

ALAN G. LANCE
Attorney General
State of Idaho

CLIVE J. STRONG
Deputy Attorney General
Chief, Natural Resources Division

CHARLES L. HONSINGER
Deputy Attorney General
Idaho Department of Water Resources
P.O. Box 83720
Boise, Idaho 83720-0098
Telephone: (208) 327-7900
FAX: (208) 327-7866

COPY

IN THE DISTRICT COURT OF THE FIFTH JUDICIAL DISTRICT
OF THE STATE OF IDAHO, IN AND FOR THE COUNTY OF TWIN FALLS

In Re SRBA	)	Subcase Nos. 36-04148A, 36-04148B,
	)	36-04074
	)	AFFIDAVIT OF
Case No. 39576	)	JEFF PEPPERSACK
_____	)	

STATE OF IDAHO)
) ss.
County of Ada)

Jeff Peppersack, being first duly sworn, deposes and states as follows:

1. My name is Jeff Peppersack. I am an engineer for the Idaho Department of Water Resources (IDWR).
2. My work address is Idaho Department of Water Resources (IDWR), 1301 North Orchard, Boise, Idaho 83706. I reside in Boise, Idaho.

3. I make the following statements based upon my personal knowledge of the facts related therein.

4. My educational background includes a Bachelor of Science in civil engineering from the University of Idaho in 1983. My course work included, but was not limited to: fluid mechanics, hydrology, hydraulics, statics and dynamics, thermodynamics, soil mechanics, chemistry, mathematics, materials, structures, sanitary engineering, electrical circuits, physics, engineering measurement, computer programming, statistics, economics, writing and report preparation.

5. I have been registered as a professional engineer in Idaho since 1989, practicing in the field of civil engineering. To become registered, I spent four years as an engineer-in-training and passed an eight hour exam on engineering fundamentals.

6. After graduating from college, I worked from 1983 to 1984 for the U.S. Geological Survey, Water Resources Division in Boise, Idaho. My duties there included working on regional irrigation pumpage estimates which incorporated field measurements and estimates based on crop water use and power consumption. I also performed field work to aid in the determination of ground water levels in a critical groundwater area and in determination of flood plain levels.

7. I worked for the Idaho Department of Water Resources Energy Bureau as an engineering specialist from 1984 to 1987. My duties included, but were not limited to: executing statewide assessment of various biomass and other renewable energy resources potential; performing pump tests and pumping system audits for irrigation and municipal pumping systems; analyzing and recommending energy savings potential; writing proposals and

specifications for services and equipment, and management of contracts for various energy-related technical assistance programs.

8. From 1987 to the present I have worked for the Idaho Department of Water Resources Adjudication Bureau as an engineer. I provide engineering and technical support for the Adjudication Bureau in numerous capacities, including, but not limited to:

a. Reviewing work by Consultants.

I worked closely with consultants employed to develop the guidelines for evaluation of irrigation diversion rates ("Hubble methodology") to be sure that the methodology developed was based on generally recognized and accepted scientific and engineering principles; that it ensured consistent, understandable results; and that it was user friendly and readily applicable by water agents.

I worked with Bonneville Blueprint Supply to design and develop a master set of aerial photography overlay "ortho-photoquads¹" for IDWR staff use. This entailed overseeing all aspects of the master set development to ensure that it met IDWR specifications. I both acquired photographic images from the U.S. Geological Survey, U.S. Forest Service, and Idaho Department of Lands to be combined with planimetric information by the contractor, and reviewed the completed product to ensure its accuracy and utility.

I am currently reviewing contract work with the Idaho Water Resources Research Institute to update the 1983 Allen and Brockway evapotranspiration estimates statewide, as well

¹ Ortho-photoquads are aerial photographs that have been rectified to remove distortion caused by depth displacement. Certain geographical features are then overlaid on top of the rectified photo. The finished product has one scale, like a map, but retains the photographic features.

as work by the State Climatologist to refine data used by IDWR to determine irrigation season of use dates in various climatic regions in the state.

b. Staff Training and Technical Assistance.

I have provided training and technical assistance to IDWR staff on the correct use of IDWR's irrigation diversion rate ("Hubble") methodology for use in the Snake River Basin Adjudication.

I collect and analyze appropriate data and research materials as needed to provide technical and engineering input into IDWR policy decisions. For instance, I have provided investigation of data to help determine policy on consumptive use, diversion volume, and season of use for irrigation. I have plotted data from the 1983 Allen and Brockway evapotranspiration estimates into a visual representation to determine boundaries of areas with similar consumptive uses and irrigation diversion volumes. This resulted in a map, which could be used by IDWR personnel to investigate consumptive use and field headgate volumes. I also incorporated temperature data into the same map, which resulted in irrigation season of use boundaries.

