IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW MEXICO

UNITED STATES OF AMERICA, for Itself and as Trustee for the Zuni Indian Tribe, Navajo Nation and Ramah Band of Navajos and STATE OF NEW MEXICO, ex rel. STATE ENGINEER, Plaintiffs,	)	
and ZUNI INDIAN TRIBE and NAVAJO NATION, Plaintiffs-in-Intervention	)	No. 01cv00072-MV/WPL **Subfile No.** ZRB-2-0014
v.	)	ZUNI RIVER BASIN ADJUDICATION
A & R PRODUCTIONS, et al.,	)	

VERIFIED STATEMENT OF SCOTT TURNBULL

1. My name is Scott Turnbull. I am an Associate Engineer with Natural Resources Consulting Engineers, Inc. (NRCE) in Fort Collins, Colorado. I have a Bachelor's of Science in Civil Engineering from Colorado State University and am a Professional Engineer licensed in the State of Colorado. Since January of 2008, I have conducted technical analysis on behalf of the United States concerning matters associated with the hydrographic survey of the Zuni River Basin and the Zuni River Basin Adjudication.
2. As an employee of NRCE, the engineering firm contracted by the United States to perform the hydrographic survey of the Zuni River Basin and to support any technical analysis necessary associated with the Zuni River Basin Adjudication, I perform field visits to document and verify water features within and throughout the Basin. I also compute water quantities associated with these features based upon available information

and by applying accepted engineering methodology.

3. I have reviewed Attachment B which was attached to the *United States' and State of New Mexico's Cross-Motion for Summary Judgment* (December 15, 2014). Attachment B is an accurate description of the water rights offered to Edward J. Bawolek and Suzan J. Bawolek (hereafter "Bawoleks") by Plaintiffs in the proposed Consent Order associated with their real property owned in the Zuni River Basin of New Mexico.
4. I have reviewed all material available concerning the Bawoleks' property. The material in my review included notes, photographs, and geospatial data collected by NRCE engineers in 2004 and generated during visits to the Bawoleks' property. The material included in my review also included all material generated and collected since 2004 by NRCE as a result of past investigations as well as maps, land ownership records, and aerial photography of the property. I have also reviewed the documents disclosed by the Bawoleks through discovery including the report prepared by Dr. Bawolek titled *Expert Witness Report of Edward J. Bawolek, PE, PhD* (dated May 14, 2014).
5. In July of 2013, I visited the Bawoleks' property to survey additional impoundments, and, escorted by Dr. Bawolek, I viewed improvements made to wells since NRCE's previous field visit (e.g. installed windmills, water meters, drinking troughs, etc.). Additionally, Dr. Bawolek showed to me the remains of a drip irrigation system (no longer functional) that appeared to have piping leading to approximately 200 drip emitters for irrigation of an unknown crop.
6. Additionally Dr. Bawolek showed me how well designated as 10C-4-W14 ("well W14")

was connected to 5 earthen impoundments[1] by pipe. There is also pipe in the well W14 vicinity that appears to connect with a drip irrigation system in a neighboring section (owned by the Bawoleks) and I have determined that it is likely that well W14 was the source of water for the drip irrigation system.

7. Based on information gathered by NRCE and my observations of the Basin, virtually all of the open land of the Basin was historically used to raise livestock, more specifically cattle. The historic use of the Bawoleks' property appears to have been to raise livestock as well.

8. In the Hydrographic Survey for Sub-area 9 and 10, NRCE previously describe how the water right associated with historic livestock raising was determined:

> Livestock – The duty of water for stock wells is the estimated water use of livestock that could be or is actually sustained by the area served by the well. The water use of cattle was calculated based on the information prepared by State of New Mexico. The area of land in which the well is located was determined from property ownership maps and database obtained from Cibola Assessors office. Carrying capacity is based on the number of "animal units" that can be sustained on an area of land, with one cow or five sheep equivalent to one unit. The land carrying capacity, which is the number of animals that a habitat maintains in a healthy, vigorous condition, was assumed to be 15 animal units per section, or the count provided by the owner, whenever applicable. The 15 animal units per section estimate is based on information from the New Mexico Department of Agriculture. The water consumption of an animal unit is estimated at an average of 10 gallons/day (488 feet per year or 0.0112 acre-feet per year) (Wilson and Lucero, 1997). An efficiency factor of 0.5 was assumed to account for consumptive and other losses.

