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BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

IN THE MATTER OF THE APPLICATION OF UNITED WATER IDAHO INC. FOR APPROVAL OF INCREASED RATES FOR WATER SERVICE	))))	CASE NO. UWI-W-00-1

DIRECT TESTIMONY OF ALFRED T. WALLACE

ON BEHALF OF UNITED WATER IDAHO INC.

February 2000

Q. Please state your name and business address.

A. My name is Alfred T. Wallace. My business address is Department of Civil Engineering, University of Idaho, Moscow, Idaho.

Q. What is your occupation?

A. I am a professor of civil engineering.

Q. Please summarize your education and training in the field of civil engineering generally.

A. My Biographical Data and Resume is attached as Exhibit No. 14 to this testimony.

Q. Please summarize your education, training and experience in the design and evaluation of domestic water systems.

A. My background education, training and experience in the design and evaluation of domestic water systems includes:

A. Undergraduate courses at Rutgers University (1957-1959) in:

1. Water Supply Engineering (4 cr.)

2. Water Chemistry (6 cr.)

3. Water Purification (3 cr.)

B. Graduate course in Domestic and Industrial Water Treatment (3 cr.) at University of Wisconsin (1963). Taught the undergraduate course in Water and Wastewater Engineering (3 cr.) twice as Instructor in Civil Engineering at University of Wisconsin (1963-1964).

C. 1. Taught an undergraduate course in Water and Wastewater Treatment (3 cr.) four times at Clemson University (1965-1967).

2. Consulting assignments during period 1965-1967 included:

a. City of Greenwood, SC. Investigations at full-scale to optimize the removal of iron and manganese at a surface water plant. 1966.

b. City of Monroe, NC. Trouble-shooting existing plant units to improve finished water quality at design flows. 1966.

c. U.S. Army, Fort Jackson, SC. Studied existing plant operation. Developed program to minimize sludge handling problems and costs. 1967.

3. Director of South Carolina's Water and Wastewater Operator's Certification Program. 1965-1967.

D. While at the University of Idaho:

2. Chairman, Idaho Water and Wastewater Operator's Certification Program. 1967-1978.

3. Taught undergraduate Water and Wastewater Engineering course (4 cr. to 1997, currently 3 cr.) thirty times.

4. Taught graduate course in Unit Operations (3 cr. – about 50 percent devoted to water treatment) thirty-one times.

5. Taught graduate course in Water Quality Management (3 cr. – about 20 percent devoted to drinking water) twenty times.

6. Consulting assignments during this period (1967 – present):

a. U.S. Army Corps of Engineers. Dworshak Dam Recreation Area. Investigated iron and manganese removal from a well supply. Recommended an alternate source of supply and treatment. 1974.

b. Lewiston Orchards Irrigation District. Operations analysis of surface water plant. Designed minor modifications. Wrote Operation and Maintenance Manual. 1973-1974.

c. Bennett Lumber Co., Princeton, ID. Developed modifications to surface water treatment system to reduce taste, odor and turbidity. 1976.

d. City of Moscow, ID. Taste and odor mitigation studies and corrosion control studies. 1976-77, 1980.

e. JUB Engineers, Inc. Process consultant for design of a 10-MGD direct filtration plant at Sandpoint, ID. 1979.

f. Anderson-Perry & Associates, LaGrande, OR. Process consultant on modifications to existing water treatment plant to convert from softening well water to conventional treatment of surface water for the City of Ontario, OR. 1976-78, 1982.

g. Anderson-Perry & Associates, LaGrande, OR. Assist with optimization of existing package plant for conventional treatment of surface water at Dayton, WA. 1979.

h. Holladay Engineers, Inc., Payette, ID. Process consultant on plant modifications and capacity expansion at Weiser, ID. 1990-1991.

i. U.S. Army Corps of Engineers. Dworshak Dam. Process design and specifications for two membrane filtration water systems (with Anderson-Perry & Associates, Walla Walla, WA). 1991.

j. Hedco Engineering Co., Troy, ID. Process consultant for new treatment system for surface water supply. Investigations and design of infiltration gallery for Juliaetta, ID. 1991.

k. JUB Engineers, Inc., Coeur d'Alene, ID. Process consultant on modifications to Riverside, ID surface water plant. 1999.

E. Member of American Water Works association since 1965.

Q. What is the purpose of your testimony?

A. I have been asked to analyze United Water Idaho Inc.'s (UWID) investment in facilities known as the "Northwest Pipeline." Based on that analysis, I have been asked to express an opinion with respect to two questions: First, whether the decision by United to construct the Northwest Pipeline was prudent from an engineering point of view; second, whether there are other, less costly, alternatives for supplying water to the area in question.

