CPB_007

CORPORATION OF THE PRESIDING BISHOP OF THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS A UTAH CORPORATION, SOLE

Technical Review and Comment Regarding SNWA Exhibits 037, 097, 307, and 363

August 26, 2011

Prepared For:

KAEMPFER CROWELL
50 West Liberty Street, Suite 900
Reno, Nevada 89501

Prepared By:

RESOURCE CONCEPTS, INC.
340 N. Minnesota Street
Carson City, Nevada 89703-4152

CPB_007

CORPORATION OF THE PRESIDING BISHOP OF THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS A UTAH CORPORATION, SOLE

Technical Review and Comment Regarding SNWA Exhibits 037, 097, 307, and 363

August 26, 2011

Prepared For:

KAEMPFER CROWELL
50 West Liberty Street, Suite 900
Reno, Nevada 89501

Prepared By:

RESOURCE CONCEPTS, INC.
340 N. Minnesota Street
Carson City, Nevada 89703-4152
www.rci-nv.com
(775) 883-1600

Table of Contents

Page

LIST OF TABLES

File doc: 2011-08-24 CPB EXH-005 SNWA Hearing 11-146.2 Kirton&McConkie jd-jm L8-49.doc
[August 25, 2011]

Section 1.0 – Overview

On behalf of Corporation of the Presiding Bishop of the Church of Jesus Christ of Latter-Day Saints (CPB), a Utah Corporation Sole, Resource Concepts, Inc. (RCI) reviewed the following listed Southern Nevada Water Authority (SNWA) Exhibits:

- SNWA Exhibit #037: *Potential Effects of Change in Depth to Water on Vegetation in Spring Valley, Nevada*
  - Prepared by KS2 Ecological Field Services, LLC (KS2 2011)
- SNWA Exhibit #097: *Committed Groundwater Resources in Four Nevada Hydrographic Areas: Cave, Dry Lake, Delamar and Spring Valleys*
  - Prepared by Stanka Consulting, LTD dated June 2011 (Stanka 2011)
- SNWA Exhibit #307: *Environmental Report Covering Selected Hydrographic Basins in Clark, Lincoln, Nye and White Pine Counties, Nevada 1994*
  - Prepared by Woodward-Clyde Consultants, Dames & Moore, 1994
- SNWA Exhibit #363: *Environmental Evaluation of SNWA Groundwater Development in Spring, Cave, Dry Lake and Delamar Valleys*
  - Prepared by SNWA, Zane Marshall and Lisa Luptowitz

In addition, RCI reviewed the *Spring Valley Hydrographic Basin 10-184 NRS Section 533.364 Inventory* prepared by the Nevada Division of Water Resources dated August 2011 (NDWR 2011) and portions of the *Clark, Lincoln, and White Pine Counties Groundwater Development Project Draft Environmental Impact Statement* prepared by the Bureau of Land Management dated June 2011 (BLM 2011). The RCI review focused on the assumptions used and analysis conducted in preparing these reports, especially as it pertained to CPB interests in north Spring Valley. Additionally, RCI identifies the ramifications of the findings of the above listed exhibits on CPB water rights, land and water resources in north Spring Valley, Nevada.

Section 2.0 – Technical Review and Comment to SNWA: Exhibit #037 "Potential Effects of Changes in Depth to Water on Vegetation in Spring Valley, Nevada" and Exhibit #307 "Environmental Report Covering Selected Hydrographic Basins in Clark, Lincoln, Nye and White Pine Counties, Nevada 1994"

2.1 Comments Regarding Analysis

Exhibit 307 was prepared in 1994, and RCI reviewed that report and incorporated its findings into the following comments, primarily directed to Exhibit 037.

Although very generalized in its presentation, Exhibit 037 (KS2 2011) represents a rather thorough literature review and summary of the expected plant succession trends that could result under increasing depths to groundwater (DTW) in Spring Valley, Nevada. Through this 37-page literature review, as supported by 122 literature citations, this analysis concluded:

> **"Substantial increases in DTW would have an effect on the vegetation in portions of Spring Valley but the effects would be manageable. Depending on the magnitude of these increases, their location and other factors discussed in this report, the results would be changes in species composition and vegetation types. Affected wet meadows are likely to shift to dry meadows, dry meadows to grass-shrublands, and greasewood shrublands to rabbitbrush and big sagebrush shrublands…… The rate and magnitude of groundwater decline can be managed such that successional processes will result in target plant communities associated with specific DTW and soil conditions" (KS2 2011).**

Perhaps due to its over-simplification, or the unfamiliarity of the authors with key ecological processes in the Great Basin, this report leaves out some important factors that will affect plant succession in DTW-affected areas located in Spring Valley. There is a high possibility these undisclosed factors could have a dramatic effect on the conclusions presented in this report.

2.1.1 Greasewood Plant Communities

These plant communities represent a significant component of Spring Valley flora, although their value and production as a forage resource is limited. On Page 3-13 of this report the conclusion is made that ***"[o]nce DTW reaches 9-10 m (sic. 30 to 33 feet), any further increases in DTW would not affect the community because it would be effectively decoupled from groundwater."*** While this statement may be partially correct, indicating that the established greasewood plants can survive their remaining life on atmospheric precipitation, it fails to take into account that the recruitment and establishment of new or replacement greasewood plants is dependent on the presence of a fluctuating, near-surface water table (J.A. Young 2011). This missing piece of information has broad ramifications since it is widely recognized that establishing plant or shrub roots will not grow very far under dry soil conditions. While greasewood seeds may germinate near the soil surface in the spring during the rare wet atmospheric precipitation events, these germinating seedings will likely expire under the subsequent drought-like summer conditions unless they have access to a fluctuating near-surface water table to draw sufficient moisture to establish their root system deep into the soil profile.

