

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,
NAVAJO NATION,

Plaintiffs in Intervention,

v.

STATE OF NEW MEXICO
COMMISSIONER OF PUBLIC LANDS,
and
A & R PRODUCTIONS, et al.,

Defendants.

No. 01cv00072-MV/JHR

ZUNI RIVER BASIN
ADJUDICATION

Sub-areas 4 and 8

Subfile No. ZRB-1-0148

DECLARATION OF THOMAS W. LEY

1. My name is Thomas W. Ley. I am a Senior Supervisory Engineer at Natural Resources Consulting Engineers, Inc. (“NRCE”) headquartered in Fort Collins, Colorado. Since August of 2013, 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. As an employee of NRCE, I perform field visits to document and verify water features within and throughout the Basin to support any

technical analysis associated with the Zuni River Basin Adjudication. I also compute water quantities associated with these features based upon available information.

2. NRCE is the contractor retained by the United States Department of Justice (“DOJ”) to conduct the hydrographic survey of the Zuni River Basin and to support any technical analysis necessary for the litigation of individual subfile actions. NRCE is a civil, environmental, and water resources engineering consulting firm that specializes in water use studies, agricultural & irrigation engineering, surface water hydrology, groundwater, and providing expert support for water right disputes. NRCE’s technical staff consists of engineers, hydrogeologists, geologists, and GIS/CAD experts. For almost three decades, NRCE has been providing water resources engineering and consulting services to clients throughout the United States and internationally.
3. I hold Bachelor and Master of Science degrees in Agricultural Engineering from Colorado State University and a PhD degree in Irrigation Engineering from Utah State University. I am licensed as a Professional Engineer in the following States: Colorado (No. 20006), Nevada (No. 23980), Washington (No. 21770), Arizona (No. 61850), and Utah (No. 9702635-2202). I have over 40 years of engineering experience including irrigation systems design and management; hydraulic design; water use evaluations; evapotranspiration modeling; agricultural hydrology and hydrologic analyses; environmental monitoring; climate analyses; water rights analyses; irrigation pumping and energy use; water quality protection and water resources engineering and management.
4. I have been qualified as an expert witness in:

Kansas v. Colorado, No. 105 Original, Supreme Court of the United States. Provided deposition and trial testimony regarding Crop Water Use Estimates for the Arkansas River Basin in Southeastern Colorado and the expert witness report prepared by Robert Hill and Thomas Ley on the subject. Pasadena CA. 2002.

In Re the General Adjudication of All Rights to Use Water in the Little Colorado River System and Source: No. CV 6417-203. Provided deposition and trial testimony regarding: a) Historical/Present Irrigation Water Uses on the Hopi Indian Reservation, b) inventory of Wells, Springs, and Impoundments on the Hopi Indian Reservation, c) Riparian and Wetlands Water Use, Pasture Canyon, Hopi Indian Reservation, and expert witness reports on those subjects. Phoenix AZ. 2018.

In Case No. 12CW79, District Court, Water Division 2, Concerning the Protest of the Bessemer Irrigating Ditch Company to the Revised Abandonment List Involving Water Rights in Pueblo County Colorado. Provided trial testimony regarding the discharge capacity of the Bessemer Ditch at the old SH 96 bridge crossing and Dr. Ley's expert witness report on the subject. Pueblo CO. 2013.

5. In addition to my own involvement with the hydrographic survey of the Zuni River Basin and the preparation of materials concerning individual subfile actions, the following staff are, or have been, directly involved with NRCE's work relating to the Zuni Basin adjudication:

- Dr. L. Niel Allen, P.E., PhD. Senior Engineer (1997-2012). PhD. Civil Engineering (U. of Idaho 1991); M.S. Agricultural & Irrigation Engineering (Utah State U., 1980); B.S. Agricultural & Irrigation Engineering (Utah State U., 1979). Responsibilities: Project Supervisor, Field Work, Consultations, Water use Calculations, Report Preparation.
- Dr. Hadi Jaafar, PhD. Associate Engineer (2003-2007). PhD. Irrigation Engineering (Utah State U., 2003); M.S. Irrigation (U. of Beirut, 1999); B.S. Biology (Univ. of Beirut, 1995), B.S. Agricultural Engineering (U. of Beirut, 1997). Responsibilities: Field Work, Consultations, and Water use Calculations
- Chris Kizer. GIS Analyst (2007-2016). B.S. Natural Resources Management (Colo. State U., 2007). Responsibilities: Geospatial Analysis and Mapping
- Scott Turnbull, Associate Engineer (2007-2016). B.S. Civil Engineering (Colo. State U., 2007). Responsibilities: Field Work, Consultations, and Water use Calculations