I also implemented the Manning equation into the IDWR investigation curriculum. Use of this equation can give an estimate of the maximum flow of a ditch or canal and can be used when water is not flowing in the ditch or canal.

I routinely contribute assistance in any technical or engineering matter that IDWR Adjudication Bureau staff may have questions about. Some examples include photo needs, measurement questions, the use of equations, or the evaluation of a diversion rate for a particular place of use. My assistance can take the form of performing the desired calculation, answering questions on the phone, or accomplishing field work.

c. Refine IDWR Methodologies and Data.

I have refined IDWR's methodology to evaluate irrigation diversion rates as better data has become available. For instance, I implemented methods to estimate peak period evapotranspiration rates to more accurately define crop water requirements. I have also investigated alternative irrigation practices to determine reasonably necessary irrigation diversion rates.

d. Perform Engineering Analysis of Diversion Rates and Volumes.

As part of ongoing settlement negotiations with individual water right claimants I routinely evaluate existing irrigation systems to determine diversion rates and volumes. This includes gathering information on soils, cropping patterns, climate, and data on the physical aspects of the claimant's irrigation system(s) for the place of use in question to determine on-farm irrigation requirements.

I also have provided technical assistance to IDWR Regional Offices to determine diversion requirements for municipal and other water diversion systems.

e. Perform Conveyance Loss Estimates.

I have also employed methodologies to estimate conveyance losses and have been involved in devising a computer spreadsheet program to apply the Worstall method of estimating conveyance losses to complex ditch systems.

f. Acquire and Interpret Remote Sensing Data.

I interpret data from various combinations of maps, aerial photography, and satellite information for determining irrigated acreage, priority dates, and/or other elements of a water right. I am responsible for obtaining NAPP and other aerial photography from various private

and public sources to aid in investigating priority dates and irrigated acreage.

h. Federal Reserved Right Negotiations.

I am involved in investigating various technical matters at issue in negotiations over federal reserved water rights. For the Fort Hall irrigation project, I investigated the actual irrigated acres which, in turn, were used to determine actual beneficial use for non-Native American water rights.

I also have participated in negotiations between the state and the Duck Valley Indian Reservation delegation as a technical representative of IDWR. During that time, I reviewed technical reports by some of the other parties involved and investigated which irrigated acres would be affected by reserved water rights in determining total water availability.

k. Spreadsheets.

I have developed several computer programs utilizing existing spreadsheets to simplify hand calculations. For instance, I helped to create a spreadsheet which applies the Worstell method of analyzing conveyance losses to ditch systems. Other examples include spreadsheets that analyze soil data to determine irrigation applications, and a spreadsheet which determines irrigation requirements for various irrigation systems.

l. Writing Specifications and Proposals for Services and Equipment.

I oversee the acquisition of such various types of equipment as surveying levels, water level measurement meters, and broad-crested weirs. I investigate and determine the necessary specifications, as well as provide staff training, when necessary, to ensure proper use of new equipment. For example, I wrote guidelines on using Global Positioning System information.

Planimeter

I was involved in the selection of the planimeter used by IDWR. Planimeters are accepted and routinely used in the engineering community, and are analogous to hand calculators.

Flowmeters

I am responsible for obtaining flow measurement equipment used by the IDWR Adjudication Bureau. For instance, I procured the Polysonic Tyme-Flyte ultrasonic flowmeter, model TF-P, for IDWR staff use. This type of meter measures the flow of water in closed pipes by measuring the transit time of an ultrasonic "pulse" between two transducers.

Before acquiring these devices, I ascertained what type of meters would be needed by IDWR staff in investigating water rights with closed-pipe delivery systems. I determined that the meters needed to use proven technologies so as to assure accurate current readings, had to be portable, and needed to be convenient for IDWR staff to use. In this case, the Polysonic Tyme-Flyte meters fit those specifications. The Tyme-Flyte flowmeter is portable as well as convenient because, unlike other types of flowmeters, the device can fit many pipe sizes and does not need to be in contact with water to measure its flow. Finally, the technology is proven, as the ultrasonic devices have been in use in closed-pipe settings such as municipal water works for over a decade. They are generally accepted within the engineering community as accurate current metering devices and engineers as well as other water management personnel rely on measurements from ultrasonic flowmeters in various water calculations and management of water. For example, some entities that use or are in the process of using ultrasonic flow metering devices include the United States Geological Survey, the University of Idaho Kimberly

Research Extension Center, A and B irrigation district, the City of Rupert, the U.S. Fish and Wildlife Hatchery in Hagerman, Idaho, and Idaho Power Company.

