Environmental Rebuttal Report Regarding SNWA Groundwater Development in Spring, Cave, Dry Lake, and Delamar Valleys

PRESENTATION TO THE OFFICE OF THE NEVADA STATE ENGINEER

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Submitted to:
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Pertaining to:
Groundwater Applications 54003 through 54021 in
Spring Valley
and
Groundwater Applications 53987 through 53992 in
Cave, Dry Lake, and Delamar Valleys

August 2011

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ACRONYMS

BLM	Bureau of Land Management
BRT	Biological Resources Team
BWG	Biological Work Group
DDC	Delamar, Dry Lake and Cave Valleys
ESA	Endangered Species Act
FLMPA	Federal Land Policy and Management Act
GBWN	Great Basin Water Network
LVVWD	Las Vegas Valley Water District
NPS	National Park Service
NEPA	National Environmental Policy Act
NSE	Nevada State Engineer
RASA	Regional Aquifer Systems Analysis
SNWA	Southern Nevada Water Authority
UGS	Utah Geological Survey
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

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1.0 INTRODUCTION

The biological resource-related expert reports submitted by the Great Basin Water Network (GBWN) and other protestants provide factual information on the occurrence of sensitive biological resources in and around Spring Valley and Delamar, Dry Lake, and Cave Valleys (DDC), but they make scientifically indefensible and incorrect impact assessments. The biological impact assessments rely upon flawed hydrologic analyses and conclusions (Burns et al. Rebuttal, 2011a and 2011b), errors in flow model conceptualization and design (Watrus Rebuttal, 2011), predictions culled from a conceptual flow model that is not calibrated to transient simulations and is not intended for predictive purposes (D'Agnese Rebuttal, 2011), and flow model simulations that incorporate groundwater applications across 17 basins and are far beyond the scope of this hearing (Schaefer and Harrill, 1995). The protestants ignore the binding commitments of the Spring Valley and DDC Stipulated Agreements between SNWA, the U.S. Fish and Wildlife Service (USFWS), the Bureau of Land Management (BLM), the Bureau of Indian Affairs, and the National Park Service (NPS) (Stipulations, 2006 and 2008), and erroneously dismiss the benefits of monitoring, management, and mitigation. The biological expert reports have also largely ignored the impact of Federal environmental compliance regulations such as the Endangered Species Act of 1973 (ESA), the National Environmental Policy Act of 1969 (NEPA) and the Federal Land Policy and Management Act of 1976 (FLPMA), as well as Nevada State Engineer (NSE) permit terms and regulatory authority, that will ensure the Clark, Lincoln, and White Pine Counties Groundwater Development Project will be developed and operated in an environmentally sound manner.

2.0 DISCUSSION

One of the major failings of Deacon's (2006, 2007, and 2011) and Deacon et al.'s (2011) impact assessments is the reliance on flawed and inappropriate hydrologic analyses and conclusions, as described in detail by the Burns et al. Rebuttal (2011a and 2011b), the D'Agnese Rebuttal (2011), and the Watrus Rebuttal (2011). According to the Burns et al. Rebuttal (2011a and 2011b) and the Watrus Rebuttal (2011), the Myers (2011a,b,c,d) reports include errors in model conceptualization and design; flawed assumptions, analyses, and interpretations; and inaccurate and unsupported conclusions regarding groundwater flow and hydrologic and environmental impacts. Furthermore, predictive statements made by Deacon (2006, 2007, 2011), Deacon et al. (2011), and Patten (2011) are based on simulations from a conceptual model that, according to D'Agnese Rebuttal (2011), was not designed for predictive purposes. As stated in the D'Agnese Rebuttal (2011), the Regional Aquifer System Analysis (RASA) model is appropriate only "to present a conceptual evaluation of ground-water flow," "has not been calibrated to any transient simulations," and is "not suited to predict accurate water-level declines that would result from pumping ground water in the province... [or] accurate rate of change in natural discharge caused by pumping" (from Prudic et al., 1995, as in the D'Agnese Rebuttal, 2011). The predictive statements made by Deacon (2006, 2007, 2011),

Deacon et al. (2011) and Patten (2011), therefore, are invalid extrapolations that are difficult if not impossible to scientifically defend.