9. I have calculated the maximum number of number of livestock (cattle) that might have been reasonably grazed on the Bawolek's property on an annual basis. At its core, this annual livestock grazing capacity accounted for all forage that could be reasonably

[1] "Earthen impoundments" are otherwise known as "stock ponds" and will be referred to as such throughout the remainder of this affidavit. Generally speaking, stock ponds are constructed by creating an earthen berm across any surface water drainage such as a wash or an arroyo. In the Zuni River Basin, as in much of the arid regions of New Mexico, it is a well-established and common practice for ranchers to impound surface water to make the little surface water created from precipitation events (e.g., rain and snow) available to livestock for a longer period of time.

expected to grow on the Bawoleks' property; whether such forage is grazed by cattle or wildlife is irrelevant to the forage calculation. Once the annual grazing capacity was established, I identified the annual water needs of livestock; this determination was based on annual livestock water consumption (*i.e.* drinking) and an efficiency factor for reasonable, incidental losses such as evaporation, wildlife consumption, and spillage. As described above, one steer, the equivalent of an "animal unit,"[2] was assumed, to have an average per day water consumption need of 10 gallons and with the efficiency factor, the daily water needs for an animal unit was calculated to be 20 gallons per day. Once the livestock carrying capacity and livestock water needs were determined for the Bawoleks' property, the livestock water consumptive need for Bawoleks' property was calculated to be 1.008 acre-feet per year ("AFY"). Plaintiffs divided the resulting annual consumptive livestock water quantity for the Bawoleks' property by the number of wells found on the Bawoleks' property. For Bawoleks property, six wells were identified having a livestock use and therefore to each well was assigned 0.168 AFY as the water right for the historic beneficial use associated with raising livestock.

10. For land owners of the Basin, Plaintiffs have been willing to recognize domestic use water right associated with wells that can be identified with serving dwelling. Through work associated with the Hydrographic Survey, three domestic, habitable structures were identified in close proximity to, or being served by, two wells (designated 10C-4-W08 and 10C-4-W14) on the Bawoleks' property. For dwellings reasonably associated with a well, such as the three dwellings on the Bawoleks' property, Plaintiffs have long been willing to stipulate without further proof to a water right quantity of 0.7 AFY (or 625 gallons per day). The rationale supporting the use of 0.7 AFY is as follows. Based on a

[2] An "animal unit" or AU is a unit of measure by which the forage needs of any range animal might be equated.

review of technical reports authored by the New Mexico Office of the State Engineer, a typical estimate of indoor domestic water use (cooking, cleaning, toilets, washing machine, dishwasher, showers, etc.) is approximately 70 gallons per person per day. Assuming an additional 50% allowance (35 gpcd) for outdoor and incidental uses (equipment washing, dust control, small gardens, etc.), 0.7 AFY (625 gallons per day) is sufficient for a full-time occupied household of over five individuals. This water quantity has been found to be adequate to meet the domestic needs of self-supplied domestic users in the Zuni River Basin.

11. Though not functional, Plaintiffs have been willing to recognize a water right associated with the drip irrigation found on Bawoleks' property. As described in my affidavit prepared in conjunction with the *United States' and State of New Mexico's Response to Edward J. Bawolek and Suzan J. Bawolek Motion Requesting Partial Summary Judgment* (December 15, 2014) – Attachment A, based on a reasonable estimate of the crop watering needs associated with such an irrigation system, I have calculated that the total consumptive use of a crop associated with the system to be 0.22 AFY. Due to the location of pipeline remains in the area, this water appeared to have been pumped from well W14 and the water quantity was assigned to that well.

12. As mentioned above, I have reviewed all of the material and documents provided by the Bawoleks to the Plaintiffs through discovery and I have reviewed Dr. Bawolek's report. In his report, Dr. Bawolek calculated a potential capacity of the drip irrigation system. In his calculation, Dr. Bawolek relied on the size/type of the piping found and the pressure created by a potential storage tank for the system to determine a potential water flow rate. Dr. Bawolek calculated an annual flow rate based on an assumed peak flow from the

storage tank (which he computed as 4 gallons per minute) for 24 hour per day, 365 days per year, to arrive at a 6.45 AFY water quantity. With other assumptions made for the system operation, Dr. Bawolek calculated that the system might also supply 8.06 AFY. This second calculation likewise was an annual flow rate based on an assumed 2 gallon per hour drip emitter flowing for 24 hours per day, 365 days per year, for 150 drip emitter sites.

