPs abstraction are technically defensible and reasonably account for uncertainties and variability. The technical basis for the parameter values used in the PA needs to be provided. | | This will be discussed at the PMR Technical Exchanges | |
| T3) Alternative modeling approaches consistent with available data and current scientific understanding are investigated and results and limitations appropriately factored into the volcanic disruption of WPs abstraction. | | This will be discussed at the PMR Technical Exchanges | |

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| T4) Outputs of the volcanic disruption of WPs abstraction are justified through comparison to outputs of detailed process models or empirical observations (laboratory testing, natural analogs, or both). | DE PMR, TSPA-SR Section 3.10 | Partially Resolved | Section 3.10 of the TSPA-SR Technical Report and the Disruptive Events PMR provide descriptions of the conceptual model developed for volcanism. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| T5) Important site and design features, physical phenomena and couplings, and consistent and appropriate assumptions are incorporated into the volcanic disruption of WPs abstraction and the technical bases are provided. | DE PMR, TSPA-SR Section 3.10 | Partially Resolved | Section 3.10 of the TSPA-SR Technical Report and the Disruptive Events PMR provide descriptions of the conceptual model developed for volcanism including the important design features and assumptions made during model development. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| **Airborne Transport of Radionuclides** | | | |
| T1) Sufficient data (field, laboratory, or natural analog data) are available to adequately define relevant parameters and conceptual models necessary for developing the airborne transport of RNs abstraction in TSPA. Where adequate data do not exist, other information sources such as expert elicitation have been appropriately incorporated into the TSPA. | DE PMR, TSPA-SR Section 3.10 | This will be discussed at the PMR Technical Exchanges | |
| T2) Parameter values, assumed ranges, probability distributions, and bounding assumptions used in the airborne transport of RNs abstraction, such as the magnitude of eruption and deposition velocity, are technically defensible and reasonably account for uncertainties and variability. | DE PMR, TSPA-SR Section 3.10 | This will be discussed at the PMR Technical Exchanges | |
| T3) Alternative modeling approaches consistent with available data and current scientific understanding are investigated and results and limitations appropriately factored into the airborne transport of RNs abstraction. | DE PMR, TSPA-SR Section 3.10 | This will be discussed at the PMR Technical Exchanges | |
| T4) Airborne transport of RNs abstraction output is justified through comparison to output of detailed process models or empirical observations (laboratory testing, natural analogs, or both). | DE PMR, TSPA-SR Section 3.10 | Partially Resolved | Section 3.10 of the TSPA-SR Technical Report and the Disruptive Events PMR provide descriptions of the conceptual model developed for volcanism. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |

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| T5) Important site features, physical phenomena and couplings, and consistent and appropriate assumptions are incorporated into the airborne transport of RNs abstraction. | DE PMR, TSPA-SR Section 3.10 | Partially Resolved | Section 3.10 of the TSPA-SR Technical Report and the Disruptive Events PMR provide descriptions of the conceptual model developed for volcanism including the important design features and assumptions made during model development. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| **Dilution of Radionuclides Due to Well Pumping** | | | |
| T1) Sufficient data (field, laboratory, or natural analog data) are available to adequately define relevant parameters and conceptual models necessary for developing the dilution of RNs due to well pumping abstraction in the TSPA. Where adequate data do not exist, other information sources such as expert elicitation have been appropriately incorporated into the TSPA. | SZFT PMR, Biosphere PMR, TSPA-SR Section 3.9 | This will be discussed at the PMR Technical Exchanges | |
| T2) Parameter values, assumed ranges, probability distributions, and bounding assumptions used in the dilution of RNs in groundwater due to well pumping abstraction, such as the pumping well characteristics and water usage by the receptor groups, are technically defensible and account for uncertainty and variability. | SZFT PMR, Biosphere PMR, TSPA-SR Section 3.9 | This will be discussed at the PMR Technical Exchanges | |
| T3) Alternative modeling approaches consistent with available data and current scientific understanding are investigated and results and limitations appropriately factored into the dilution of RNs in groundwater due to well pumping abstraction. | SZFT PMR, Biosphere PMR, TSPA-SR Section 3.9 | This will be discussed at the PMR Technical Exchanges | |
| T4) Dilution of RNs due to well pumping abstraction output is justified through comparison to outputs of detailed process models or empirical observations (laboratory test). | SZFT PMR, Biosphere PMR, TSPA-SR Section 3.9 | Largely Resolved | For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| T5) PA analyses incorporate important hydrogeologic features, physical phenomena and couplings, and consistent and appropriate assumptions are incorporated into the dilution of RNs due to well pumping abstraction. | SZFT PMR, Biosphere PMR, TSPA-SR Section 3.9 | Largely Resolved | For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| **Redistribution of Radionuclides in Soil** | | | |
| T1) Sufficient data (field, laboratory, or natural analog data) are available to adequately define relevant parameters and conceptual models necessary for developing the redistribution of RNs in soil abstraction in TSPA. Where adequate data do not exist, other information sources such as expert elicitation have been appropriately incorporated into the TSPA. | Biosphere PMR, TSPA-SR Section 3.10 | This will be discussed at the PMR Technical Exchanges | |
| T2) Parameter values, assumed ranges, probability distributions, and bounding assumptions used in the redistribution of RNs in soil abstraction, such as depth of the plowed layers and mass loading factor, are technically defensible and reasonably account for uncertainties and variability. | Biosphere PMR, TSPA-SR Section 3.10 | This will be discussed at the PMR Technical Exchanges | |