Deacon's (2011) expert report makes broad sweeping predictions of decline or extirpation of spring- and wetland-dependent species populations without providing adequate analyses or evidence. These claims do not take into account the complexities of the hydrogeology (Prieur Rebuttal, 2011b); connectivity to the groundwater aquifer (e.g., impacts are predicted to springsnails in local mountain-block springs that are not connected to the groundwater aquifer); groundwater flow systems and flow paths (e.g., impacts are predicted outside of the Salt Lake Desert and White River Flow Systems; see Burns et al. Rebuttal [2011a]); and reasonable time frames (e.g., some of the predicted impacts are based on Myers [2011] simulations of continuous pumping for thousands of years). There is also no consideration of current land management that influences species and habitats; or opportunities for conservation, restoration, mitigation, and integrated resource management (for integrated resource management discussion, see Marshall and Luptowitz, 2011 Chapter 6). For example, the breeding habitats of Pahranagat Valley southwestern willow flycatcher [*Empidonax traillii* ssp. *Extimus*] in Key Pitman Wildlife Management Area and Pahranagat National Wildlife Refuge are largely influenced by upstream irrigation practices and reservoir management (Klinger et al., 2007 and McCleod et al., 2007); this not only influences the current status of the species and its habitat, but also provides ample management opportunities. Another example is the refugium population of Pahrump poolfish (*Empetrichthys latos latos*), which recently experienced a decline in one of the managed artificial refuge ponds at Shoshone Ponds (A. Ambos, SNWA biologist, personal communication, August 17, 2011); USFWS has oversight responsibility for this species to ensure proper management under the Pahrump Poolfish Recovery Implementation Plan, and Stipulation-related monitoring, management, and mitigation could help improve baseline conditions fostering the species' recovery. Lastly, Deacon's (2011) report does not consider the protections afforded by Federal environmental laws (ESA, NEPA, and FLPMA; see Marshall and Luptowitz, 2011 Chapter 5), binding Stipulated Agreements (Stipulation, 2006 and 2008; see Marshall and Luptowitz, 2011 Chapter 3), and NSE regulatory authority and requirements for environmental soundness.

Deacon's (2011, 2007) predictions on extent and intensity of impacts to springs, wetlands, and associated biota as a result of SNWA pumping in the project basins are not supported by scientific evidence. Deacon's (2011, 2007) wide-spread predictions of spring drying and population extinctions are without merit because, according to Prieur Rebuttal (2011b), the hydrologic predictions that they are based upon largely ignore the actual local, intermediate, and regional hydrogeologic conditions; ignore the fact that variation in local hydrogeologic conditions and pumping regimes influence aquifer responses in different areas; do not consider the degree of hydraulic connection between areas of pumping and areas of interest; do not consider standard groundwater management practices; and do not integrate monitoring, management, and mitigation (for further discussion of Myers' [2011] broad hydrologic predictions, see Burns et al. Rebuttal [2011a and 2011b] and Prieur Rebuttal [2011b]). Deacon's (2011, 2007) specific predictions about percent spring declines and impacts to spring biota are also invalid because, according to D'Agnese Rebuttal (2011) and Watrus Rebuttal (2011), the Myers model that they are based upon lacks the necessary precision and predictive capabilities to warrant such detailed conclusions. For example, as explained in D'Agnese Rebuttal (2011), because of the large range of uncertainty in the model (the model is considered accurate where simulated and actual water levels are within 250 feet of each other), any predicted drawdown