13. Dr. Bawolek's water quantity calculations for the drip irrigation system were not based on metered irrigation water provided in the past (no irrigation records exist for this system) nor were his calculations based on any actual plant or crop need (i.e. not based on a crop irrigation requirement) nor did his calculations correspond to the growing season of any crop; instead Dr. Bawolek's water quantity calculations were simply based on assumed capacities of the irrigation system and continuous pumping throughout the year (resulting in quantities between 6.45 and 8.06 AFY).

14. In addition, in his report, Dr. Bawolek stated that in 2007 the Bawoleks pumped 1.5 million gallons of groundwater from well 10C-4-W14, a combined 173 thousand gallons from wells 10C-4-W13 and 10C-4-W16 in 2008, and 1.2 million gallons from well 10C-4-W08 between 2011 and 2013. Dr. Bawolek determined the quantity pumped from each well by water meters attached to the well piping or by calculations made from energy readings. Dr. Bawolek also stated in his report that the water pumped from the four wells was used to fill stock ponds 10C-4-SP14; 10C-4-SP21; 10C-4-SP22; 10C-4-SP23; and 10C-4-SP24.

15. Next, because the quantity pumped from each of the four wells occurred at different time and for different durations over the course of six years, Dr. Bawolek annualized the

pumped quantities to quantities from each well that might be expected throughout the year. As a result, Dr. Bawolek calculated that the four wells would have pumped a combined, annualized quantity of water of approximately 10 AF (including an additional domestic use of 0.7 AFY for each of two dwellings (1.4 AFY total) which is not accounted for in the meter records).

16. Dr. Bawolek's water quantity calculations for the amount of water pumped from the four wells since 2007 were not based on any watering needs identified for wildlife or elk; instead Dr. Bawolek's water quantity calculations simply reflect how much water was actually pumped into the six stockponds during the metering intervals and how much water might be pumped into each stock pond on an annualized basis.

17. Through discovery, the Bawoleks provided documents and information which reveal the following. Over the last several years, the Bawoleks have leased their property to elk hunters and allowed these hunters to come onto the Bawoleks' property so that elk could be hunted. It appears that the Bawoleks claim their stock ponds and the groundwater pumped into the stock ponds increase the occurrence of elk on their property for the benefit of hunters. However, although the Bawoleks provided several photos of elk drinking water from stock ponds holding water, no material was disclosed in discovery that suggests the occurrence of the Bawoleks' pumping beyond the quantity offered by the Plaintiffs had any impact on the number of elk that occur on their property at any time of the year. Furthermore, the Bawoleks have provided no information concerning or quantifying elk or other wildlife watering needs for their property greater than what was previously offered by the Plaintiffs in the proposed consent decree.

18. As I described above, to calculate the water right associated with grazing livestock on the

Bawoleks' property, I applied a carrying capacity that accounts for the maximum forage made available for grazing. Whether grazed by cattle, horses, sheep, or elk, the amount of forage available on the Bawoleks' property can only reasonably support a limited number of grazing animals. My calculations to determine a livestock water right was based upon identifying the maximum number of grazing animals (based on forage) that might be reasonably graze on the Bawoleks' property. For the Bawoleks' property, there was no discernable evidence that suggested that any landowner prior to the Bawoleks ever diverted surface water or groundwater to provide a wildlife benefit.

19. Like cattle, elk is a grazing animal not uncommon to the Basin. Whereas a single beef cow is defined to be the equivalent of a single animal unit, an adult elk has a comparable animal unit equivalent of 0.7 AU, as stated in literature. Therefore, both the forage and water needs of an elk are 30% less than a single cow. Also, as mentioned above, the daily AU consumption quantity determined to establish the quantity of water amount of water necessary for livestock was increased by a 50% efficiency factor thereby doubling it to 20 gallons per AU per day to account for losses in delivering such water; the contemplated losses include wildlife consumption such as water consumption by elk.

Scott Turnbull
Associate Engineer
Natural Resources Consulting Engineers, Inc.
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Subscribed and sworn before me this 15 day of December 2014.

Carin Tatum

Notary Public

CARIN TATUM
Notary Public
State of Colorado
My Commission Expires August 25, 2015

8/25/2015

My Commission Expires