Based on this important and undisclosed factor, it is possible that established greasewood plants may develop to the point where they can continue to exist under conditions where their rooting depth is decoupled from groundwater. However, the prerequisite requirement for a fluctuating near-surface water table would prevent the recruitment of new greasewood plants into the plant community. Under the information presented in KS2 (2011), the authors would likely contend rabbitbrush and sagebrush would fill any future voids produced by future failures in greasewood recruitment. However, in consideration of the following points, these replacement shrub species may not be adapted to the future site conditions in these former greasewood sites.

2.1.2 Soil and Water Salinity Relationships

The KS2 (2011) report fails to consider the ramifications of disrupting the soil and water salinity relationships by increasing DTW and how these secondary changes could subsequently affect plant succession in Spring Valley. Spring Valley is a closed hydrologic basin and has been for a very long period of time. This means all the water-soluble salts that have gone into solution from geologic erosion have now cumulated into either the groundwater or the lake-plain sediments in this basin. As a closed basin, there are two principal mechanisms to remove or redistribute accumulated salts. The first requires a fluctuating water table that frequently reaches the depth of soil surface wetting in lake plain sediments where salt crystals are subsequently formed through water evaporation. These salt crystals can then be transported either out of the basin or surrounding upland sites through wind erosion. This process is the only mechanism that can effectively remove or relocate eroded soluble salts from closed basins (J.A. Young 2011).

The second mechanism involves greasewood and its unique ability to access salt-affected groundwater. As a facultative phreatophyte, greasewood can root up to a depth of about 20 to 30 feet (KP2 2011) and ready access and uptake shallow groundwater sources that are often contaminated by soluble salts. Through the process of forming oxalates in leaf tissues and annual leaf drop, greasewood has the unique ability to transport salt-affected groundwater and deposit soluble salts to the soil surface where it can either be relocated through wind-driven soil deposition or reintroduced into the lake plain soils and groundwater through surface water infiltration (J.A. Young 2011).

Combined, these two mechanisms represent the primary factors in controlling the dynamics of soluble salts in a closed basin (J.A. Young 2011). These mechanisms are dependent on a fluctuating water table that allows groundwater to reach the depth of soil surface wetting in lake plain sediments and permit the crystallization of soluble salts and allow the establishment and replacement of greasewood plants. If these processes are disrupted by an increasing DTW through groundwater development and export, the concentration of soluble salts in the lake plain sediment soils can accumulate and increase to the point where salt-saturated lakes, similar to Great Salt Lake, are formed (J.A. Young 2011). The deterioration of these two mechanisms can further affect existing groundwater quality in an adverse manner. The resulting accumulation of soluble salts concentrations in lake plain soils is also not conducive for the establishment of rabbitbrush or sagebrush as replacements to greasewood, as discussed earlier.

2.1.3 Invasive Weeds

The important issue on how annual or perennial weeds could modify or otherwise truncate plant succession in native plant communities affected by a declining DTW is limited to one paragraph on Page 5-3 in KS2 (2011) that focuses entirely on one invasive species, cheatgrass. Other widespread and threatening invasive weed species adapted to Spring Valley, like halogeton, is not referenced in KS2 (2011).

The general conclusion of this one paragraph discussion is that established perennial native grass species can out-compete cheatgrass due to their ability to access deeper levels of stored soil moisture and will begin to replace cheatgrass over a period of 10 to 20 years. What this conclusion fails to recognize is the increased flammability of cheatgrass often reduces fire-return intervals to re-occurring levels where the residual perennial native vegetation is nearly eliminated over an interval of a decade or two (NAES 2008). In these all too frequent situations in the Great Basin, cheatgrass establishes as a monoculture due to its adaptability to re-occurring fire regimes and the lack of interspatial competition from perennial plant species. Red brome, classified in the same genus as cheatgrass, plays a duplicate role in the Mojave Desert environments.

Young and Clements (2009) provide an authoritative compilation of the current scientific information on the biology and autecology of cheatgrass, and its associated species, including red brome. This definitive work also provides a detailed explanation on how the presence and ecology of cheatgrass can truncate plant succession in temperate desert shrublands. The biological processes defined by Young and Clements (2009) represent serious challenges to the plant successional pathways identified in KP2 (2011) for shrub-dominated plant communities affected by the Clark, Lincoln and White Pine Counties Groundwater Development Project.

2.2 Potential Implications of Findings from Exhibit 037 to CPB Holdings (Land and Water) in north Spring Valley

The biggest omission or deficiency in the KP2 (2011) report is that it fails to apply the compiled plant succession information against the modeled projections for groundwater declines to disclose direct estimates on how this proposed project will actually affect existing plant communities, and the secondary effects on related natural resources (i.e., wildlife habitats, air and water quality, permitted livestock grazing, etc.) and the human environment. This limitation in KP2 (2011) falls decidedly short in providing the project-specific assessment needed by the Nevada State Engineer to render a well-founded decision under the requirements of NRS 533.370(6)(c).

With the basic biological information provided in KP2 (2011), the project area plant community mapping provided by McLendon, et al. (2011), and acceptable DTW modeling projections for the SNWA project, the development of estimates on how groundwater withdrawal would directly affect existing vegetation and plant communities located in the project area or the Cleveland Ranch would represent a relatively simple analysis.

