OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS REVIEW OF THE U.S. DEPARTMENT OF ENERGY KEY TECHNICAL ISSUE AGREEMENT RESPONSES TO CLST.1.06, TSPAI.3.01, 3.03, 3.04, 3.05, 3.12, AND GEN.1.01 (COMMENT 11)

1.0 INTRODUCTION

By letters dated November 25, 2003, and December 9, 2003, DOE submitted “Technical Basis Document No. 5: In-Drift Chemical Environment” (Bechtel SAIC Company, LLC, 2003a) and “Technical Basis Document No. 6: Waste Package and Drip Shield Corrosion” (Bechtel SAIC Company, LLC, 2003b) to satisfy the informational needs of numerous key technical issue agreement items pertaining to the in-drift chemical environment, environmental degradation of the waste package and drip shield materials, and total system performance and integration. DOE supplemented Technical Basis Document No. 6 by providing Appendixes J, L, and M by letters dated May 28, 2004 (Bechtel SAIC Company, LLC, 2004a,b). The information was requested by NRC during previous technical exchanges in September 2000 (Schlueter, 2000) and August 2001 (Reamer, 2001).

This report provides the NRC evaluation of the extent to which the DOE submittal satisfies the informational requirements of agreements CLST.1.06; TSPAI.3.01, 3.03, 3.04, 3.05, and 3.12; and GEN.1.01 (Comment 11). The NRC evaluation of the extent to which the DOE submittal satisfies requirements of other agreements addressed by the aforementioned technical basis documents and appendixes will be provided in separate documents.

2.0 WORDING OF THE AGREEMENTS

The wording of the agreements is provided in the subsequent paragraphs.

CLST.1.06

“Provide the documentation on testing showing corrosion rates in the absence of silica deposition. DOE will document the results of testing in the absence of silica deposits in the revision of Alloy 22 AMR (ANL–EBS–MD–000003) prior to LA.”

TSPAI.3.01

“Propagate significant sources of uncertainty into projections of waste package and drip shield performance included in future performance assessments. Specific sources of uncertainty that should be propagated (or strong technical basis provided as to why it is insignificant) include: (1) the uncertainty from measured crevice and weight-loss samples general corrosion rates and the statistical differences between the populations, (2) the uncertainty from alternative explanations for the decrease in corrosion rates with time (such as silica coatings that alter the reactive surface area), (3) the uncertainty from utilizing a limited number of samples to define the correction for silica precipitation, (4) the confidence in the upper limit of corrosion rates resulting from the limited sample size, and (5) the uncertainty from alternative statistical representations of the population of empirical general corrosion rates. The technical basis for sources of uncertainty will be established upon completion of existing agreement items CLST.1.04, 1.05, 1.06, and 1.07. DOE will then propagate significant sources of uncertainty into projections of waste package and drip shield performance included in future performance assessments. This technical basis will be documented in a future revision of the General and Localized Corrosion of Waste Package Outer Barrier AMR (ANL–EBS–MD–000003) expected to be available consistent with the scope and schedules for the specified CLST agreements. The results of the AMR analyses will be propagated into future TSPA analyses for any potential license application."

TSPAI.3.03

"Provide the technical basis for crack arrest and plugging of crack openings (including the impact of oxide wedging and stress redistribution) in assessing the impact of SCC of the drip shield and waste package in revised documentation (ENG1.12 and ENG1.4.1). DOE will provide the basis for crack arrest and plugging of openings (including the impact of oxide wedging and stress redistribution) in assessing the stress corrosion cracking of the drip shield and waste package in an update to the Stress Corrosion Cracking AMR (ANL–EBS–MD–000005) in accordance with the scope and schedule for existing agreement item CLST.1.12."