- Randy Macan. GIS/CAD Supervisor (1992-present). A.A.S. Drafting and Design Technology (Mississippi Gulf Coast Community College, 1987). Responsibilities: Computer Aided Design, Geospatial Analysis, and Mapping
 - Kathleen Madigan. Assistant Engineer (2003-2006). Education: B.S. Bioresources and Agricultural Engineering (Colo. State U., 2003). Responsibilities: Field Work and Geospatial Data
 - Kit Nielson, P.E. Senior Engineer (2003-2012). M.S. Civil Engineering/Groundwater/Modeling (Colo. State U., 1987); B.S. Environmental Engineering (U. of Florida, 1980). Field Work, Consultations, Water use Calculations
 - Brent Read. GIS Analyst (2004-2007). Education: M.S. Forest Science (Colo. State U., 2004); B.S. Forest Fire Science (Colo. State U., 2002). Responsibilities: Geospatial Analysis and Mapping
 - Dr. Assad Safadi, PhD. Senior Vice President (1991-present). PhD. Agricultural and Irrigation Engineering (Utah State U., 1991); M.S. Soils and Irrigation (U. of Jordan, 1987); B.S. Soils and Irrigation (U. of Jordan, 1985). Responsibilities: Project Supervision.
6. Throughout my work on the Zuni River Basin Adjudication, I have had access to and am familiar with the analysis and materials previously produced by the NRCE staff listed above.
7. While employed at NRCE, other than my work on the Zuni River Basin adjudication, I design on-farm irrigation, water conveyance, and water distribution systems and provide cost estimates for practicably irrigable acreage (“PIA”) projects; interpret aerial imagery to identify and map presently and historically irrigated lands; evaluate historical irrigation water use and estimate future irrigation water requirements; assess irrigation systems and provide information on water conservation and system rehabilitation; provide expert witness reports and testimony concerning PIA projects and water rights analyses; assist with the conceptual and final designs of irrigation facilities, including canals, diversion structures, and water control and water measurement structures. I have interpreted aerial

imagery to identify historically and presently irrigated acreage in Colorado, Arizona, New Mexico, Nevada, Idaho, Montana, and Utah.

8. While employed at NRCE, under contract work for DOJ, I have:
- evaluated irrigation and livestock water rights claims located in the Montana Stream Basin Adjudications—Peoples Creek (Basin 40I), Milk River (Basin 40J), Pryor Creek (Basin 43E), Little Bighorn River (Basin 43O), Bighorn River (Basin 43P), Rosebud Creek (Basin 42A), and Two Medicine River (Basin 41M). This includes determination of irrigated areas, priority dates, points and means of diversion, purpose of use, water use quantities such as flow rate and annual volume, evidence of abandonment/non-perfection of rights, and review of property ownership information. DOJ then relies upon these technical reviews when filing objections to water right claims and during hearings with water users.
 - provided deposition and trial testimony regarding: a) Historical/Present Irrigation Water Uses on the Hopi Indian Reservation, b) inventory of Wells, Springs, and Impoundments on the Hopi Indian Reservation, c) Riparian and Wetlands Water Use, Pasture Canyon, Hopi Indian Reservation, and expert witness reports on those subjects in support of water rights claims of the United States on behalf of the Hopi Indian Tribe in the Little Colorado River System general adjudication in Arizona.
 - prepared expert witness reports on: a) Identification of Historically Irrigated Area using Surface Water Sources and Estimation of Irrigation Water Requirements, b) Identification of Historically Irrigated Area using Groundwater Sources and Estimation of Irrigation Water Requirements, c) Irrigated Pasture/Grass Fed Beef Feasibility Study Irrigation System Design and Cost Estimation, and d) High Value Crop Operation Feasibility Study Irrigation System Design and Cost Estimation in support of Federal reserved water rights claims of the United States on behalf of the Walker River Paiute Indian Tribe.
 - supervised preparation of expert witness reports and the formulation of stipulation terms and conditions regarding quantification of water rights for irrigation uses (historically irrigated area and estimation of irrigation water requirements) in Contested Case No. W1-11-1675 in the general adjudication of all rights to use water in the Gila River System of Arizona.

WATER CLAIMS ASSERTED BY DEFENDANTS

9. I have reviewed all the material available concerning Subfile ZRB-1-0148, Norma M. Meech, individually and as the successor-in-interest to Walter V. Meech (“Defendant”).