While it is beyond the scope of this initial review to conduct this project modeling, some general conclusions can be made as to how the SNWA project, specifically the Proposed Action presented in the USDI, Bureau of Land Management (BLM) DEIS (BLM 2011), will affect the existing forage production resources at the Cleveland Ranch and the BLM public land grazing permits attached to this ranch. Each of these important and contributory components of the range livestock operation at the Cleveland Ranch is presented separately below.

2.2.1 Public Land Grazing Allotments

For the purpose of meeting the yearly forage requirements of a 1,750-head cow/calf operation, the Cleveland Ranch is dependent on the forages provided on the public lands that surround the ranch. This dependency represents a common characteristic for many ranching operations in the West and over time has evolved into the development of a public land grazing permitting program administered by the BLM. With regard to the Cleveland Ranch, the BLM Ely District is the administrating agency for the public land grazing permits.

To meet its yearly forage demand, the Cleveland Ranch currently holds the permits for three public land grazing allotments, including Bastian Creek, Cleveland Ranch and Negro Creek. Combined, these permits provide the authority to the Cleveland Ranch to annually apply up to 6,526 animal unit months (AUMs) of cattle use spread across the 57,168 acres represented by the three permitted allotments. In very rough terms, this permitted public land grazing use equates to approximately 30 percent of the annual forage demands for a 1,750-cow herd.

The only assessment currently available on how groundwater withdrawal will affect these public land grazing permits is found in BLM (2011). This assessment included: 1) an analysis of the susceptibility of individual streams and springs to increasing DTW, and 2) an assumption that a drawdown contour indexed at 10 feet would provide a reasonable estimate of when and where long-term changes in plant community vigor and composition would begin to appear.

Based on the analyses contained in BLM (2011), specific project-related effects to the three grazing allotments permitted to the Cleveland Ranch were compiled and summarized in Table 2.1. This agency analysis and modeling indicated about 25 percent of the existing vegetation on these allotments will be affected after 75 years of operation under the Proposed Action. Since the anticipated project effects relate to the reduction in the future availability of soil moisture, there can be little doubt that these anticipated vegetation changes would result in reduced plant vigor, palatability, and forage production on these three public land allotments. In addition to adverse effects to the forage resources, this analysis also discloses that the agency modeling of the proposed groundwater withdrawals will reduce water yields from 29 separate spring sources and 5.7 miles of existing streams, most of which are permitted to the Ranch under the beneficial use of stockwater. These effects are expected to increase, both in terms of the vegetation and reduced surface-water yields after 200 years of operation under the Proposed Action.

Table 2.1. Summary of Effects to Grazing Allotments Disclosed in the BLM DEIS for the Clark, Lincoln, and White Pine Counties Groundwater Development Project under the Proposed Action (BLM 2011)

Allotment Name	**Proposed Action at Build Out + 75 Years**				**Proposed Action at Build Out + 200 Years**		
	Construction Disturbances[1/] (Ac.)	**No. of Affected Springs**	**Affected Stream (Miles)**	**Affected Vegetation (Ac.)**	**No. of Affected Springs**	**Affected Stream (Miles)**	**Affected Vegetation (Ac.)**
Bastian Creek		5		8,028	5		8,028
Cleveland Ranch	13[2/]	3	0.83	1,250	18	3.34	2,417
Negro Creek		21	4.85	4,883	29	4.86	5,668
Combined Allotment **Totals:**	**13[2/]**	**29**	**5.68**	**14,161**	**52**	**8.20**	**16,113**
Percent of Combined Allotment Acreage (%):				**25%**			**28%**

1/ This BLM DEIS did not include the development of surface facilities at specific well site locations.
2/ This disclosed project construction estimate includes 12 acres of temporary ground disturbance for construction of project right-of-ways and one acre of permanent access road construction under the Proposed Action at build out.

These expected and disclosed project effects would result in the loss of current forage production levels and stockwater yields and distribution across the three public land allotments. The loss of stockwater sources on these allotments could significantly reduce the amount of grazable rangeland and concentrate cattle use on smaller portions of the allotments that remain accessible to stockwater. Further, if existing stockwater sources were eliminated through the Proposed Action, this would place more concentrated livestock use on the residual stockwater sources.

Left unmitigated, these anticipated (but not fully defined) project impacts would most certainly require substantial modification to the current agency grazing permits. Due to the reported magnitude of loss in stockwater sources, and forage production and stockwater yields, these future permit modifications will mostly likely require the reduction in the permitted number of livestock and/or the duration of grazing use. In either instance, these future permit modifications will end up placing a greater reliance on the development and production from private land forage resources to maintain the annual forage balance for the existing 1,750-cow/calf base herd.

2.2.2 Developed Private Land Forage

The Cleveland Ranch proper, and its associated private land holdings (Cleveland Ranch), represent a 6,840-acre operation that is extensively developed and irrigated to produce sufficient livestock forage to sustaine a 1,750-head base herd for about 70 percent of the year (Table 2.2). With about 87 percent under developed irrigation, the majority of this irrigated forage production occurs on the Cleveland Ranch unit. Most of the developed irrigation across the entire ranch is currently permitted from surface water sources (i.e., springs and creeks) or subterranean drainage (RCI 2011).

Table 2.2. Summary of Developed Surface-Water Irrigation on Private Properties Comprising the Cleveland Ranch (RCI 2011)

Ranch Property Units	Private Land Acreage (Ac.)	Irrigated Acreage* (Ac.)	Percent Irrigated (%)
Cleveland Ranch	4,760	4,150	87
Rogers Ranch	1,480	160	11
Negro Creek Homestead	400	67	17
Four Mile Springs	80	10	13
North Cleveland	120	0	0
Ranch Totals:	**6,840**	**4,383**	**64**

* Approximate Irrigated Acreage based on mapping and water right records provided in CPB Exhibit 001.