TSPAI.3.04

"Provide the technical basis that the representation of the variation of general corrosion rates (if a significant portion is lack of knowledge uncertainty) does not result in risk dilution of projected dose responses (ENG1.3.3). DOE will provide the technical basis that the representation of the variation of general corrosion rates results in reasonably conservative projected dose rates. The technical basis will be documented in an update to the WAPDEG Analysis of Waste Package and Drip Shield Degradation AMR (ANL–EBS–PA–000001). This AMR is expected to be available to NRC in FY 2003. These results will be incorporated into future TSPA documentation for any potential license application."

TSPAI.3.05

"Provide the technical basis for the representation of uncertainty/variability in the general corrosion rates in revised documentation. This technical basis should provide a detailed discussion and analyses to allow independent reviewers the ability to interpret the representations of 100% uncertainty, 100% variability, and any intermediate representations in the DOE model (ENG1.3.6). DOE will provide the technical basis for the representation of uncertainty/variability in the general corrosion rates. This technical basis will include the results of 100% uncertainty, 100% variability, and selected intermediate representations used in the DOE model. These results will be documented in an update to the WAPDEG Analysis of Waste Package and Drip Shield Degradation AMR (ANL–EBS–PA–000001) or other document. This AMR is expected to be available to NRC in FY 2003."

TSPAI.3.12

"DOE should complete testing of corrosion in the chemical environments predicted by the model or provide technical basis why it is not needed (ENG3.1.8). DOE will conduct testing of corrosion in the credible range of chemical environments predicted by the model in accordance with the scope and schedule for existing agreements CLST.1.04 and 1.06 or provide a technical basis why it is not needed."

GEN.1.01 (Comment 11)

“The analyses of the drip shield corrosion rate and the treatment of drip shield corrosion rate uncertainty in the SSPA is not transparent. Basis: In the supplemental model for drip shield corrosion the uncertainty due to variability is reduced. The effect of this change is in the treatment of uncertainty is that the drip shield failure occurs at later times (failure is delayed approximately 10,000 years with respect to the TSPA-SR base case). No details are provided on how the corrosion rate uncertainty was treated.”

3.0 RELEVANCE TO OVERALL PERFORMANCE

The waste package, composed of the containers and the waste forms, is the primary engineered barrier controlling the release of radionuclides from spent nuclear fuel and high-level waste glass. Because corrosion processes, promoted by the presence of an aqueous environment contacting the surface of the containers, will be the primary cause of container failure under undisturbed conditions, the mode and rate of corrosion need to be evaluated to determine container lifetimes. Characterization of corrosion resistance of waste package materials should be consistent with anticipated evolution of environmental conditions in the emplacement drifts. In the absence of conditions leading to localized corrosion, general corrosion is the dominant degradation mode for undisturbed conditions. Therefore, appropriate definition of distributions of general corrosion rates is relevant for performance assessment estimates of waste package lifetimes.

Drip shield performance is important because the drip shields are incorporated into the design of the engineered barrier system to limit the amount of water contacting the waste package as a result of dripping and preventing damage to the waste package from rockfall. Initiation of aqueous corrosion of the waste packages depends on the deliquescence of dust or the contact with seepage water. The presence of drip shields will delay the contact of seepage water with the waste package surface, resulting in a significantly longer container lifetime. In addition, once the containers are breached, the amount of water available for the dissolution of spent nuclear fuel and high-level waste glass and advective transport of the released radionuclides could be limited, even under the presence of a partially damaged drip shield.

The NRC has performed a risk insights analysis that indicates the persistence of a passive film on the waste package outer container has a high significance to waste isolation (NRC, 2004). Localized corrosion of the waste package and the integrity of the drip shields has a medium significance to waste isolation (NRC, 2004). The persistence of a passive film on the waste package outer container surface is anticipated to result in low corrosion rates and long waste package lifetimes. High temperatures and aggressive water chemistry conditions can have a detrimental effect on the stability of the passive film and may accelerate corrosion over extended surface areas or promote localized corrosion. Fabrication processes may also affect

the stability of the passive film. Microbial activity on or near the waste packages may also alter the local environment and influence the waste package corrosion rates. While intact, the drip shield will limit the quantity of water contacting the waste packages and waste forms and limit the formation of aggressive environments on the waste package surfaces. Penetration of the waste package by corrosion processes will allow water to contact the waste forms and release of radionuclides; however, the transport of water and the release rate of the radionuclides is limited by the extent of the surface affected by corrosion.