of less than 250 ft should be viewed only as a qualitative indicator that drawdown may occur. Furthermore, as described in D'Agnese Rebuttal (2011) and Watrus Rebuttal (2011), spring flows were not included during the steady-state model calibration, and the steady-state simulation values are in poor agreement with actual spring flow observations (for further discussion of Myers' [2011] detailed hydrologic predictions and the limitations and uncertainties of Myers' [2011] model, see D'Agnese Rebuttal [2011] and Watrus Rebuttal [2011]). If actual spring flows are not represented correctly in the first instance in the steady-state model, one can have little to no confidence in the predictions made regarding spring flow declines and attendant species impacts. Finally, as discussed above, the RASA model is not calibrated to transient simulations and is not intended for predictive purposes (D'Agnese Rebuttal, 2011). From a biological perspective, Deacon (2011) also did not link habitat requirements or species life stage data to spring flows. Therefore, Deacon's (2011, 2007) wide-spread predictions of spring drying and population extinctions as a result of SNWA groundwater pumping in the project basins are over-generalized, exaggerated, and without scientific merit, and Deacon's (2011, 2007) specific predictions about percent spring declines and impacts to spring biota are not based on good science and do not merit any reasonable level of confidence.

The Deacon (2011 and 2007) expert reports and Deacon et al. (2007) *BioScience* article also provide impact assessments that are far beyond the scope of this hearing. These impact assessments are based on Schaefer and Harrill (1995) simulations of groundwater drawdown assuming full pumping of all Las Vegas Valley Water District (LVVWD)/Southern Nevada Water Authority (SNWA) groundwater applications from 17 basins in east-central and southern Nevada. The model simulations are not specific to SNWA Spring Valley and DDC groundwater applications, do not consider the actual water rights granted to LVVWD and SNWA, and do not recognize that the NSE considers perennial yield and environmental soundness in granting water rights. Although it is not clearly stated in Deacon's (2007 and 2011) expert reports, the predictions of impacts to 20 endangered or threatened species and 157 endemic wetland species are based on this sweeping analysis – not on the SNWA Spring and DDC valleys groundwater applications under review. The lack of transparency in the Deacon (2011) report is striking, in that impacts to a wide range of basins are suggested without clarifying which predictions are from this sweeping analysis and which are from Myers' (2011) analysis on SNWA pumping from the basins subject to this hearing. In addition, Deacon (2007) and Deacon et al. (2007) do not consider monitoring, management, and mitigation, and Deacon (2011) inaccurately dismisses the benefits of monitoring, management, and mitigation (for detailed discussion, see Prieur Rebuttal [2011b]). Here again, hydrogeologic complexities and connectivity to the groundwater aquifer are not taken into account; groundwater flow systems and flow paths are not adequately recognized; and the protections afforded by Federal environmental regulations (ESA, NEPA, and FLPMA), binding Stipulated Agreements (Stipulation, 2006 and 2008), integrated resource management, and NSE authority and requirements for environmental soundness are ignored.

Another major failing of Deacon's (2011) impact assessment is the erroneous conclusion that the monitoring, management, and mitigation programs under the Stipulated Agreements and Draft Environmental Impact Statement cannot succeed in the long run. These conclusions are based on the Bredehoeft and Durbin (2009) "time to full capture problem" which, as described in Prieur Rebuttal (2011b), is flawed in its application. According to Prieur Rebuttal (2011b), Bredehoeft (2011a and 2011b), and Bredehoeft and Durbin (2009) present oversimplified analyses that do not reflect the complexities of the hydrogeology; largely overlook the potential to site wells to reduce impacts, including the commitment to do so in the Spring Valley and DDC Stipulated Agreements (Stipulation,

2006 and 2008); assume no active management of the groundwater development project; and ignore the Spring Valley and DDC Stipulation hydrologic monitoring well networks that include interim wells placed between proposed areas of pumping and areas of interest. As explained in Prieur Rebuttal (2011b), monitoring can be effective if monitoring wells are located downgradient of pumping and upgradient of sites of interest, providing early warning of potential impacts and the ability to adapt and respond (for further discussion, see Prieur Rebuttal [2011b]).