The real property associated with this subfile is located in the NW 1/4 of Section 4, Township 9 North, Range 13 West, New Mexico Principal Meridian and contains five water features—two wells and three ponds (see Attachment A – Hydrographic Survey Map for Subfile ZRB-1-0148). The material in my review included notes, photographs, and geospatial data collected by NRCE engineers during visits to the Defendant’s property; DOJ April 5, 2006 consultation notes with Defendant; and correspondence between Defendant’s legal counsel and DOJ counsel in June 2017. My review also included:

- Defendant’s *Disclosures Under Rule 1-26(a)(2)(B), Federal Rules of Civil Procedure* dated July 17, 2020 (“July 2020 Disclosure”);
- Defendant’s *Answers to Plaintiff United States of America’s First Combined Discovery Requests Directed to Subfile Defendant Norma M. Meech*, filed August 24, 2020 (“2020 Answer”);
- Defendant’s *Supplemental Disclosures Pursuant to Fed. R. Civ. P. 26(a)(2)(B)* dated November 9, 2020 (“Supplemental Disclosure”);
- Defendant’s *Response to Plaintiffs’ Request for Records of Water Usage at the Tinaja Pit Mine* (“C&E Water Logs (2013-2020)”);
- Defendant’s *Supplemental Response to Plaintiffs’ Requests for Well Meter Readings 2016-2020* (“Supplemental Well Meter Readings”);
- *Expert Witness Report of Douglas L. Irving*, Chapman, Wood and Griswold, Inc. dated July 16, 2020; and
- *Expert Witness Report of Alan K. Kuhn*, Alan Kuhn Associates, LLC dated November 6, 2020.

WELLS 8B-1-W10 AND 8B-1-W11

10. The quantity of water to which the Defendant is entitled for the two wells located on the real property associated with Subfile No. ZRB-1-0148 as identified by the hydrographic

survey ID numbers 8B-1-W10 (New Mexico Office of the State Engineer (“OSE”) file number G-336) (“Well 8B-1-W10”) and 8B-1-W11 (OSE file number G-337) (“Well 8B-1-W11”) has been evaluated using monthly meter readings which record cumulative volume of water that passes through the meter (2020 Answer Exhibit H and Exhibit I and Supplemental Well Meter Readings).

11. Well 8B-1-10 (OSE G-336) is equipped with a 1-inch meter (2020 Answer Exhibit H). A photo of the meter installed on Well 8B-1-10 is shown in (2020 Answer Exhibit O) and is noted to be a 1” Badger Meter Model 55 Recordall.
12. This meter on Well 8B-1-10 is capable of reading cumulative volume in gallons to a maximum of 9,999,999.9 gallons. The meter has a fixed zero in the single digits place. The gallonage in the single digits place from 0.0 to 9.9 gallons is read using the sweeping red dial arm.
13. Monthly meter readings for Well 8B-1-10 (OSE G-336) for the period January 1, 2001 to September 1, 2016 (2020 Answer Exhibit H) were analyzed to determine volume of water pumped from Well 8B-1-10 on a monthly and annual basis. During this period, the meter readings for the following periods were recorded as: April through July 2011—out of service, August 1, 2012 through August 1, 2013—100 (indicating no pumping), September 1, 2013 to September 1, 2016—out of service. Monthly meter readings are reported as occurring on the first day of the month (2020 Answer Exhibit H). Annual total volume pumped for year being analyzed was computed as the meter reading on January 1 of the following year minus the meter reading on January 1 of the year being analyzed. Significant discrepancies were found in the recorded meter readings in terms of

the number of digits recorded. These discrepancies were resolved based on the photo of the meter on this well (see Para. 11), an understanding of the meter recording range (see Para. 12), and the maximum number of digits in a valid meter reading. Annual pumping volume for Well 8B-1-W10 for the period 2001-2012 ranged from 0.046 acre-feet to 2.041 acre-feet. The maximum annual pumping volume of 2.041 acre-feet occurred in 2006.