4.0 RESULTS OF THE NRC REVIEW

Issues related to documentation of the effect of silica deposits on corrosion rates to support the DOE performance assessment abstraction for general corrosion of the drip shield and waste package, in the response to CLST.1.06, are included in the integrated subissue for degradation of engineered barriers. The CLST.1.06 agreement resulted from a staff review of the DOE documentation that is consistent with NRC (2003, Review Method 3, Section 2.2.1.3.1.2). The NRC review of the response also was conducted in accordance with the aforementioned review method. This review method includes the evaluation of technical bases for parameter values, assumed ranges, probability distributions, and bounding values used in conceptual models, process models, and alternative conceptual models considered in the total system performance assessment abstraction of degradation of engineered barriers.

Issues related to distributions of general corrosion rates of waste package and drip shield materials are included in the integrated subissue for degradation of engineered barriers. Agreements TSPAI.3.01, TSPAI.3.04, and TSPAI.3.05 resulted from a staff review of the DOE documentation that is consistent with NRC (2003, Review Method 3, Section 2.2.1.3.1.2). The NRC review of the response also was conducted in accordance with the aforementioned review method. This review method includes the evaluation of technical bases for parameter values, assumed ranges, probability distributions, and bounding values used in conceptual models, process models, and alternative conceptual models considered in the total system performance assessment abstraction of degradation of engineered barriers.

Issues related to the abstracted modeling to stress corrosion cracking of the waste package and drip shield are included in the integrated subissue for degradation of engineered barriers. Agreement TSPAI.3.03 is related to the technical basis of assumed dimensions of cracks in the performance assessment abstraction. The TSPAI.3.03 agreement resulted from a staff review of the DOE documentation that is consistent with NRC (2003, Review Method 1, Section 2.2.1.3.1.2). The NRC review of the response also was conducted in accordance with the aforementioned review method. This review method includes examination of how features, events, and processes related to the degradation of the engineered barriers have been included in the total system performance assessment abstraction.

Issues related to environments selected for the characterization of the corrosion resistance of drip shield and waste package materials are included in the integrated subissue for degradation of engineered barriers. Agreement TSPAI.3.12 is related to corrosion testing in a range of environments consistent with estimates of the possible chemistry of solutions in contact with waste packages and drip shields. The TSPAI.3.12 agreement resulted from a staff review of the DOE documentation that is consistent with NRC (2003, Review Method 2, Section 2.2.1.3.1.2). The NRC review of the DOE response also was conducted in accordance with the aforementioned review method. This review method includes verification of whether sufficient data have been collected to model adequately the degradation processes, as well as the characteristics of geochemistry, hydrology, design features, and thermal effects, to establish initial and boundary conditions for the total system performance assessment abstraction of degradation of engineered barriers.

CLST.1.06

Appendix J of DOE Technical Basis Document No. 6: Waste Package and Drip Shield Corrosion (Bechtel SAIC Company, LLC, 2004b, 2003b) provides information related to agreement CLST 1.06. The agreement requests DOE to provide documentation about measurements of corrosion rates in solutions without silica. The intent of the agreement was to obtain additional information to understand the effect of silica on corrosion rates that could be used to support the selection of distributions of general corrosion rates of Alloy 22 to be used in the total system performance assessment model. In Appendix J, electrochemical tests are discussed in systems with and without silica. Evidence is produced to support the notion that silica has a minor effect on the corrosion potential and the Alloy 22 anodic current density (proportional to corrosion rates). Electrochemical tests show a decrease in the potentiostatic current density versus time in 25-day experiments, with a similar decrease for solutions with and without silica. The decrease with time is argued to continue, yielding slower corrosion rates as time elapses. Therefore, data in Appendix J are intended to support the conclusion that the decrease in corrosion rates measured in the long-term corrosion test facility is because of changes in the oxide film or metal-oxide interface and not a result of the presence of protective silica deposits.