Q. Please describe the methods you followed in conducting this analysis.

A. Materials reviewed before forming opinion:

1. United Water Idaho Water System Master Plan. Montgomery Watson Americas, Inc. 1998.

2. Transcripts (some incomplete), responses to production requests and orders related to Case No. UWI-W-97-6 as follows:

1. Responses to staff's first production request, 12 through 25, 27 and 29
2. Direct testimony of W.C. Linam
3. Direct testimony of R. Lobb (partial)
4. Rebuttal testimony of W.C. Linam
5. Rebuttal testimony of D. Brown
6. Order No. 27617
7. Order No. 27690

3. Water Distribution System Map revised 4/8/98.
4. Project history prepared by T. Farrell, 6 pp.
5. Good Street and Hidden Hollow reservoir levels for July and August, 1997-99.
6. Technical memorandum from R. Dittus to T. Farrell (6/9/99) regarding test wells in the West Main Service Level.
7. Water Quality Data:
    1. Floating Feather well
    2. Garden City Booster
    3. Lexington Hills No. 1 well
    4. Redwood Creek well
    5. Swift Nos. 1, 2 & 3 wells
    6. Willow Lane Nos. 1, 2 & 3 wells

7. Appendix E and several tables in Section 7 of the Master Plan (1998).

Methods followed in conducting analysis:

A relatively straightforward process was followed wherein the materials reviewed contained “pieces to the puzzle,” none of which by themselves were conclusive, but taken together, became persuasive in support of UWID’s decision to install the Northwest Pipeline. One needs to evaluate many complex and interrelated factors including:

1. Current and future peak demands in the West Main Service Level.
2. Well supplies in the area, including both capacity and quality considerations.
3. The potential for developing additional groundwater supplies in or very near this service area.
4. The availability of surplus supplies outside the West Main Service Level which can potentially be imported. In this evaluation, the hydraulic limitations of the distribution piping must be carefully considered.
5. Historical data on the operation of storage reservoirs within the West Main Service Area, especially those on the Far East and west ends of the area.
6. The need to maintain reasonable distribution system pressures during periods of “combined draft,” that is, supplying maximum day flows coincident with required fire flows at critical points within the service area.

All the factors listed above were considered in this review to the degree permitted by the data available.

Q. Based on your training and experience and based on the analysis you have described, have you formulated opinions regarding these questions, and if so, could you summarize your conclusions.

A. Yes, in my professional opinion the decision to construct the Northwest Pipeline was clearly prudent from an engineering point of view. It is also my professional opinion that there are not any other, less costly alternatives for supplying water to the area.

Q. Please explain the basis for your opinion that the decision to construct the Northwest Pipeline was prudent.

A. The basis for my opinion that the construction of the Northwest Pipeline was a prudent engineering decision was predicated on the evidence displayed by the operation of Good Street and Hidden Hollow Reservoirs over the years 1997 through 1999.

The water level records provided by the Company for the 3 million gallon (MG) Good Street reservoir and the 2 MG Hidden Hollow reservoir during peak flow months of July and August for the three years 1997 through 1999 , interpreted in the light of several other events, tell a very compelling story and are critical to the opinion I have formed. The Good Street reservoir is on the Far Eastern end of the West Main Service Area and the Hidden Hollow reservoir is on the Far Western end. Although approximately 2 MGD can be drawn into the western end of the West Main area from the Garden City booster station in peak flow periods, almost all of this supply goes to the Company's 900 customers acquired up in the

1995 customer exchange agreement between UWID and Garden City, thus there is a very limited surplus water from this source which can be sent to Hidden Hollow reservoir. It is also probable that this capacity may be eroded over future years as Garden City seeks to meet its own growing needs. Wells located in this general area are either low producers (Willow Lane wells, which also have some quality concerns: No. 1 has iron and manganese; all have corrosive tendencies) or are of poor quality (Swift wells: No. 1 has high iron and manganese; Nos. 2 and 3 have high iron; all have taste and odor problems). Efforts to locate new groundwater supplies in this area have met with failure (Gary Lane and State Street test wells). Thus, without the Northwest Pipeline to supply good quality water from the west, the only means of getting sufficient water to the west end of this service area is by importation from the east, either from wells located in the East Main area or, more likely, from the Marden Water Treatment Plant. However, a hydraulic analysis of the distribution pipes in the West Main Service Level shows that the hydraulic capacity is inadequate to move water from east to west at rates which would allow proper operation of Hidden Hollow. During peak demand periods in 1997, the Good Street and Hidden Hollow reservoirs followed very similar sequences of filling and emptying, except that the Good Street reservoir always had far more water in it than did the Hidden Hollow reservoir, which operated at about one-third of capacity for several extended periods. It was simply impossible to keep the Good Street reservoir nearly full while concomitantly transferring enough additional water westward to both satisfy instantaneous demands and operate the Hidden Hollow reservoir at desirable levels, which in my opinion would have been no less than 70 to 80 percent of full capacity. In the event of a fire in the north State Street area when Hidden Hollow