The BLM (2011) analysis and modeling of project impacts excludes, and does not extend into, the private properties that constitute the Cleveland Ranch. However, groundwater modeling utilized by the BLM shows increased DTW in the magnitude of minus 10-to-50 feet on all sides of the Ranch and up to 100-foot groundwater decline immediately to the south of the Ranch. Intuitively, it is reasonable to expect that the Ranch will incur impacts from groundwater withdrawal similar to those of the surrounding public lands. This is particularly likely since permitted surface water represents the source for most of the irrigation currently developed on the Ranch.

The analysis used in BLM (2011) utilized a threshold of 10-foot decline in the groundwater depth to indicate a sufficient loss in hydrology to initiate a change in the vigor, production, and species composition in wet-meadow plant communities. Since irrigated pasture production practiced at the Cleveland Ranch is functionally equivalent to native meadow production, it is a reasonable expectation that similar effects will occur on the irrigated portions of the Cleveland Ranch as was modeled by BLM (2011) for wet meadows.

While the extent of increased DTW at the Cleveland Ranch is not well understood at this time, Table 2.3 provides an indication of the expected vegetation production levels that may be achieved if the existing site hydrology was modified to produce alternative and more arid plant communities. These selected plant communities generally follow the plant succession patterns identified in KP2 (2011).

Table 2.3. Estimated Normal Vegetation Production Levels for Selected Ecological Sites (NRCS 2003)

Ecological Site Description		Estimated Plant Production (Dry lbs./Ac.)	Percent Change (%)
Name	**Number**		
Wet Meadow 10-14 P.Z.	028BY001NV	2,000	----
Saline Meadow	028BY002NV	1,000	50
Sodic Flat 8-10 P.Z.	028BY069NV	600	40
Sodic Flat 5-8 P.Z.	028BY020NV	300	50
		Cumulative Change (%) =	**85**

This information indicates that as the Ranch becomes more arid, due to the loss of surface water diversion and distribution, vegetation production in the currently irrigated pastures at the Cleveland Ranch will be significantly reduced. Along with this reduction in vegetation production there will be a corresponding reduction in the ability of the Ranch to support a viable grazing operation. This raises the question as to whether or not changes in vegetation are in fact “manageable” as described in this exhibit.

Section 3.0 – Technical Review and Comment to SNWA Exhibit 097 "Committed Groundwater Resources in Four Nevada Hydrographic Areas: Cave, Dry Lake, and Spring Valleys"

3.1 Comments Regarding this Analysis

On behalf of CPB, Resource Concepts, Inc. (RCI) reviewed SNWA Exhibit #097 entitled *Committed Groundwater Resources in Four Nevada Hydrographic Areas: Cave, Dry Lake, Delamar and Spring Valleys* and prepared by Stanka Consulting, LTD dated June 2011 (Stanka 2011). In addition, RCI reviewed the *Spring Valley Hydrographic Basin 10-184 NRS Section 533.364 Inventory* prepared by the Nevada Division of Water Resources dated August 2011 (NDWR 2011). The RCI review focused on the assumptions used and analysis conducted in preparing both reports, especially as it pertained to CPB interests in north Spring Valley. In comparing the two reports, it appears that both accurately described the current underground water rights within Spring Valley, at least as they pertain to CPB interests in north Spring Valley. However, the total amounts of the effective duty of committed groundwater resources disclosed in the two reports were inconsistent, as described later in this report. Furthermore, the Stanka 2011 report did not include any information pertinent to committed surface water resources.

RCI had concern with the Stanka 2011 report to the extent that it categorizes committed groundwater resources as those with priority dates prior to October 17, 1989, and those with priority dates after October 17, 1989. The Stanka report concludes that there are approximately 10,430 AFA of committed "consumptive" water rights with priority dates prior to October 17, 1989, and 2,339 AFA with priority dates after October 17, 1989. October 17, 1989, is significant in that it is the priority date of the SNWA water rights filings. Although this date is significant in terms of water right priority, it does not discount the fact that all of these water rights are already committed; therefore, none of them should be excluded from consideration of the amount of water already allocated within a finite hydrographic basin. More to the point, both the Stanka and NDWR reports excluded any groundwater rights that were classified either as RFP, RFA or APP as they were not considered as being "active." As such, the SNWA applications that are currently classified as RFP should not be considered as active, thereby excluding any previous commitments of groundwater. Excluding the amount of consumptive groundwater for rights with priority dates after October 17, 1989 from consideration should not be allowed during the SNWA hearing.

While the overall amount of committed groundwater by duty was consistent between the two reports, the calculated effective duty reported by Stanka 2011 and NDWR 2011 varied as summarized in Table 3.1 below.

Table 3.1. Committed groundwater in the Spring Valley Hydrographic Basin (10-184) as reported and calculated by Stanka 2011 and NDWR 2011.