14. Meter reading data for Well 8B-1-10 (OSE G-336) for the period 2016 to January 1, 2021 submitted by the Defendant (Supplemental Well Meter Readings) showed the well was out of service for the entire period.
15. Well 8B-1-11 (OSE G-337) is equipped with a 2-inch meter (2020 Answer Exhibit H). A photo of the meter installed on Well 8B-1-11 is shown in (2020 Answer Exhibit O) and is noted to be a 2" Badger Meter Model 170 Recordall.
16. This meter on Well 8B-1-11 is capable of reading cumulative volume in gallons to a maximum of 99,999,999 gallons. The meter has two fixed zeros in the single and double digits places. The gallonage in the single and double digits place from 0 to 99 gallons is read using the sweeping red dial arm.
17. Monthly meter readings for Well 8B-1-11 (OSE G-337) for the period January 1, 2001 to October 1, 2016 (2020 Answer Exhibit I) were analyzed to determine volume of water pumped from Well 8B-1-11 on a monthly and annual basis. Monthly meter readings (2020 Answer Exhibit I) are reported as occurring on the first day of the month. Annual total volume pumped for year being analyzed was computed as the meter reading on January 1 of the following year minus the meter reading on January 1 of the year being

analyzed. The recorded meter readings for Well 8B-1-W11 were more consistent in terms of the number of digits recorded. Meter readings were analyzed based on the photo of the meter on this well (see Para. 15), an understanding of the meter recording range (see Para. 16), and the maximum number of digits in a valid meter reading. Annual pumping volume for Well 8B-1-W11 for the period 2001-2015 ranged from 16.72 acre-feet to 44.98 acre-feet. The maximum annual pumping volume of 44.98 acre-feet occurred in 2008.

18. Meter reading data for Well 8B-1-11 (OSE G-337) for the period January 1, 2017 to January 1, 2021 submitted by the Defendant (Supplemental Well Meter Readings) showed the well was out of service from January through July 2017, a new pump installed in July 2017, out of service in January and March of 2018, and a new meter installed in May 2018. Annual pumping volume for Well 8B-1-W11 for the period 2016-2020 ranged from 17.12 acre-feet to 67.93 acre-feet. The maximum annual pumping volume of 67.93 acre-feet occurred in 2019.

PONDS 8B-1-SP34, 8B-1-SP66, AND 8B-1-SP69B

19. The three ponds located on the real property associated with Subfile No. ZRB-1-0148 are identified by the hydrographic survey ID numbers 8B-1-SP34, 8B-1-SP66, and 8B-1-SP69B, respectively.
20. Pond 8B-1-SP34 and Pond 8B-1-SP66 are stock ponds used for livestock watering purposes. Both fill from surface runoff.
21. Pond 8B-1-SP69B is used for industrial purposes related to the Defendant's mining operations. Wells 8B-1-W10 and 8B-1-W-11 have been used to fill the pond.

22. Based on field measurements and aerial imagery analyses, the storage capacity of Pond 8B-1-SP34 was determined as 0.167 acre-feet based on a depth of 3 feet and surface area of 4,034 square feet. The storage capacity of Pond 8B-1-SP69B was determined to be 1.933 acre-feet based on a depth of 10 feet and surface area of 14,033 square feet. The storage capacity of Pond 8B-1-SP69 was determined to be 0.540 acre-feet based on a depth of 6 feet and surface area of 6,539 square feet.

REGARDING THE HYDROGRAPHIC SURVEY REPORT

23. The Hydrographic Survey Report for Sub Areas 4 and 8¹ was prepared by NRCE to identify water users and water features within the boundaries of the Zuni River Basin. This includes the identification of wells, springs, impoundments, reservoirs, and irrigated land. Since it is not feasible for NRCE to find and collect all relevant information for each and every water user throughout the Zuni Basin, it is the responsibility of each water user to demonstrate the basis of their claimed water use. This was accomplished by consultations involving each water user, DOJ, OSE, and NRCE engineers. When possible, water rights offered in the Plaintiffs' consent orders are based upon evidence of actual historic use to the extent that it can be demonstrated by the water user. When the water user failed to demonstrate actual historic use, or the actual historic use could not be determined based upon the information available to the Plaintiffs, the broad assumptions described in the hydrographic survey report were then applied to develop default water rights.