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| T3) Alternative modeling approaches consistent with available data and current scientific understanding are investigated and their results and limitations appropriately factored into the redistribution of RNs in soil abstraction. | Biosphere PMR, TSPA-SR Section 3.10 | This will be discussed at the PMR Technical Exchanges | |
| T4) Redistribution of RNs in soil output is justified through comparison to output of detailed process models or empirical observations (laboratory testings, natural analogs, or both). | Biosphere PMR, TSPA-SR Section 3.10 | Largely Resolved | Section 3.9 of the TSPA-SR Technical Report describes the Biosphere component of the TSPA-SR model. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| T5) Important site features, physical phenomena and couplings, and consistent and appropriate assumptions are incorporated into the redistribution of RNs in soil abstraction. | Biosphere PMR, TSPA-SR Section 3.10 | Largely Resolved | Section 3.9 of the TSPA-SR Technical Report describes the Biosphere component of the TSPA-SR model. This section includes a description of the integration of the biosphere into the TSPA-SR model. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| **Lifestyle of the Critical Group** | | | |
| T1) Sufficient data (field, laboratory, or natural analog data) are available to adequately define relevant parameters and conceptual models as necessary for developing the lifestyle of critical group abstraction in TSPA. Where adequate data do not exist, other information sources such as expert elicitation have been appropriately incorporated into the TSPA. | Biosphere PMR, TSPA-SR Section 3.9 | This will be discussed at the PMR Technical Exchanges | |
| T2) Parameter values, assumed ranges, probability distributions, and bounding assumptions used in the lifestyle of critical group abstraction such as consumption rates, plant and animal uptake factors, mass loading factors, and BDCFs are technically defensible and reasonably account for uncertainties and variability. | Biosphere PMR, TSPA-SR Section 3.9 | This will be discussed at the PMR Technical Exchanges | |
| T3) Alternative modeling approaches consistent with available data and current scientific understanding are investigated and results and limitations appropriately factored into the lifestyle of critical group abstractions. | Biosphere PMR, TSPA-SR Section 3.9 | This will be discussed at the PMR Technical Exchanges | |
| T4) Dose calculation output pertaining to lifestyle of the critical group is justified through comparison to output of detailed process models, and/or empirical observations (field data, laboratory data, or natural analogs). | Biosphere PMR, TSPA-SR Section 3.9 | Largely Resolved | Section 3.9 of the TSPA-SR Technical Report and the Biosphere PMR describe the Biosphere Model. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |
| T5) Important site features, physical phenomena and couplings, and consistent and appropriate assumptions are incorporated into the lifestyle of the critical group abstraction. | Biosphere PMR, TSPA-SR Section 3.9 | Largely Resolved | Section 3.9 of the TSPA-SR Technical Report and the Biosphere PMR describe the Biosphere Model including integration of the biosphere into the TSPA-SR model. For this acceptance criteria to be closed, the TSPA-SR Technical Report and supporting PMRs and AMRs will need to be reviewed by the NRC. |

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| **SUBISSUE 4 - Demonstration of the Overall Performance Objective** | | | |
| The final requirements for the overall performance objective will be established after the rule is published in final form. | TSPA-SR | Partially Resolved | |