The focus of the agreement was ensuring that corrosion rates are not underestimated as a result of the deposition of silica (e.g., by decreasing the reactive surface area of the alloy). Information in Appendix J of the Technical Basis Document No. 6 (Bechtel SAIC Company, LLC, 2003b) supports the conclusion that the effect of silica on the corrosion rate is minor. For the total system performance assessment model to support the License Application, DOE will not correct corrosion rates to account for the presence of silica deposits. DOE provided appropriate information to address the effect of silica on corrosion rates. Based on the NRC review of the DOE response to CLST.1.06, in accordance with methods discussed in the appropriate section of NRC (2003, Section 2.2.1.3.1.2, Review Method 3), NRC found the DOE response to the agreement to be satisfactory.

TSPAI.3.01, 3.04, 3.05

Appendix M of Technical Basis Document No. 6: Waste Package and Drip Shield Corrosion (Bechtel SAIC Company, LLC, 2004b, 2003b) provides information related to agreements TSPAI.3.01, TSPAI.3.04, and TSPAI.3.05. Agreement TSPAI.3.01 requests to further the technical basis in the definition of distributions of corrosion rates and account for processes that could yield higher estimates of corrosion rates (e.g., crevice corrosion, effect of silica deposits, and statistical uncertainty) in the performance assessment.

Information presented in Appendix M shows the uniform corrosion rates of crevice samples are slightly higher than the corrosion rates for weight-loss samples; however, there is no evidence of crevice corrosion in any of the samples. Therefore, there is no evidence to support the notion that the corrosion attack on the crevice samples is restricted to the crevice area, and there is no justification to select a reduced area (less than the total test coupon surface) to compute an average corrosion rate from weight-loss experiments. Both kinds of samples (crevice and weight-loss) at two different temperatures {60 and 90 EC [140 and 194 EF]} in a 5-year period were considered in developing a distribution of corrosion rates for Alloy 22 from weight-loss experiments. In Appendix M it is shown that corrosion rates do not correlate to variations in environmental conditions or to test sample kind (crevice samples or noncrevice samples). In the performance assessment model, an Arrhenius temperature correction is applied to the Alloy 22 corrosion rates based on short-term electrochemical experiments. For the abstraction of corrosion rates of Titanium Grade 7, two different distributions are considered. One distribution considers 1-year data and empirical corrosion rates from weight-loss and crevice samples. This distribution is employed to model the degradation of the external drip shield face (side facing the drift). A second distribution was derived considering only 1-year data from noncrevice specimens. This distribution is used to model degradation of the internal face of the drip shield (side facing the waste package). No temperature correction is applied to the corrosion rates.

In Appendix J of Technical Basis Document No. 6 (Bechtel SAIC Company, LLC, 2004b), it is explained that silica has a minor to negligible effect on corrosion potential and corrosion rate. Therefore, the decrease in the corrosion rate is more likely because of changes in the oxide film or metal-film interface. In response to the agreement request for consideration of alternative statistical interpretations of weight-loss data, in appendix M (Bechtel SAIC Company, LLC, 2004b) it is argued that selected corrosion rates are conservative (based on 1-year data for the drip shield and 5-year data for the waste package), because empirical evidence indicates corrosion rates will continuously decrease with time. Also, assuming that corrosion occurs only in the crevice area is conservative, as there is no evidence that only the crevice area corrodes. In the performance assessment, a “shape factor” is applied to the distribution of Alloy 22 corrosion rates to account for the fact that the area of a waste package “patch” in the performance assessment model is four times larger than the surface of a test coupon in the weight-loss experiments. This correction results in more frequent sampling of higher corrosion rates. For these reasons, consideration of alternative statistical representations of corrosion rates is not necessary.