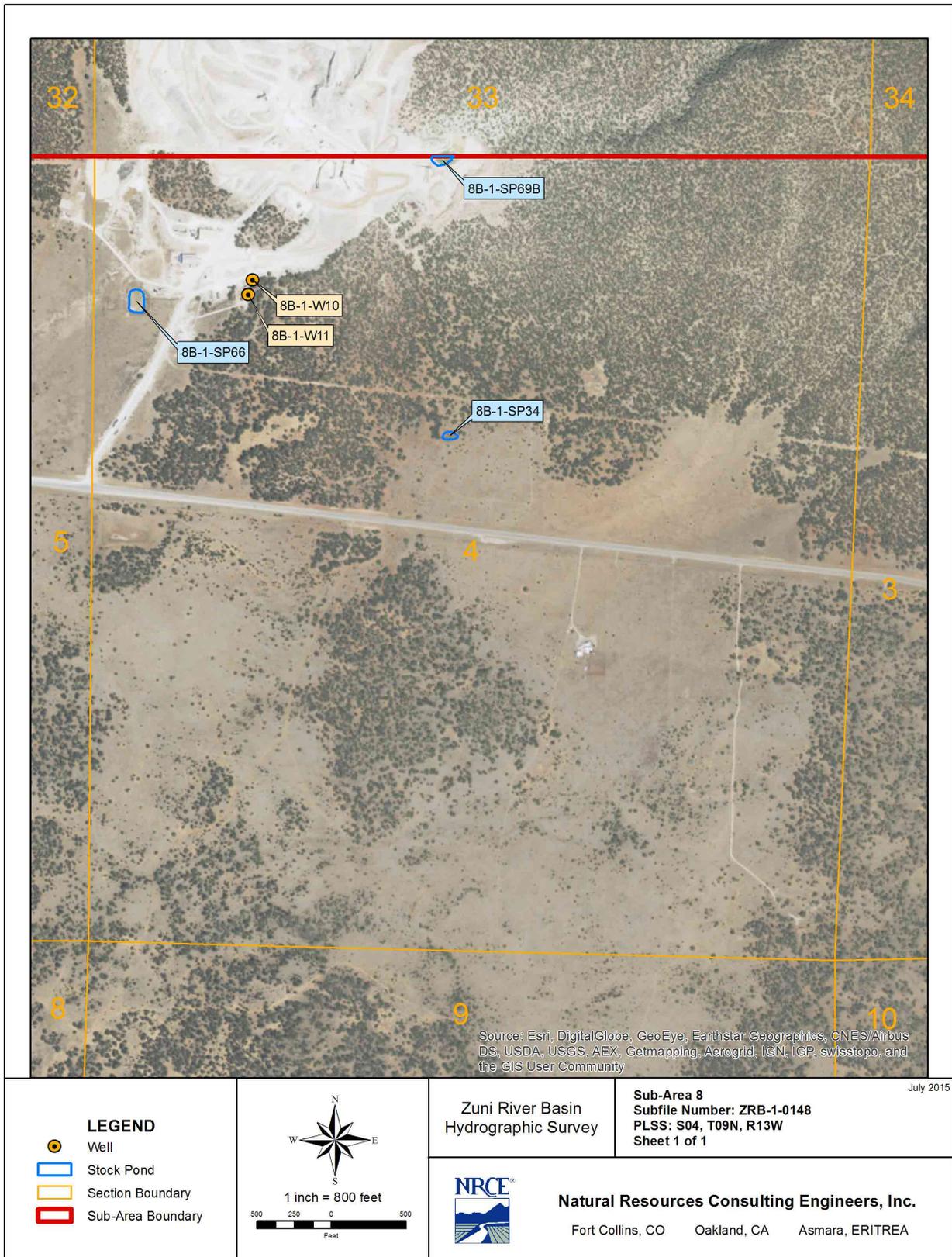
¹ *Zuni River Adjudication Hydrographic Survey Report for Sub-areas 4 and 8*. Prepared by Natural Resources Consulting Engineers, Inc., Fort Collins, CO. July 14, 2004.

24. The duty of water assigned to industrial wells as stated in the Hydrographic Survey Report for Sub Areas 4 and 8 is based upon the historical use of the well and the information provided by the owner.
25. The duty of water assigned to ponds as stated in the Hydrographic Survey Report for Sub Areas 4 and 8 is based upon their capacities. The number of times a pond fills during a year is not estimated. The capacities of the ponds were determined using the following methodology. Pond depths were estimated based on the high-water mark observed in the field. Pond boundaries were delineated in the office prior to the field visit. Using GPS units, the boundaries were verified /modified in the field and then they were brought into GIS for area calculations. The capacity of the pond was calculated by multiplying the depth times the area times a factor of 0.6 that accounts for the irregularity of the pond's geometry. Consistently throughout the hydrographic survey and adjudication process, evaporation losses from ponds filled from surface runoff, wells and/or springs are incidental and not considered a beneficial consumptive use.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct. Executed on this 15th day of March 2021.



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Attachment A – Hydrographic Survey Map for Subfile ZRB-1-0148