I also reviewed literature on the Polysonic Tyme-Flyte flowmeter itself. For instance, I reviewed a study conducted in 1989 by J. Paul Tullis, Ph.D., and Blake P. Tullis at the Utah Water Research Laboratory in Logan, Utah, for the Bonneville Power Administration entitled, *Laboratory Calibration of Two Portable Ultrasonic Meters*. The study tested the Polysonic Tyme-Flyte flowmeter under a variety of conditions against known flowrates. This study confirmed that these flowmeters have acceptable accuracy.

On March 7, 1990, I had the Polysonic company representative demonstrate the Tyme-Flyte flowmeter at the University of Idaho Kimberly Research Extension Center in Kimberly, Idaho. There, I tried out the flowmeter during a "hands-on" demonstration and compared the readings on the device with known flowrates. The machine performed accurately.

I have since had the opportunity to use the Polysonic Tyme-Flyte numerous times since its acquisition by IDWR in 1990 and have found the machine to give readings within the expected range of flow.

9. My additional education/training since college has included, but is not limited to:

a. A three-day workshop, sponsored by the California Department of Water Resources and California Polytechnic State University, on evaluation of irrigation systems, held in San Luis Obispo, California, March 23 to March 25, 1994.

b. A one-day seminar, sponsored by the manufacturer, on the use of the Polysonic Tyme-Flyte ultrasonic flowmeter, held on May 13, 1993 in Kennewick, Washington.

c. A two-day seminar sponsored by the Idaho Law Foundation, the University of Idaho Law Review, and the Idaho State Bar Water Law Section, entitled, "Staying Afloat: Current Water Law Issues," held February 20-21, 1992, in Boise, Idaho. Topics included discussions on Idaho water rights, water allocations, the SRBA, and other related water law subjects.

d. A week-long workshop on aerial photography/remote sensing held at the University of Idaho, February 25 - March 1, 1991. The workshop included understanding, interpreting, and measurement of maps, aerial and satellite imagery, as applied by natural resource land managers and personnel.

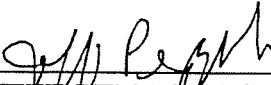
e. A three-day training program from Environmental Training Consultants, Inc., held in Idaho Falls, Idaho, on operation and maintenance of pumps in water and wastewater treatment facilities.

f. A two-day workshop by the Montana Department of Natural Resources and Conservation and the U.S. Department of Energy on energy auditing in water supply and wastewater treatment facilities, conducted June 19 - 20, 1985, in Helena, Montana.

g. A two-day workshop by the Northwest Public Power Association and the Bonneville Power Administration for certification as a BPA irrigation system auditor, held March 5 - 6, 1985.

10. I prepared IDWR's Report Regarding Evaluation of Irrigation Diversion Rates, and the statements contained therein are true and correct to the best of my knowledge and belief. IDWR's Report Regarding Evaluation of Irrigation Diversion Rates is incorporated herein by reference.

11. I prepared IDWR's report entitled Evaluation of Irrigation Diversion Rate Water Right Numbers: 36-04074, 36-04148A and 36-04148B, and the statements contained therein are true and correct to the best of my knowledge and belief. IDWR's report entitled Evaluation of Irrigation Diversion Rate Water Right Numbers: 36-04074, 36-04148A and 36-04148B is incorporated herein by reference.


JEFF PEPPERSACK

SUBSCRIBED AND SWORN to this 15th day of August, 1996.

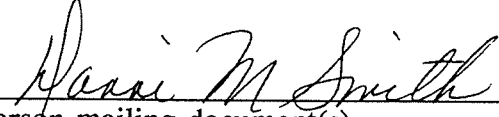

Notary Public for the State of Idaho
Residing at: Boise ID
My commission expires: 12/5/2000

CERTIFICATE OF SERVICE

I certify that I served true and correct copies of the foregoing document to each person at the address listed below by mailing in the U.S. Mail with the correct postage affixed thereto on the 15th day of August, 1996.

Patrick D. Brown
P.O. Box 389
Twin Falls, Idaho 83303-0389

Norman M. Semanko
P.O. Box 1906
Twin Falls, Idaho 83303-1906


Person mailing document(s)