

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
Atomic Safety and Licensing Board**

**Before Administrative Judges:**

ASLBP BOARD 09-892-HLW-CAB04 Thomas S. Moore, Chairman Paul S. Ryerson Richard E. Wardwell
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In the Matter of	)	
	)	
U.S. DEPARTMENT OF ENERGY	)	Docket No. 63-001-HLW
	)	
(High Level Waste Repository)	)	November 12, 2009
	)	

**STATE OF NEVADA REPLY  
TO NUCLEAR ENERGY INSTITUTE OBJECTION  
TO JOINT SUBMISSION OF CONTENTION GROUPINGS  
FOR PHASE I DISCOVERY**

On October 13, 2009, the State of Nevada ("Nevada") filed a Joint Submission of Contention Groupings (hereinafter "Contention Groupings") and therein noted that the submission was supported by all the Petitioners involved in Phase I discovery with the exception that the Nuclear Energy Institute ("NEI") was reserving its right to file an objection with regard to the grouping of five specific Nevada contentions involving drip shields. On November 2, 2009, NEI filed its Objection to the Joint Submission of Contention Groupings for Phase I Discovery ("NEI's Objection") to explain its position with regard to those five specific Nevada contentions involving drip shields. Pursuant to CAB Case Management Order #2 dated September 30, 2009 (hereinafter "CMO #2") at 5, Nevada files this Reply to NEI's Objection.

## **I. Summary of Reply**

Nevada opposes NEI's proposal to relocate five Nevada contentions involving drip shields from the groups already identified in the Contention Groupings pleading for the following three reasons. First, the groupings of contentions identified in the Contention Groupings pleading are supported by all Petitioners (other than NEI) as well as the Department of Energy ("DOE"), and the U.S. Nuclear Regulatory Commission ("NRC") Staff is not opposed to those groupings. *See* Section II, *infra*. To make the changes proposed by NEI would elevate form over substance since NEI is free to participate in the discovery process for any and all contentions included in Phase I regardless of which group a particular contention may be included within. *Ibid*. Second, NEI's approach to re-grouping is selective, and its proposal is being applied arbitrarily and inconsistently as evidenced by the fact that even if accepted there would remain seven Nevada contentions addressing drip shields that would still not be included in the Drip Shield Group. *See* Section III, *infra*. In addition, NEI premises its argument for re-grouping on the need for the Board to hear various factors affecting drip shield performance together during the hearings; however, at the present time, only discovery for Phase I is authorized (which NEI can participate in fully), and the "make-up" of the contentions to be presented at the hearings has not been addressed or decided. *Ibid*. Finally, NEI presents only one argument in support of its proposal to relocate all five Nevada contentions, and that argument is based upon an inaccurate understanding of the contentions or the matters at issue within the contentions. *See* Section IV, *infra*. As evidenced below for each contention, the matters at issue and the rationale for grouping each contention warrant keeping the groupings in place for the five Nevada contentions now challenged by NEI. *Ibid*. Accordingly, NEI's

Objection should be denied and the Contention Groupings should be approved as requested by Nevada, the other Petitioners, and DOE.

**II. NEI is Free to Participate in Discovery on All Contentions Involving Drip Shields Regardless of Contention Groupings**

NEI has two contentions that will be subject to discovery during Phase I of this proceeding; however, only one contention – NEI-SAFETY-006 (drip shields are not necessary) – involves drip shields. *See* NEI Petition to Intervene (Dec. 19, 2008), at 35-39; and CMO #2, App. 1, at 1. NEI, Nevada, and all the other Petitioners involved in Phase I, as well as DOE, agree that NEI-SAFETY-006 should be grouped with 13 other similar contentions in the Drip Shield Group. *See* Contention Groupings at 2, and Exh. 1. The NRC Staff took no position when the Contention Groupings was filed and has not since objected to the inclusion of NEI-SAFETY-006 in the Drip Shield Group.

Nevada has 25 contentions involving drip shields that are subject to discovery during Phase I of this proceeding, and those contentions have been placed in five separate groups along with various other contentions.