Source	Committed Groundwater by Duty (AFA)	Committed Groundwater by Calculated Effective Duty (AFA)
Stanka 2011[1/]	21,702	12,769
NDWR 2011[2/]	21,702	14,207
Difference =	**0**	**1,438**

1/ From Table 5-22, page 5-35 (Stanka 2011)
2/ From Table A-1, page A-3 (NDWR 2011)

The difference of 1,434 AFA is likely attributed to the difference in analysis of two primary factors:

1. The assumptions used to calculate the effective use of groundwater that is supplemental to surface water for the purpose of irrigation, and
2. The assumptions used to calculate the effective use of groundwater by domestic well users

3.1.1 Calculation of Effective Use of Supplemental Groundwater for Irrigation

The Stanka 2011 report assumed that the average effective use of wells that provide supplemental irrigation groundwater to primary surface water irrigation rights to be 39.1% of the duty recorded in the water right. The NDWR 2011 report assumed the effective use to be 50% of the recorded duty. The Stanka 2011 report based this assumption on an analysis of the hydrograph developed by mean monthly flows from Cleveland Creek across a 7-month irrigation season, April 1 to October 31. The report indicated that the mean monthly peak flow of 23 cfs experienced during May and June would need to be supplemented in July through October by supplemental groundwater rights in order to achieve consistent flows of 23 cfs throughout the irrigation season. That assumption resulted in an estimated 39.1% of water needing to come from supplemental groundwater and the assumption was then used for a basin-wide analysis of the effective use of supplemental groundwater for irrigation purposes.

RCI considers this to be an underestimate of the required supplemental groundwater usage in Spring Valley. While Cleveland Creek does have very good historical records, the watershed is not necessarily typical of others that flow into Spring Valley. The analysis assumes that the entire flow is put to beneficial use, and does not account for water conveyance losses across porous alluvial fans typical of Spring Valley. The use of historic records on Cleveland Creek, dating as far back as 1914, is more reflective of past climatic, watershed, and weather patterns. Basing this analysis on past records does not account for more recent impacts such as climate change, increased vegetation interception and consumptive use of water in the upper watershed due to expansion of pinyon-juniper woodlands, and the timing and duration of more recent snow pack and storm events. The analysis does not take into consideration the likely need for a stronger reliance on supplemental groundwater as a result of the proposed SNWA project and associated groundwater drawdown. The project has the potential to draw down groundwater tables, impact stream reaches including Cleveland Creek, and decrease spring flows in the area of the Cleveland Ranch (DEIS 2011), which will require more reliance on supplemental groundwater resources. For these reasons RCI supports the analysis in NDWR 2011 which uses an assumption of 50% use of recorded duty to compute effective duty for groundwater that is supplemental to surface water irrigation rights.

3.1.2 Calculation of Effective Use of Domestic Groundwater Wells

The Stanka 2011 report cited a 2005 study that estimated the per capita water usage in Carson City, Lyon and Douglas Counties. They used the high estimate of 0.22 AFA per capita estimated in the study and multiplied that by the 2000 US Census Data for Lyon County, which showed the highest average people per household at 2.61 for a total estimated usage of 0.57 AFA per domestic well. The fundamental flaw with this analysis is that domestic usage in Spring Valley, which is very remote and consists primarily of ranching families and workers, could be much different than the more populous urban counties of Carson City, Douglas and Lyon. For this reason, RCI supports the analysis in NDWR 2011 assuming 1 AFA per domestic wells specific to rural usage in order to calculate the effective duty of groundwater that is classified for domestic usage.

RCI would suggest that the findings of the NDWR 2011 report, specifically the estimation of 14,203 AFA, be used during the SNWA hearing as it relates to discussion of effective committed groundwater.

3.2 Potential Implications of Findings from Exhibit 097 and *Spring Valley Hydrographic Basin 10-184 NRS Section 533.364 Inventory* to CPB Holdings (Land and Water) in north Spring Valley

While Exhibit 097 (Stanka 2011) did not assess available or committed surface water from springs and streams, the inventory of the Spring Valley Hydrographic Basin completed by the Nevada Division of Water Resources (NDWR 2011) did. The findings of the inventory help to substantiate the claims and arguments established in CPB-001, which has already been submitted.

3.2.1 Cleveland Ranch

RCI developed and presented a series of maps and figures pertinent to the irrigation of private land held by CPB and important stockwater in north Spring Valley as part of CPB Exhibit 001 (RCI 2011). This information included preliminary flow estimates for perennial streams utilized by CPB. While some of the estimated flows varied between RCI (2011) and NDWR (2011), the same general theme emerged: CPB holds more water rights (VST, CER) than water provided by streams and springs critical to its operations including Cleveland Creek, Indian Creek and Stephens Creek associated with the Cleveland Ranch and Negro Creek associated with the Rogers Ranch and Negro Creek Homestead. This information is summarized in Table 3.2 below.

Table 3.2. Estimated Duty and Flow of Water Used for Irrigation on the Cleveland Ranch in North Spring Valley

Water Source	NDWR (2011) Duty (AFA)	NDWR (2011) Est Annual Discharge (AFA)	RCI (2011) Duty (AFA)	RCI (2011) Est Annual Discharge (AFA)
Cleveland Creek	[1/]13,254.18	7,529.29	[2/]25,254.18	7,732
Indian Creek	NA	470.58	Commingled with Cleveland Creek	NA
Stephens Creek	4,800.00	482.87	4,800.00	747
Murphy & Big Reservoir Springs	9,600.00	5,006.00	9,600.00	NA
Total flow to Cleveland Ranch per NDWR (2011) =		**13,488.74**	**[3/]Per RCI (2011) =**	**13,485**

[1/] Supplementally Adjusted Demand as noted by NDWR (2011)
[2/] Additive per water rights held by CPB as noted by RCI (2011)
[3/] Including NDWR (2011) Spring Flow Estimate

Assuming a duty balance of 4 acre-feet per acre, both NDWR (2011) and RCI (2011) would imply that, on average, the Cleveland Ranch receives enough water to irrigate approximately 3,370 acres annually. This is based on water supplied by Cleveland, Indian and Stephens Creeks as well as a series of springs (Murphy and Big Reservoir 1-11) located on the Ranch. On good water years the Ranch can irrigate up to 4,150 acres of pasture on the Cleveland Ranch when combining acreage that is under sprinkler, flood or sub-irrigation with flood inclusions. This difference can be attributed to the unique layout of the Cleveland Ranch and the built-in water efficiency.