The hydrologic and biological monitoring plans under the Spring Valley and DDC Stipulated Agreements are designed to provide early warning of potential hydrologic and biologic impacts from SNWA groundwater withdrawal in Spring and DDC valleys (Prieur, 2011a; Prieur Rebuttal, 2011b; BWG, 2009; BRT, 2011). Throughout Spring, northern Hamlin, Delamar, Dry Lake, Cave, southern White River, and Pahranagat valleys, current Stipulation and SNWA monitoring is composed of 54 monitor wells, including continuous recording instrumentation at 23 locations (Prieur Rebuttal, 2011b). Thirty-three (33) springs are currently being monitored, with continuous discharge or piezometer instrumentation at 19 locations. Additional monitor well data collected as part of US Geological Survey (USGS)-SNWA joint funding agreements and Utah Geological Survey (UGS) monitoring efforts is available in the region, including in Snake Valley. Installation of 12 additional wells with continuous instrumentation is planned in the future prior to project initiation. These wells and springs, coupled with numerous stream discharge continuous gages, provide an expansive baseline hydrologic monitoring program (for full description of the hydrologic monitoring program, see Prieur [2011a]). Monitor well sites under the Spring Valley and DDC Stipulated Agreements were selected at strategic locations to accomplish a number of explicit goals, including monitoring between areas of potential groundwater export and areas of biological concern, as well as at the areas of biological monitoring and concern (page 4-19 in BWG, 2009; page 4-17 in BRT, 2011; Prieur Rebuttal, 2011b). Once pumping facilities are sited, additional monitoring wells may be placed between the planned facilities and sites of biological interest as needed. This monitoring well network will provide early warning of impacts to biological sites of interest and will provide effective monitoring and management.

The biological monitoring plans for the Spring Valley and DDC Stipulated Agreements (BWG, 2009; BRT, 2011) are designed to avoid unreasonable adverse effects to federal resources in the stipulated Areas of Interest, which requires predicting potential unreasonable adverse effects and adopting management actions to avoid such effects (for further discussion, see Chapter 3 in Marshall and Luptowitz, 2011). To this end, as stated above, hydrologic monitoring sites have been or will be located between areas of proposed pumping and biological sites of interest, as well as at the sites of biological monitoring and concern; hydrologic and biologic monitoring sites are geographically distributed; and hydrologic and biologic data will be used in conjunction to monitor, manage, and mitigate (BRT, 2011; BWG, 2009; Chapter 3 in Marshall and Luptowitz, 2011; Prieur, 2011a; Prieur Rebuttal, 2011b; and SNWA, 2009a and 2009b). Distributed biological monitoring sites will allow tracking and prediction of effects across space and time, and changes in groundwater elevation at wells located between production wells and biological monitoring sites will provide early warning of propagation of effects (BRT, 2011; BWG, 2009; Prieur Rebuttal, 2011b). Furthermore, the adaptive monitoring and management approach described in Prieur (2011a), the Prieur Rebuttal (2011b), BRT (2011), BWG (2009), and Marshall and Luptowitz (2011 Chapters 3 and 5) will enable the incorporation of additional pumping locations into hydrologic and biologic monitoring designs. Lastly, clearly defined objectives of the biological monitoring plans include identifying and collecting

data on hydrologic and biologic early warning indicators, including indicators that demonstrate the condition of species and their habitat and that help differentiate between effects from SNWA groundwater withdrawal and other stressors; identifying ranges of variation, trends over time, ecological thresholds, and acceptable ranges of variation for those indicators; determining relationships between hydrologic and biologic indicators; and, based on this scientific process, assessing and predicting the response of species and their habitats to changes resulting from SNWA groundwater withdrawal (BRT, 2011; BWG, 2009). Marshall and Luptowitz (2011 Chapter 4) characterizes the substantial data collection and reporting efforts already undertaken in accordance with these objectives, and annual reports (SNWA, 2010 and 2011) have been submitted to the NSE. With this approach, the Spring Valley and DDC Stipulation hydrologic and biologic monitoring plans ensure effective monitoring, management, and mitigation of SNWA's groundwater development project.

3.0 CONCLUSION

In conclusion, Dr. Deacon's assessment of the biological effects resulting from the development of SNWA applications 54003 through 54021, inclusive, in Spring Valley and applications 53987 through 53992, inclusive, in DDC valleys is unfounded. He relies on flawed and inappropriate hydrologic analyses and conclusions; he incorrectly dismisses the contribution the Spring Valley and DDC Stipulations make toward the sustainable management of biological resources; and, he completely fails to consider the regulatory authority of the BLM, the USFWS, and the NSE.

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