Corrosion Group (consisting of 29 contentions total)

NEV-SAFETY-080 (localized corrosion of drip shields from evaporating seepage)  
 NEV-SAFETY-081 (effect on drip shields from hydrogen absorption due to general corrosion)  
 NEV-SAFETY-082 (effect of thermally oxidized titanium under repository corrosion conditions)  
 NEV-SAFETY-083 (general and localized corrosion testing of drip shields)  
 NEV-SAFETY-084 (differential weight loss to estimate corrosion rates of drip shields)  
 NEV-SAFETY-097 (corrosion caused by degradation of the drip shield)  
 NEV-SAFETY-098 (drip shield stress corrosion cracking at interconnections)  
 NEV-SAFETY-105 (modeling drip shield corrosion environment based on test conditions)

Emplacement Drift Geochemistry Group (consisting of 10 contentions total)

NEV-SAFETY-109 (molten salt corrosion of the drip shield)

Drip Shield Group (consisting of 14 contentions total)

NEV-SAFETY-124 (drip shield failure due to welding of alpha beta Ti alloy to unalloyed Ti)  
 NEV-SAFETY-125 (effectiveness of stress relief on various grades of Ti in drip shields)  
 NEV-SAFETY-126 (properties of dissimilar grades of Ti in metal weld joints of drip shields)

NEV-SAFETY-127 (filler material for welded joints of differing Ti grades than drip shields)  
 NEV-SAFETY-128 (drip shield nuclear code and fabrication quality assurance standards)  
 NEV-SAFETY-129 (early failure mechanisms associated with Ti fabrication of drip shields)  
 NEV-SAFETY-130 (drip shield emplacement plan, equipment and schedule)  
 NEV-SAFETY-142 (standard Ti grades for the drip shield)  
 NEV-SAFETY-143 (available drip shield design information)  
 NEV-SAFETY-144 (drip shield failure mechanisms)  
 NEV-SAFETY-145 (drip shield specifications)  
 NEV-SAFETY-161 (critical role of drip shield)  
 NEV-SAFETY-162 (drip shield installation schedule)

Rock Structure, Geomechanics and EBS Group (consisting of 13 contentions total)

NEV-SAFETY-133 (drip shield gantry description)

Human Reliability Group (consisting of 4 contentions total)

NEV-SAFETY-147 (data used in drip shield failure probability)

NEV-SAFETY-148 (computational procedure used in drip shield failure probability)

*See Nevada Petition to Intervene (Dec. 19, 2008), at 433-58, 523-31, 561-65, 579-82, 663-710, 720-22, 750-69, 774-82, and 857-63; CMO #2, App. 1, at 2-4; and Contention Groupings, Exh.*

1. With the singular exception of NEI, all Petitioners involved in Phase I, as well as DOE, agree with the proposed groupings for Nevada's 25 contentions involving drip shields. *See Contention Groupings at 2.* The NRC Staff took no position when the Contention Groupings was filed and has not since objected to the grouping of the foregoing 25 contentions.

NEI proposes to relocate five drip shields contentions advanced by Nevada – *i.e.*, NEV-SAFETY-083, 097, 098, 105 and 109 – to the Drip Shield Group. Since these five contentions were submitted by Nevada and not NEI, and since NEI has not adopted any of these five contentions, NEI's proposal should be accorded little, if any, weight. NEI's proposal runs contrary to the agreement of all the other Petitioners in Phase I as well as DOE (with no objection from the NRC Staff). More significantly, however, as a party with contentions admitted in Phase I, NEI is free to participate in discovery on these five contentions (as well as any and all other contentions in Phase I) regardless of where a particular contention(s) may be

grouped. *See* CMO #2 at 5 ("each party intervenor is permitted to advocate or defend each of those contentions and participate in the discovery process for each of those contentions notwithstanding the identified groupings"). Thus, NEI's proposal elevates form over substance. Finally, NEI's position is inconsistently applied because, even if accepted, the fact remains that seven other drip shield contentions advanced by Nevada will be remain grouped outside the Drip Shield Group.

