TSPAI IRSR REV. 2 ACCEPTANCE CRITERIA	APPLICABLE PMRs
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
T2) Information is amply cross referenced.	All
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
T2) Relationships between relevant FEPs are fully described.	All
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
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.	All
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
Data Use and Validity	
T1) The pedigree of data from laboratory tests, natural analogs, and the site is clearly identified.	All
T2) Input parameter development and basis for their selection is described.	All
T3) A thorough description of the method used to identify performance confirmation program parameters.	All
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
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
Code Design and Data Flow	
T1) The flow of information (input and output) between the various modules is clearly described.	All
T2) Supporting documentation (e.g., user's manuals, design documents) clearly describes code structure and relationships between modules.	All
Demonstration Of Multiple Barriers	
Will be developed in Revision 3	
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.	All
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.	All
2) Categorization of processes and events is compatible with the use of categories during the screening of processes and events.	All
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.	All
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.	All
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.	All

TSPAI IRSR REV. 2 ACCEPTANCE CRITERIA	APPLICABLE PMRs
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.	All
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.	All
2) The set of scenario classes is mutually exclusive and complete.	All
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.	All
2) The probability assigned to each scenario class is consistent with site information, well documented, and appropriately considers uncertainty.	All
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.	All
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.	All
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
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
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
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
T5) Integration - Important design features, physical phenomena and couplings, and consistent and appropriate assumptions are incorporated into the WP corrosion abstraction.	All
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
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
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
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
T5) Important design features, physical phenomena and couplings, and consistent and appropriate assumptions are incorporated into the WP corrosion abstraction.	WP
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

TSPAI IRSR REV. 2 ACCEPTANCE CRITERIA	APPLICABLE PMRs
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
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
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
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
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.	UZFT, WF
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
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
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
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
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
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
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
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
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
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
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

TSPAI IRSR REV. 2 ACCEPTANCE CRITERIA	APPLICABLE PMRs
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
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
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
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
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
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
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
T5) Important design features, physical phenomena and couplings, and consistent and appropriate assumptions are incorporated into the flow paths in the UZ abstraction.	UZFT
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
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
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
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
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
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.	SZFT
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.	SZFT
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.	SZFT
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
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

TSPAI IRSR REV. 2 ACCEPTANCE CRITERIA	APPLICABLE PMRs
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
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
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
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
T5) Important physical phenomena and couplings and consistent and appropriate assumptions are incorporated into the consideration of RT in the SZ abstraction.	SZFT
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.	DE
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.	DE
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.	DE
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
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
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
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
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
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
T5) Important site features, physical phenomena and couplings, and consistent and appropriate assumptions are incorporated into the airborne transport of RNs abstraction.	DE
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, BIO
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, BIO
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, BIO
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, BIO

TSPAI IRSR REV. 2 ACCEPTANCE CRITERIA	APPLICABLE PMRs
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, BIO
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.	BIO
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.	BIO
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.	BIO
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).	BIO
T5) Important site features, physical phenomena and couplings, and consistent and appropriate assumptions are incorporated into the redistribution of RNs in soil abstraction.	BIO
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.	BIO
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.	BIO
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.	BIO
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).	BIO
T5) Important site features, physical phenomena and couplings, and consistent and appropriate assumptions are incorporated into the lifestyle of the critical group abstraction.	BIO
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.	