The objective of the agreement was ensuring consideration of processes that could alter the stress corrosion cracking abstraction model in the performance assessment. Also, ensuring that consistent screening arguments are provided to features, events, and processes related to stress corrosion cracking (e.g., 2.1.03.02.00, Stress Corrosion Cracking of Waste Containers), and strengthening the technical basis to crack arrest implemented in the performance assessment model. Sound arguments are provided in Appendix L of Technical Basis Document No. 6 (Bechtel SAIC Company, LLC, 2004a, 2003b) to support the conclusion that the waste package stress corrosion cracking and crack arrest models in the performance assessment model are conservative. Disregarding stress corrosion cracking of Titanium Grade 7 (drip shield material) in the performance assessment model is consistent with the empirical evidence. Based on the NRC review of the DOE response to TSPAI.3.03, in accordance with methods discussed in the appropriate section of NRC (2003, Section 2.2.1.3.1.2, Review Method 1), NRC found the DOE response to the agreement to be satisfactory.

Arguments presented in Appendix M (Bechtel SAIC Company, LLC, 2004b, 2003b) to support the notion that distributions of corrosion rates for the abstraction of general corrosion of the drip shield and waste package are conservative also address agreement TSPAI.3.04.

DOE discontinued the use of Gauss-Variance partitioning to perform uncertainty-variability splits of distributions of general corrosion rates. In the License Application performance assessment model, corrosion rates will be sampled from unique distributions. Arguments presented in Appendix M to support the notion that distributions of corrosion rates for the abstraction of general corrosion of the drip shield and waste package are conservative also address agreement TSPAI.3.05.

Agreement TSPAI.3.01 is related to the selection of distribution of general corrosion rates for waste package and drip shield materials consistent with significant sources of uncertainty. Agreement TSPAI.3.04 is related to use of the distribution of corrosion rates in the performance assessment model. The objective of this agreement was ensuring that tails of distributions of corrosion rates were sampled appropriately to avoid risk dilution. Agreement TSPAI.3.05 requested technical basis of the uncertainty-variability partition (referred to as Gauss-Variance partitioning by DOE) of the distributions of corrosion rates employed in the performance assessment model.

With respect to Agreement TSPAI.3.01, in Appendix M of Technical Basis Document No. 6 (Bechtel SAIC Company, LLC, 2004b, 2003b), it is argued that distributions of corrosion rates are conservative, because reduction of corrosion rates with time is ignored. The argument is appropriate, provided that Agreements CLST.1.08 and CLST.1.09 respond to the cause for the observed decrease with time in corrosion rates measured at the Long-Term Corrosion Test Facility. Although the staff considers this agreement closed, DOE should consider the following comments:

- The purpose of considering two different distributions of corrosion rates to model general corrosion of the drip shield should be explained. This may not be risk significant because it is likely that consideration of a single distribution of corrosion rates to model general corrosion of the drip shield would yield similar results.

- The justification for the different approaches taken to subdivide the waste package and drip shield surfaces (1000 patches and 1 patch, respectively) is not clear. Weight loss experiments on titanium alloy and Alloy 22 samples were identical, and it is not clear why the variance in the measured corrosion rates was interpreted differently for the two alloy kinds.

- Definition of a shape factor (based on differences in size in the test coupon and model "patch") was used to change the distribution of Alloy 22 corrosion rates. It is not clear why a similar shape factor is not applied to the distribution of titanium alloy corrosion rates (the surface of titanum alloy test coupons is much smaller than the drip shield surface, modeled as one single patch).

With respect to Agreements TSPAI.3.04 and TSPAI.3.05, the argument offered by DOE supporting the conclusion that corrosion rate distributions for drip shield and waste package materials is conservative, is sufficient to address the agreements. Risk dilution from inappropriate sampling of corrosion rates is not an issue because the distribution of corrosion rates is conservatively selected. DOE has stated that the Gauss-Variance partitioning will not be implemented in the performance assessment model; thus, the need to justify this technique is moot.