### **III. NEI's Only Argument in Support of Its Proposal Fails to Justify Relocating Contentions from Agreed-Upon Groupings**

NEI justifies its proposal to change groupings for each of the five specific Nevada contentions involving drip shields with a single argument – "[t]his matter is integral to the larger question of whether or not the drip shields will be able to perform their Important to Waste Isolation (ITWI) function as postulated in DOE's safety analysis." NEI's Objection at 2 (although for one of the proposed contention re-groupings NEI asserts that the matter is "intrinsically related to" as opposed to "integral to" the ability of drip shields to perform their ITWI function). NEI explains its argument with the following statement:

Drip shield performance is dependent upon a number of factors. . . . During Board hearings these factors, including corrosion, should all be considered together in order to best provide a synoptic and integrated understanding of the function of, performance of, and – most basically, from NEI's perspective – the fundamental need for drip shields.

*Id.* at 2 (emphasis in original).

One of the problems with this argument, however, is acknowledged by NEI itself – namely, NEI is arguing that there is **no need** for drip shields. Thus, if NEI is correct that there is no need for drip shields, it follows that contentions that address inadequacies or deficiencies associated with drip shields, even if successful, would be irrelevant regardless of where those contentions are grouped because NEI's contention, if successful, would operate to remove an

inadequate or deficient component from the design and operation of the Yucca Mountain repository. (Since NEI has not adopted any of Nevada's 25 contentions involving drip shields as a fall-back argument, NEI cannot claim it has an interest in ensuring drip shields are installed without inadequacies or deficiencies assuming NEI-SAFETY-006 is not proven correct.) Also, under NEI's rationale for its proposed re-groupings, any favorable resolution of NEI-SAFETY-006 "considered together" with NEV-SAFETY-083, 097, 098, 105, and 109 still would not "provide a synoptic and integrated understanding of the function of, and performance of . . . drip shields" because seven other Nevada contentions addressing drip shields would remain for resolution separately, *i.e.*, as part of another group of contentions.

Since NEI believes the other seven Nevada contentions addressing the drip shields need not be relocated to the Drip Shield Group, NEI must be of the opinion that those contentions are not "integral to" or "intrinsically related to" the ability of the drip shields to perform their ITWI function. Consider, for example, that NEI is not proposing to relocate NEV-SAFETY-080, which focuses on localized corrosion of drip shields from evaporating seepage, and is not proposing to relocate NEV-SAFETY-081, which focuses on the effect of hydrogen absorption due to general corrosion. In contrast, however, NEI is proposing to relocate to the Drip Shield Group NEV-SAFETY-083, which focuses on both general and localized corrosion testing of drip shields. Contrasting just these three contentions makes clear that NEI's approach to re-grouping is selective, its argument in support of re-grouping is disingenuous, and that NEI's proposal is being applied arbitrarily and inconsistently.

Finally, NEI argues for the relocation of five specific Nevada drip shield contentions so that the various factors affecting drip shield performance can be heard together "[d]uring Board hearings." However, there is no assurance that the grouping of contentions proposed for the

purpose of Phase I discovery would be the same groupings, if any, used to conduct hearings for Phase I. Clearly if only certain contentions or groups of contentions are presented to the Board in a hearing at one particular time, the "make-up" of the contentions or groups of contentions presented to the Board is particularly significant. But at the present time, only discovery for Phase I is authorized, and discovery on all Phase I contentions will be going on throughout the authorized period. Therefore, regardless of how contentions are grouped during discovery for Phase I, counsel for all parties including NEI will have a right to participate in that discovery and will have access to the information developed as a result of discovery. Accordingly, for NEI to hinge its argument on what the Board will be considering during Phase I **hearings** is not appropriate to the manner in which Phase I **discovery** is conducted.

#### **IV. Nevada Responses to NEI's Specific Objections**

Nevada maintains that the drip shields are an integral part of the disposal system proposed by DOE for the Yucca Mountain repository and cannot be considered separately from that system, except as may be necessary to determine compliance with the requirements for multiple barriers. There is a need to take into account the interactions of drip shields with other components and processes that affect both drip shields and components such as the waste containers. Accordingly, Nevada has been careful in deciding which of its drip shield contentions belong in which group of contentions so as to ensure that similar contentions that address similar interactions are properly considered at the same time.

