IN THE OFFICE OF THE STATE ENGINEER OF THE STATE OF NEVADA

IN THE MATTER OF APPLICATIONS 53987 THROUGH 53992, INCLUSIVE, AND 54003 THROUGH 54021, INCLUSIVE, FILED TO APPROPRIATE THE UNDERGROUND WATERS OF SPRING VALLEY, CAVE VALLEY, DELAMAR VALLEY, AND DRY LAKE VALLEY HYDROGRAPHIC BASINS (180, 181, 182 AND 184), LINCOLN COUNTY AND WHITE PINE COUNTY, NEVADA	)	CLOSING ARGUMENT OF PROTESTANTS MILLARD AND JUAB COUNTIES

Protestants Millard County, Utah and Juab County, Utah, through their undersigned counsel, submit the following closing argument in the above-entitled matter.

The following conclusions may be drawn from the written and oral expert witness testimony of Dr. Hugh Hurlow, Utah Geological Survey:

1. Groundwater flows from the southern part of the Spring Valley hydrographic basin to the southern part of Snake Valley hydrographic basin. Analysis of published reports and data shows that a hydraulic gradient from west to east and permeable aquifers exist between the two basins, providing the driving force and physical pathway, respectively, for interbasin flow. Interbasin flow from southern Spring Valley contributes to the total recharge of the Snake Valley groundwater system. On cross examination, SNWA's counsel tried to get Dr. Hurlow to speculate that a groundwater level drawdown of only 45 feet would reverse the interbasin gradient and therefore reverse the direction of interbasin flow. Even if such a highly speculative scenario were

possible, the discharge in Snake Valley would have had to already decrease before interbasin hydraulic gradient were reversed. In other words, decreasing the head difference between the two valleys would nevertheless reduce flow to discharge in the ET areas of Snake Valley.

Thus, even under SNWA's dubious "quick reverse gradient" scenario urged on cross examination, there would still be a negative impact to Snake Valley in the form of reduced discharge. Therefore, any you slice it, groundwater pumping in Spring Valley will have a negative impact on Snake Valley. Dr. Hurlow's overall point remained unchallenged: Due to the lack of data to plug into the Darcy equation, as well as the uncertainty of the equation itself, it behooves the Engineer to carefully monitor and test the effects of groundwater pumping in small, drawn out, careful increments.

2. The proposed groundwater pumping in southern Spring Valley would eliminate or reverse the current interbasin flow. This is shown by A) analysis of SNWA's own predictive simulations of water levels in southern Spring Valley from their transient groundwater flow model, and B) use of the Darcy flow equation to estimate percent reduction in groundwater flow that would result from decrease in hydraulic gradient produced by lowering of groundwater levels by pumping in southern Spring Valley. SNWA's counsel's approach to challenging this point on cross-examination, revealed a scientifically unsound willingness to selectively range through various model results and pick the lowest range of accepted interbasin flow rates. An example of this is when SNWA's counsel touted the Myers groundwater flow model to challenge Hurlow, only to find SNWA's counsel challenging the very Myers' model the very next hearing day.

The take away from Dr. Hurlow's opinion under points 1 and 2 remains un-challenged after cross examination: Snake Valley will feel negative impacts from Spring Valley pumping, either in the form of decreased recharge to Snake Valley due to decreased interbasin flow, or in the form of decrease discharge in Snake Valley due to a reversal of interbasin flow, or both.

3. Groundwater in the Utah part of southern Snake Valley would be affected by reduced interbasin flow from southern Spring Valley to southern Snake Valley. Analysis of groundwater-level contours and hydrogeology in the interbasin flow area indicates that 1) groundwater flows continuously from west to east through the interbasin flow area, and from south to north from the Nevada part to the Utah part of southern Snake Valley, and 2) mapped and interpreted faults may from permeable groundwater flow pathways east-west through the interbasin flow area and north-south below southern Snake Valley.

4. Groundwater in the Utah part of southern Snake Valley is sensitive to pumping, so further decrease in recharge to the area due to reduced interbasin flow from Spring Valley would reduce spring flow and groundwater levels, potentially damaging the groundwater-dependent ecology and economy there. Analysis of hydrographs show strong response to local pumping and overall decline in water levels, suggesting that groundwater reserves may be declining due to current usage. Therefore, additional removal of recharge would accelerate the trends of declining groundwater levels.

5. *Dr. Hurlow's Recommendations to the Nevada State Engineer.* If groundwater pumping in southern Spring Valley is permitted, the following measures should be implemented to prevent damage to the groundwater system in the Utah part of southern Snake Valley.

- At least 5 years but preferably 8 to 10 years prior to the beginning of pumping, establish and continuously record a groundwater monitoring system in the interbasin groundwater monitoring zone and in the initial biological monitoring zone, defined by the Spring Valley Stipulated Agreement between SNWA and the U.S. Department of the Interior The system should include wells specified in the Stipulated Agreement and wells and surface-flow gages established by the Utah Geological Survey.
- Before pumping starts, establish early warning criteria and mitigation measures for adverse effects to the groundwater flow system in southern Spring Valley and southern Snake Valley, including cessation of pumping, as delineated in the Spring Valley Stipulated Agreement.
- Construct a numerical groundwater flow model that includes the pumping area, the interbasin flow area, and the initial biological monitoring zone. Include a more detailed geologic framework than is possible in the current SNWA groundwater flow model, and water-level and chemical tracer data from the new monitoring wells.
- If permitted, limit initial pumping in southern Snake Valley to 15,000 to 20,000 acre-feet per year for 10 years.
- When the groundwater monitoring system shows measurable response to the initial pumping, calibrate the numerical model using the pumping data and water-level changes and perform predictive simulations to evaluate possible impacts to groundwater in the Utah part of southern Snake Valley.

Millard and Juab Counties respectfully urge the State Engineer to continue with all of the protections accorded by the SNWA – Department of Interior 2006 Stipulated Agreement as a foundation. And then overlay and integrate into the 2006 Stipulated Agreement all of the above-stated recommendations of Dr. Hurlow. In other words, start with the Stipulated Agreement of 2006 and supplement it with recommendations of Dr. Hurlow as stated above, and do so for the entire so-called Areas of Interest as shown in the Figure 1 map in the 2006 Stipulated Agreement.

Respectfully submitted this 22nd day of December, 2011.

/s/ J. Mark Ward
J. Mark Ward, Admitted Pro Hac Vice
Utah State Bar #4436
5397 South Vine Street
Murray, Utah 84107

John B. Rhodes, NV Bar #1353
P.O. Box 18191
Reno, Nevada 89511
Phone (775) 849-2525

Attorneys for Protestants Millard County, Utah
and Juab County, Utah