The Cleveland Ranch slopes along the Spring Valley alluvial fan from west to east. The stream sources enter the Ranch along the western boundary. Water from the streams is used to irrigate via sprinkler or flood on the upper western pastures. Unused water that is either infiltrated during irrigation or conveyance is either collected as tailwater by a series of ditches or leaches into the alluvial fill and helps to recharge the series of springs located in the middle portion of the Ranch. This commingled water is redistributed across the Ranch for flood irrigation of the middle pastures. The fields on the lowest gradient along the eastern portion of the Ranch are primarily sub-irrigated with a series of flood irrigated inclusions throughout the extensive network of natural drainages and channels. Therefore water utilized along the highest elevations, western portion of the Ranch, is essentially recycled and utilized for flood irrigation and/or recharge for flood and subirrigation along the lowest elevations, eastern portion of the Ranch. This unique layout allows the Cleveland Ranch to maximize the utilization of its irrigation water.

As such, the CPB agrees with the NDWR (2011) assertion that there is no available water from Cleveland Creek, Indian Creek, Stephens Creek or the Murphy and Big Reservoir Springs located on the Cleveland Ranch. Furthermore, if drawdown occurs in the vicinity of Cleveland Creek or the Ranch, the irrigation efficiency described above could be compromised. Increase infiltration of Cleveland Creek as a result of groundwater pumping could result in less subsurface flow reaching the pastures and springs. If the springs on the Cleveland Ranch go dry, the ability to flood irrigation the middle portions of the Ranch will be compromised. If the depth to ground water is increased in the eastern portion of the Ranch, the sub-irrigation of these areas will be compromised and the critical plant communities that provide forage would also be altered. All of this would result in one of two options for the Ranch to remain viable, reduce the number of stock or pump groundwater to make up for the loss. Both options will result in major financial challenges to the Ranch, and further groundwater pumping in the area could serve to exacerbate the water table drawdown. These are some of the primary reasons that the CPB has filed protests on 12 of the SNWA proposed wells in Spring Valley.

3.2.2 Rogers Ranch

Per the NDWR (2011), the duty from water rights held by the CPB far exceeds the estimated annual discharge of Negro Creek as shown in Table 3.3. The RCI (2011) flow estimate was substantially higher, but these estimates were derived on the Negro Creek Homestead based on several flow estimates made across a single irrigation season. The amount of water that actually reaches the Rogers Ranch, where the primary place of use is located, is significantly less as described by RCI (2011).

Table 3.3. Estimated Duty and Flow of Water Used for Irrigation on the Rogers Ranch and Negro Creek Homestead in north Spring Valley

Water Source	NDWR (2011) Duty (AFA)	NDWR (2011) Est Annual Discharge (AFA)	RCI (2011) Duty (AFA)	RCI (2011) Est Annual Discharge (AFA)
Negro Creek and Tributaries	1/2,055.55	1,158.35	2/2,600.58	3/2,334

1/Supplementally Adjusted Demand as noted by NDWR (2011)
2/Additive per water rights held by CPB as noted by RCI (2011)
3/Estimated at the Negro Creek Homestead

Currently, the estimated irrigated acreage in these two units is much lower than allowed by the recorded duty. This is due to the loss of water between the Negro Creek Homestead and the Rogers Ranch. The CPB has been working to improve the efficiency of water delivery along this stream reach by planning a pipeline installment between the Negro Creek Homestead and the Rogers Ranch. The CPB has been working with the BLM to secure a right-of-way and with NDWR to change the point of diversion for the water rights associated with the Rogers Ranch. The CPB also has two outstanding applications (69726-7 RFA) for supplemental groundwater for irrigation on the Rogers Ranch. Improving forage production on the Rogers Ranch is of paramount importance for maintaining or increasing the overall livestock production from CPB operations in north Spring Valley.

3.2.3 Grazing Allotments (Cleveland Ranch Allotment, Negro Creek Allotment and Bastian Springs Allotment)

NDWR (2011) also accurately identified existing water rights associated with CPB grazing allotments and made the statement that "it is possible that vested rights exist for which no filing with the Office of the State Engineer has been made." CPB has recently submitted 16 Proofs of Appropriation of Water for Stock Watering Purposes for spring sources on both deeded lands and grazing allotments (reference CPB Exhibit 006 for locations and details). These springs are critical to CPB grazing operations in north Spring Valley. CPB is also working to convey existing water rights held by previous owners to CPB ownership, and developing new applications for stockwater in portions of allotments that lack sufficient water.

The efforts put forth by CPB to improve water conveyance efficiency as it relates to the Rogers Ranch, and to secure stockwater in both private and public grazing units proves its desire to maintain or increase its ranching operations in north Spring Valley. As such, CPB requests the State Engineer to consider the potential impacts of the SNWA project to its operation. If approval is granted on any of the 12 permits that CPB has protested, then allowances should be made for future groundwater appropriations in Spring Valley for the purposes of both irrigation and stock watering.