##### **1. NEV-SAFETY-083 Properly Belongs in the Corrosion Grouping**

NEV-SAFETY-083 challenges the corrosion test methods used for drip shields. *See* Nevada Petition to Intervene at 448-53. Specific issues to be addressed as part of this contention include the failure to replenish the solution used, the failure to address various approaches to

aeration, reliance on weight loss measurements, and lack of testing at relevant higher temperatures. *Id.* at 450-52. Nevada also contends that the corrosion test methods used for C-22 were inappropriate for many of the same reasons. For example, NEV-SAFETY-091 explicitly addresses inadequacies in the methods of testing both C-22 and Ti-7. *Id.* at 493-97. Therefore, in the process of completing discovery for NEV-SAFETY-083 the parties would simultaneously complete discovery for other similar and related contentions, including NEV-SAFETY-091, that address the various methods of corrosion testing and their applicability to corrosion of both C-22 and Ti-7. Accordingly, Nevada placed NEV-SAFETY-083 (as well as NEV-SAFETY-091) in the Corrosion Group. *See* Contention Groupings, Exh. 1. DOE concurred and the NRC Staff does not object.

NEI's sole argument for relocating NEV-SAFETY-083 to the Drip Shield Group is "[t]his matter is integral to the larger question of whether or not the drip shields will be able to perform their Important to Waste Isolation (ITWI) function as postulated in DOE's safety analysis." NEI Objection at 2. However, nowhere in NEV-SAFETY-083 does Nevada postulate this "larger question," and nowhere in NEV-SAFETY-083 does Nevada present the contention in the context of the ITWI function. Instead, Nevada makes clear that "[t]his contention challenges the sufficiency of conditions tested and validity of the titanium corrosion data from the Long Term Facility Tests as described in SAR Subsection 2.3.6 and similar subsections," and alleges those subsections "do not comply with 10 C.F.R. § 63.114(g), which requires that any performance assessment used to demonstrate compliance with Section 63.113 must provide the technical basis for models used in the performance assessment such as comparisons made with empirical observations. . . ." Nevada Petition to Intervene at 452. In

short, NEI's sole argument for relocating NEV-SAFETY-083 is not based upon an accurate understanding of the contention or the matters at issue within the contention.

Nevada properly grouped NEV-SAFETY-083 within the Corrosion Group, and the argument advanced by NEI to change that grouping is inapplicable and does not warrant the change.

**2. NEV-SAFETY-097 Properly Belongs in the Corrosion Group**

NEV-SAFETY-097 asserts that DOE's model for drip shield corrosion fails to recognize that the degradation of the drip shield will cause a debris field that collects on the surface of the waste containers and that this debris can accelerate C-22 corrosion. Nevada Petition to Intervene at 523-27. The contention addresses a process that explicitly couples corrosion of the drip shield with corrosion of the underlying waste package. Specifically, the drip shield debris field will provide a cap-like cover that forms crevices on the surface of the C-22, and when the dripping unsaturated zone water vaporizes, brines are trapped within these crevices and corresponding corrosion occurs. *Id.* at 525-26. To properly address this contention, discovery will be needed on the corrosive properties of both Ti-7 and C-22, and how corrosion products from Ti-7 can influence the geochemical environment in which C-22 corrosion occurs. Accordingly, Nevada placed NEV-SAFETY-097 in the Corrosion Group. *See* Contention Groupings, Exh. 1. DOE concurred, and the NRC Staff does not object.

NEI argues for relocating NEV-SAFETY-097 to the Drip Shield Group "[b]ecause Nevada's assertion about drip shield degradation is based on Nevada's other assertions that this degradation will be 'more rapid and extensive than assumed by DOE,' it is intrinsically related to each of Nevada's contentions challenging the ability of the drip shields to perform their ITWI function as postulated in DOE's safety analysis." NEI Objection at 2. To the contrary, none of

the assertions made by Nevada in NEV-SAFETY-097 are based on assertions made in any other contention. While Nevada is asserting in NEV-SAFETY-097 (Nevada Petition to Intervene at 526) that degradation of the drip shield will be "more rapid and extensive than assumed by DOE," that assertion is made in the context of the preceding five examples of environmental characteristics that were not taken into account in DOE's analysis – in other words, the assertion is made based upon information presented **within** NEV-SAFETY-097 and not within any other contentions. Moreover, nowhere in NEV-SAFETY-097 does Nevada challenge "the ability of the drip shield to perform their ITWI function." In short, NEI's sole argument for relocating NEV-SAFETY-097 is not based upon an accurate understanding of the contention or the matters at issue within the contention.