Based on the NRC review of the DOE response to Agreements TSPAI.3.01, TSPAI.3.04, and TSPAI.3.05 in accordance with methods discussed in the appropriate section of NRC (2003, Section 2.2.1.3.1.2, Review Method 3), NRC found the DOE response to the agreements to be satisfactory.

TSPAI.3.03

Appendix L of DOE Technical Basis Document No. 6: Waste Package and Drip Shield Corrosion (Bechtel SAIC Company, LLC, 2004a, 2003b) provides information related to agreement TSPAI.3.03. The agreement requests the technical basis for crack arrest and plugging of crack openings in assessing the stress corrosion cracking of the drip shield and waste package. In particular, the document requests consideration of oxide wedging as a possible mechanism for opening of cracks.

In Appendix L it is argued that cracks can fill with oxides but it is estimated to take a few thousand years. Thus, oxide wedging is not a concern as a crack opening mechanism, because the tip of the crack grows at a rate exceeding the rate of passive growth of the oxide film on the crack walls, relieving stress buildup. Therefore, Appendix L states oxide wedging is unlikely to promote the opening of cracks. Appendix L provides arguments supporting the assessment that contaminant transport through cracks is difficult for multiple reasons: (i) cracks can fill with calcite resulting from evaporation processes, (ii) evaporation mobilizes water away from the waste package surface, and (iii) capillary forces in cracks are sufficient to prevent inflow of water. Nonetheless, the performance assessment model considers that waste packages could exhibit stress corrosion cracking and release of radionuclides through cracks. Furthermore, stress corrosion cracking is considered to occur independently of environmental conditions and of the corrosion potential, despite observations this kind of cracking has been noted only for a narrow range of conditions. Therefore, it is argued the stress corrosion cracking abstraction in the performance assessment model is conservative.

Crack arrest is assumed to occur when the stress intensity factor falls below a threshold value. The technical basis for crack arrest is provided in Bechtel SAIC Company, LLC (2004a, 2003c). The threshold stress intensity equation is summarized in Equation L–1 of Appendix L. The threshold stress intensity factor in the performance assessment computations has a range of 3 to 29 MPa@m$^{1/2}$ [2.7 to 26.4 ksi@in$^{1/2}$] with a mean value of 11 MPa@m$^{1/2}$ [10 ksi@in$^{1/2}$] and is based on crack tip blunting by passive corrosion.

Stress corrosion cracking is assumed not to occur on the drip shield in the performance assessment abstraction.

The objective of the agreement was ensuring consideration of processes that could alter the stress corrosion cracking abstraction model in the performance assessment. Also, ensuring that consistent screening arguments are provided to features, events, and processes related to stress corrosion cracking (e.g., 2.1.03.02.00, Stress Corrosion Cracking of Waste Containers), and strengthening the technical basis to crack arrest implemented in the performance assessment model. Sound arguments are provided in Appendix L of Technical Basis Document No. 6 (Bechtel SAIC Company, LLC, 2004a, 2003b) to support the conclusion that the waste package stress corrosion cracking and crack arrest models in the performance assessment model are conservative. Disregarding stress corrosion cracking of Titanium Grade 7 (drip shield material) in the performance assessment model is consistent with the empirical evidence. Based on the NRC review of the DOE response to TSPAI.3.03, in accordance with methods discussed in the appropriate section of NRC (2003, Section 2.2.1.3.1.2, Review Method 1), NRC found the DOE response to the agreement to be satisfactory.