Section 4.0 – Technical Review and Comment to SNWA Exhibit 363 "Environmental Evaluation of SNWA Groundwater Development in Spring, Cave, Dry Lake and Delamar Valleys"

4.1 Comments Regarding this Analysis

This is a well-written progress report that reviews the status of SNWA compliance with the Spring Valley Stipulation Agreement. It identifies monitoring locations and identifies the general locations of occurrences of Special Status Species that have been monitored for several years. It confirms that SNWA has complied with the Stipulation Agreement in developing and implementing monitoring studies of groundwater-influenced habitats.

It is not a baseline report that can be used to describe the existing environment. It lacks presentation of data, results, or interpretations of results that are necessary for impact analyses in the EIS.

This report, by itself, is far from adequate for decision-making based on biological criteria. It identifies the threshold for the State Engineer's critical decision regarding whether or not the Proposed Groundwater Development Project can be implemented. The decision must be made in a manner that "will be in the best interest of the public," and it must be demonstrated that the project is "environmentally sound." If these are the ultimate questions for the State Engineer, this report is not useful in making such determinations.

The threshold for making an "environmentally sound" decision "in the best interest of the public" requires consideration of many different perspectives not set forth in the report. Due to the very long timeframe before anticipated affects can be detected, intermediate thresholds for measuring "significant" impacts should be clearly described. Such thresholds are essential for making informed management decisions. The CPB needs to know what these thresholds are or participate in their development.

The report is a starting point, but does not meet the minimum standards for an "environmental evaluation" based on NEPA standards. At a minimum, the report is deficient in the following areas:

- The report does not analyze existing data
- The report does not analyze indirect impacts to adjacent private land or adjacent uplands. The report fails to identify the many biological connections between the groundwater-influenced habitats and upland habitats
- The report does not consider the importance of the wetlands and aquatic sites for the larval stages of important ecosystem pollinators
- The report does not analyze cumulative impacts
- The report does not evaluate the project in relation to climate change
- The report does not clearly state the thresholds for "significant" impacts
- The scope of the proposed project to be analyzed in the EIS is extremely narrow and does not describe a single and complete project

The report fails to recognize the regional environmental context of the proposed project. The richness and extensive distribution (160,000 acres) of diverse aquatic, wetlands, and stream habitats is unique in Nevada. Nevada is the driest of the 50 United States. The high density of the springs, spring brooks, seeps, ponds, streams, wetlands (8,000 acres), meadows (7,000 acres), phreatophytic shrubland

(145,000 acres), phreatophytic woodland, and riparian habitat in Spring Valley is unique for Nevada and much of the western United States. These habitats are described as being “relatively small” and therefore of less importance or easier to mitigate. Actually, the small size of these individual habitats significantly increases their value and importance.

The report also underplays the importance of the groundwater-supported Shoshone Ponds Area of Critical Environment Concern (ACEC) that supports critical refugia for Pahrump poolfish (Federally listed Endangered) and relict dace (State listed). The Pahrump poolfish has been listed as endangered since 1967 and still has not recovered. These groundwater-supported ponds are of critical importance to maintaining refugium populations and emphasis on monitoring the ponds should be elevated above other “areas of environmental interest”.

There is a potentially harmful concept throughout the entire report suggesting that the acquisition of private land and control of grazing rights on public land allotments will be used to mitigate “unreasonable adverse impacts.” SNWA Northern Resources purchased ranch properties in and around Spring Valley that total approximately 23,500 acres. Four of the ranch properties are base properties to federal grazing allotments managed by BLM or Forest Service that total approximately 900,000 acres. Most of this area is in Spring Valley.

The implication is that manipulating livestock grazing will compensate for the loss of unique and irreplaceable springs, spring brooks, wetland, meadows, perennial streams, and riparian zones. While properly implemented grazing management plans will improve and maintain upland conditions, uplands, even in pristine condition, can in no way compensate for loss of wetlands.

The report also implies that all of the habitats included as “environmental areas of interest” have been affected by anthropogenic (human-caused) factors and that this fact may somehow diminish their value. The existing environment – as is – should be the standard for measuring future impacts.

4.2 Potential Implications of Findings from Exhibit 363 and to CPB Holdings (Land and Water) in north Spring Valley

It is too late to comment on the monitoring protocols or selection of the study areas on public lands. These decisions come from the Stipulated Agreement. Overall, the monitoring sites and protocols are acceptable with a few exceptions for baseline monitoring. However, none of the 19 “environmental areas of interest” in Spring Valley are on private land. The same protection thresholds, or higher, should be applicable to private land. The environmental and economic values are not the same on private versus public land. The additional water spreading from irrigation practices greatly expands the extent of the wetland and aquatic areas creating additional wildlife habitat benefits. The benefits to migratory birds are exemplified by the existing breeding grounds for the sandhill crane on the Cleveland Ranch.

The Spring Valley Plan requires seven years of baseline biological data prior to groundwater withdrawal and requires continued monitoring during operation. Monitoring sites should be established on private land – either as part of the SNWA monitoring program, i.e. recognized as an ‘area of environmental interest,’ or privately implemented by CPB. Without site-specific data for private property held by CPB, impacts will be inferred from studies on public land.

The Spring Valley Stipulated Agreement does not include provisions for private land. The Agreement sets forth the ‘common goals’ of the “Parties,” but private landowners are not included as one of the “Parties” with participation and representation at some level on the Biological Resources Team and the Executive Committee.

Currently, the Biological Work Group is conducting a scientific evaluation of the Spring Valley Plan, and will revise components, methods, and approaches as needed to meet the needs of the Stipulation and future rulings by the Nevada State Engineer. Private parties, such as CPB, should be permitted to actively participate in this process.

The standards for measuring "significant impacts" on private lands should be clearly defined to assess whether or not the groundwater development project is "causing injury or unreasonable adverse impacts to federal <u>and other important resources</u> on private land".