Nevada properly grouped NEV-SAFETY-097 within the Corrosion Group, and the argument advanced by NEI to change that grouping is inapplicable and does not warrant the change.

**3. NEV-SAFETY-098 Properly Belongs in the Corrosion Group**

NEV-SAFETY-098 argues that the drip shield connector plate and plate sections, due to the interlocking design, form crevices that have the potential to provide a locus for stress corrosion cracking ("SSC") driven by concentrations of chloride and fluoride in unsaturated zone waters. *See* Nevada Petition to Intervene at 528-31. The concentrations of chloride and fluoride in these waters are also critical to determining the corrosive behavior of C-22 (*see, e.g.*, NEV-SAFETY-089 on the effect of nitrate to chloride ratios). Therefore, Nevada placed NEV-SAFETY-098 in the Corrosion Group (along with NEV-SAFETY-089) to address the wider context of how chloride and fluoride can become concentrated at metal surfaces and lead to the

potential for SSC. *See* Contention Groupings, Exh. 1. DOE concurred, and the NRC Staff does not object.

NEI's sole argument for relocating NEV-SAFETY-098 to the Drip Shield Group is "[t]his issue is integral to the larger question of whether or not the drip shields will be able to perform their ITWI function as postulated in DOE's safety analysis." NEI Objection at 2. However, nowhere in NEV-SAFETY-098 does Nevada postulate this "larger question," and nowhere in NEV-SAFETY-098 does Nevada present the contention in the context of the ITWI function. Instead, Nevada asserts that the applicable subsections of the SAR "fail to recognize that the interlocking section design forms crevices that have the potential to provide locations for SCC driven by chloride and fluoride present in percolating unsaturated zone water," and as a result, those "subsections do not comply with 10 C.F.R. § 63.114(f), which requires that any performance assessment used to demonstrate compliance with Section 63.113 must provide the technical basis for either inclusion or exclusion of degradation, deterioration, or alteration processes of engineered barriers in the performance assessment . . . ." Nevada Petition to Intervene at 530. In short, NEI's sole argument for relocating NEV-SAFETY-098 is not based upon an accurate understanding of the contention or the matters at issue within the contention.

Nevada properly grouped NEV-SAFETY-098 within the Corrosion Group, and the argument advanced by NEI to change that grouping is inapplicable and does not warrant the change.

#### **4. NEV-SAFETY-105 Properly Belongs in the Corrosion Group**

NEV-SAFETY-105 closely parallels NEV-SAFETY-106, and both contend that DOE has failed to provide a realistic model of corrosive behavior because of the use of inappropriate test conditions. NEV-SAFETY-105 relates to the drip shield, and NEV-SAFETY-106 relates to the

waste canister. *See* Nevada Petition to Intervene at 561-65 (NEV-SAFETY-105) and at 566-70 (NEV-SAFETY-106). The technical bases for the two contentions are very similar, and both contentions will require discovery related to the relevance of corrosion tests performed in bulk liquid environments, whereas actual exposure conditions will involve water dripping onto surfaces of the drip shield or canister where it will be evaporated under the influence of elevated temperatures leading to significantly more aggressive conditions. *Ibid.* Accordingly, Nevada placed NEV-SAFETY-105 (and NEV-SAFETY-106) in the Corrosion Group. *See* Contention Groupings, Exh. 1. DOE concurred, and the NRC Staff does not object.

NEI's sole argument for relocating NEV-SAFETY-105 to the Drip Shield Group is "[t]his matter is integral to the larger question of whether or not the drip shields will be able to perform their ITWI function as postulated in DOE's safety analysis." NEI Objection at 2. However, nowhere in NEV-SAFETY-105 does Nevada postulate this "larger question," and nowhere in NEV-SAFETY-105 does Nevada present the contention in the context of the ITWI function. Instead, in this contention, Nevada "challenges SAR Subsection 2.3.6.8 and similar subsections, which fail to provide a realistic model of the corrosion behavior of the drip shield because they are based on inappropriate test conditions," and as a result, "these subsections do not comply with 10 C.F.R. § 63.114(f), which requires that any performance assessment used to demonstrate compliance with Section 63.113 must provide the technical basis for either inclusion or exclusion of degradation, deterioration, or alteration processes of engineered barriers in the performance assessment ...." Nevada Petition to Intervene at 564. In short, NEI's sole argument for relocating NEV-SAFETY-105 is not based upon an accurate understanding of the contention or the matters at issue within the contention.