TSPAI.3.12

In Appendix A of Technical Basis Document No. 5 (Bechtel SAIC Company, LLC, 2003a), DOE indicated that simulated groundwater solutions in corrosion tests on engineered barrier materials are sufficient to represent the composition of seepage waters likely to enter the emplacement drifts. The corrosion abstraction for the performance assessment model is discussed in the WAPDEG Analysis of Waste Package and Drip Shield Degradation (Bechtel SAIC Company, LLC, 2003d). A WAPDEG model is described for localized corrosion of the waste package that is a function of temperature, pH, and concentration of relevant ionic species (chloride and nitrate) in solutions contacting the waste package. In the performance assessment model, the drip shield is assumed not to undergo localized corrosion. The rationale for this assumption is provided in the WAPDEG document (Bechtel SAIC Company, LLC, 2003d). Therefore, DOE argues that it performed tests in a broad spectrum of relevant environments and has implemented abstractions for general corrosion and localized corrosion consistent with those environments.

Appendix A of Technical Basis Document No. 5 (Bechtel SAIC Company, LLC, 2003a) discusses the range of environments considered to characterize the emplacement drift. The considered environments include a broad spectrum, providing appropriate characterization of environments that may lead to the onset of localized corrosion. A model to predict localized corrosion of the waste package, that considers environmental conditions, is described in the WAPDEG report (Bechtel SAIC Company, LLC, 2003d). Ignoring localized corrosion of the drip shield in performance assessment is consistent with the empirical data. Based on the NRC review of the DOE response to TSPAI.3.12, and in accordance with methods discussed in the appropriate section of NRC (2003, Section 2.2.1.3.1.2, Review Method 2), NRC found the DOE response to the agreement to be satisfactory.

GEN.1.01 (Comment 11)

In Appendix M of Technical Basis Document No. 6 (Bechtel SAIC Company, LLC, 2004b, 2003b), DOE stated the drip shield model is clearly explained in the WAPDEG document (Bechtel SAIC Company, LLC, 2003d).

The purpose of this comment was to ask for clarification in the DOE analyses. DOE has responded to the comment in Appendix M of Technical Basis Document No. 6 (Bechtel SAIC Company, LLC, 2004b, 2003b). The original comment is of low risk significance to waste isolation. The DOE response addresses this comment, and no more clarification is needed.

5.0 SUMMARY

NRC reviewed the DOE key technical issue agreement responses within the report to determine whether any important aspect of agreements CLST.1.06, TSPAI.3.01, TSPAI.3.03, TSPAI.3.04, TSPAI.3.05, TSPAI.3.12, and GEN.1.01 (Comment 11) were excluded from the response. In addition, NRC performed an independent assessment to determine whether the information provided would support submission of a potential license application for a potential geologic repository. Notwithstanding new information that could raise new questions or comments concerning these agreements, the information provided satisfies the intent of the agreements. On the basis of this review, NRC agrees with DOE that the information assembled in response to agreements CLST.1.06, TSPAI.3.01, TSPAI.3.03, TSPAI.3.04, TSPAI.3.05, TSPAI.3.12, and GEN.1.01 (Comment 11) are adequate to support the submission of the license application for the potential repository at Yucca Mountain.

6.0 STATUS OF THE AGREEMENTS

Based on the preceding review, NRC agrees with DOE that the information provided with respect to agreements CLST.1.06, TSPAI.3.01, TSPAI.3.03, TSPAI.3.04, TSPAI.3.05, TSPAI.3.12, and GEN.1.01 (Comment 11) is adequate to support the submission of the license application. Therefore, NRC considers agreements CLST.1.06, TSPAI.3.01, TSPAI.3.03, TSPAI.3.04, TSPAI.3.05, TSPAI.3.12, and GEN.1.01 (Comment 11) to be closed.

7.0 REFERENCES

Bechtel SAIC Company, LLC. “Transmittal of Appendix L of the Technical Basis Document No. 6: Waste Package and Drip Shield Corrosion, Addressing Key Technical Issue (KTI) Agreement Related to Total System Performance Assessment and Integration (TSPAI) 3.03 Additional Information Needed (AIN)-1.” Las Vegas, Nevada: Bechtel SAIC Company, LLC. 2004a.

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———. “Technical Basis Document No. 6: Waste Package and Drip Shield Corrosion.” Rev. 1. Las Vegas, Nevada: Bechtel SAIC Company, LLC. 2003b.

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