Section 5.0 – Conclusions

5.1 Regarding Vegetation and Forage

- The analysis on impacts to native vegetation due to increased depth to groundwater from the proposed SNWA project are over-simplified in terms of function of native plants and interactions with invasive species, particularly cheatgrass and halogeten.
- The most significant limitation of the SNWA Exhibits related to vegetation impacts is that they fail to apply the compiled plant succession information with the model projections for project-related groundwater draw down. Such an analysis is essential in order to disclose the direct estimates of how this project will actually affect existing plant communities, and the related secondary impacts to other natural resources and the human environment. This omission fails to provide the State Engineer with project-specific information needed to meet the requirements of NRS 533.370(6)(c).
- As a result of vegetative changes, the proposed SNWA project will result in a significant loss of forage on both deeded property and grazing allotments. The potential loss of flow at critical stock watering springs within the CPB's deeded land and three grazing allotments will also have a profound effect on cattle distribution and the CPB's ability to properly manage such distributions in accordance with existing permits and practices.
- The CPB has indicated a desire to maintain and expand its grazing operations in north Spring Valley. SNWA Exhibit 037 describes vegetative changes as "manageable;" however, such changes would be detrimental to CPB grazing operations in north Spring Valley. If the project were developed as proposed, it would be difficult for the CPB to maintain viable grazing operations, let alone expanding those operations.

5.2 Regarding Water Rights

- The estimate of effective committed groundwater (14,207 AFA) developed by the Nevada Division of Water Resources should be used during the SNWA hearing, rather than that developed by Stanka 2011.
- The overall duty of water rights held by the CPB on Cleveland, Indian, Stephens and Negro Creeks exceed the estimated annual discharge of these creeks as estimated by the Nevada Division of Water Resources, therefore there is no water available for the SNWA project from these sources.
- The overall duty of water rights held by the CPB on Springs located on the Cleveland Ranch exceed the estimated annual discharge of these springs as estimated by the Nevada Division of Water Resources, therefore there is no water available for the SNWA project from these sources.
- The CPB is in the process of transferring existing water rights from previous owners and developing new claims of vested right and applications for water (both surface and underground) on both deeded property and grazing allotments for irrigation and stock water. Additional water is necessary to maintain or increase available forage to sustain or grow its livestock production operation in north Spring Valley. As such, the State Engineer should consider reserving groundwater resources for future development if any of the 12 wells protested by the CPB are permitted

5.3 Regarding Biological Resources

- The impacts to biological resources have been understated as the SNWA Exhibits fail to emphasize the importance, richness and diversity of wetlands, springs, streams, phreatophytic woodlands and riparian areas in north Spring Valley.
- SNWA has not proven that this project can be completed in a manner that is in the "best interest of the public" or that the project is "environmentally sound" from a biological standpoint.
- SNWA indicates that the acquisition of private lands and grazing allotments will allow them to mitigate "unreasonable adverse impacts" through manipulation of livestock grazing in these areas. However, the loss of unique water-dependant ecosystems cannot be mitigated through grazing manipulations.
- While SNWA has identified protocols for monitoring and mitigating impacts on public lands, they have not done so for private property still held by others. CPB holdings in north Spring Valley contain an abundance of unique water-dependant ecosystems and wildlife that is important to them for more than grazing.

Section 6.0 – References Cited

Bureau of Land Management (BLM). 2011. *Clark, Lincoln, and White Pine Counties Groundwater Development Project Draft Environmental Impact Statement*. Nevada State Office. Reno, Nevada. BLM/NV/NV/11-17+1793. www.blm.gov/5w5c.

KS2 Ecological Field Services, LLC (KS2). 2011. Potential effects of change in depth to water on vegetation in Spring Valley, Nevada. Prepared for the Southern Nevada Water Authority. Anton, TX.

McLendon, T., J.P. Rieder, C. Hindes, K.D. Standley, K.S. Stanley, and M.J. Trilica. 2011. Classification and mapping of the vegetation of selected valley floor and alluvial fan areas in Spring Valley (Hydrologic Area 184), Nevada. Prepared for the Southern Nevada Water Authority. KS2 Ecological Field Services. Anton, TX.

Natural Resources Conservation Service (NRCS). 2003. Major Land Resource Area 28B Ecological Site Descriptions. Nevada State Office. Reno, NV

Nevada Agricultural Experiment Station (NAES). 2008. *Great Basin Wildfire Forum—the search for solutions*. E. Miller and R. Narayanan (eds.). Reno, NV. www.cabnr.unr.edu/naes/wildfireforum.pdf.

Nevada Division of Water Resources (NDWR). August 2011. Spring Valley Hydrographic Basin 10-184 NRS Section 533.365 Inventory

Resource Concepts, Inc. (RCI). July 1, 2011. CPB EXH-001 Corporation of the Presiding Bishop of the Church of Jesus Christ of Latter-day Saints, a Utah Corporation Sole. Water Rights, Land & Water Resources Report for North Spring Valley, Nevada. Prepared for Kirton and McConkie.

Stanka Consulting, LTD (Stanka). June 2011. Committed Groundwater Resources in Four Nevada Hydrographic Areas: Cave, Dry Lake, Delamar and Spring Valleys. Presentation to the Office of the Nevada State Engineer. Prepared for Southern Nevada Water Authority.

Young, J.A. 2011. Personal communication. Reno, NV. August 4, 2011.

Young, J.A. and C.D. Clements. 2009. *Cheatgrass—Fire and Forage on the Range*. University of Nevada Press. Reno, NV.