Nevada properly grouped NEV-SAFETY-105 within the Corrosion Group, and the argument advanced by NEI to change that grouping is inapplicable and does not warrant the change.

**5. NEV-SAFETY-109 Properly Belongs in the Emplacement Drift Geochemistry Group**

NEV-SAFETY-109 argues that in DOE's evaluation of uniform and localized corrosion and SCC of Ti-7 only bulk aqueous solutions were considered despite evidence that liquid phases (*i.e.*, concentrated salt solutions or molten salts) that are capable of causing corrosion can be formed. *See* Nevada Petition to Intervene at 579-582. The contention states that it is well known in the corrosion community that molten salts may be significantly more corrosive than aqueous solutions because the temperature tends to be higher and due to the potential for fluxing of oxides that are protective in aqueous solutions. *Id.* at 580-81. Essentially identical arguments are made in NEV-SAFETY-108 for corrosion of the canister. *Id.* at 575-78. In both cases, the key issue is the propensity for molten salts to form, which is determined by the geochemical characteristics of the local environment, and the degree to which their corrosive effects are greater than those of aqueous solutions. Accordingly, Nevada placed NEV-SAFETY-109 (and NEV-SAFETY-108) in the Emplacement Drift Geochemistry Group. *See* Contention Groupings, Exh. 1. DOE concurred, and the NRC Staff does not object.

NEI's sole argument for relocating NEV-SAFETY-109 to the Drip Shield Group is "this matter is integral to the larger question of whether or not the drip shields will be able to perform their ITWI function as postulated in DOE's safety analysis." NEI Objection at 2<sup>1</sup>. However,

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<sup>1</sup> NEI's Objection (at 3) incorrectly asserts that NEV-SAFETY-109 is currently contained in the Corrosion Group. In fact, NEV-SAFETY-109 is currently found in the Emplacement Drift Geochemistry Group. *See* Contention Groupings, Exh. 1. This oversight, however, is not material since NEI is merely arguing for the movement of NEV-SAFETY-109 into the Drip Shield Group, and NEI does not address why its presence in the Emplacement Drift Geochemistry may be inappropriate in its opinion.

nowhere in NEV-SAFETY-109 does Nevada postulate this "larger question," and nowhere in NEV-SAFETY-109 does Nevada present the contention in the context of the ITWI function. Instead, in this contention, Nevada "challenges SAR Subsection 2.3.6.8 and similar subsections, which treat the corrosion of the drip shield, because they fail to consider molten salt corrosion," and as a result, "these subsections do not comply with 10 C.F.R. § 63.114(f), which requires that any performance assessment used to demonstrate compliance with § 63.113 must provide the technical basis for either inclusion or exclusion of degradation, deterioration, or alteration processes of engineered barriers in the performance assessment ...." Nevada Petition to Intervene at 581. In short, NEI's sole argument for relocating NEV-SAFETY-109 is not based upon an accurate understanding of the contention or the matters at issue within the contention.

Nevada properly grouped NEV-SAFETY-109 within the Emplacement Drift Geochemistry Group, and the argument advanced by NEI to change that grouping is inapplicable and does not warrant the change.

**V. Conclusion**

Based upon the foregoing, Nevada respectfully requests the Board to reject NEI's Objection. In accordance with CMO #2 at 5, Nevada also respectfully requests the Board to issue an order setting forth the groupings of contentions for Phase I consistent with the Contention Groupings pleading filed on October 13, 2009.

Respectfully submitted,

*(signed electronically)*

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Dated: November 12, 2009

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION**

**Atomic Safety and Licensing Board**

<b>In the Matter of</b>	)	
	)	
<b>U.S. DEPARTMENT OF ENERGY</b>	)	<b>Docket No. 63-001-HLW</b>
	)	
<b>(High Level Waste Repository)</b>	)	<b>November 12, 2009</b>

**CERTIFICATE OF SERVICE**

I hereby certify that the foregoing State of Nevada's Reply to NEI's Objection to Joint Submission of Contention Groupings for Phase I Discovery has been served upon the following persons by the Electronic Information Exchange:

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CAB 01

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CAB 03

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CAB 04

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