reservoir was at a level less than about half its maximum level, and this was a large percentage of the July-August period that year, the consequences could have been potentially devastating. Operation of the "system" which is this service level, in this fashion in subsequent years would have been foolhardy in my opinion. However, note what happened to the respective water levels upon completion of the Northwest Pipeline. The Hidden Hollow reservoir operated through most of the peak demand period at nearly 90 percent of capacity whereas the Good Street reservoir now became dangerously low for most of the 1998 peak demand months. Even with importation of water to the east end of the West Main Service Area from the Marden Water Treatment Plant, the increase in demand in the east side did not allow the Good Street reservoir to get full or even nearly full except for a very brief period in early August. Had it not been for the Northwest Pipeline bringing an additional 2 MGD into the west end of the service area, the Good Street reservoir would have never filled beyond about 40 percent of its capacity and the Hidden Hollow reservoir would likely have gone completely dry for a large part of the two month period. Surely the potential consequences of this could be viewed as negligent management in the event of a fire in this general area.

Reservoir levels during the 1999 peak demand period show the combined effects of the Northwest Pipeline and the additional capacity of the newly expanded Marden Water Treatment Plant. The desired operating strategy for the reservoirs is to pull them down only during peak demand periods and then to refill them during periods of lower demand so that the water to meet the next peak, or to provide fire protection, is always available. Except for a short period in early July 1999, it was generally possible to recover to about 90 percent of maximum

capacity at both reservoirs following the drawdown which accompanied the peak demand periods. In my opinion, this was the first peak period in three years where the West Main Service Level was operated properly, as a "system," with all the necessary elements required of a system. The Northwest Pipeline was a necessary element in this system concept; thus, its construction was clearly prudent and justified.

Q. Please explain the basis for your opinion that there are not other less costly alternatives.

A. The most desirable alternative would certainly be the development of about 2 MGD of good quality groundwater from new wells located in fairly close proximity to Hidden Hollow reservoir. However, UWID's attempts to implement this alternative (Gary Lane and State Street test wells) were unsuccessful. Abandonment of this alternative then, is not a matter of economics, it is just not a probable, perhaps not even a possible solution.

Development of this quantity of good quality groundwater supply from new wells located in the First Bench service level certainly is a possibility. Appendix D, "Groundwater Characterization," of the 1998 Master Plan suggests that as much as 11 MGD of additional good quality groundwater supply might be developed in the West First Bench area. However, getting approximately 2 MGD of this potential new supply to Hidden Hollow reservoir would require a transmission main about 16-inches in diameter and approximately 3 to 3.5 miles in length and it would have to cross both Garden City and the Boise River. UWID engineering staff has made a budget-level cost estimate for this alternative. The total cost, including a new well, the pipeline and river crossing, came to $2.7 million. A further consideration relative to this or any other potential groundwater supply is

the risk associated with the quality of a new well supply. Several of the wells located on the northerly side of the First Bench service level have high iron concentrations.

Another possible alternative could have been construction of a surface water treatment plant near the east end of Eagle Island. However, this has water right issues associated with it and does not make much sense when a surplus of good quality groundwater already exists a little further to the west. UWID engineering staff also performed a cost estimate for this alternative and the total cost was $6.0 million. Another alternative they examined was a well on Eagle Island and a transmission pipeline to Hidden Hollow reservoir. The cost estimate for this alternative was $2.2 million.

Additional supply from the east was previously addressed. First, water balance studies conducted by UWID in 1999 indicated that during peak demand periods, nothing even approaching 2 MGD of supply is available to be transported from East Main sources to the west side of the West Main level. However, even assuming its availability, hydraulic limitations would prevent transfers at this rate (2 MGD) at peak demand. The hydraulic analysis demonstrated that about 5.7 miles of new transmission pipeline of at least 30-inch diameter would be needed to make this transfer feasible. Their cost estimate for such a pipeline came to $5.25 million.

Thus, taking all the foregoing information into consideration, my conclusion is, not only was the Northwest Pipeline a prudent choice, it was also the most cost-effective alternative of those which might have been pursued. It has the further advantage of certainty of supply and good water quality characteristics to recommend it.

Q. As you have stated, the Marden treatment plant was expanded from 8 MGD to 16 MGD in May of 1999. Would this additional 8MGD in capacity have been sufficient to meet maximum day demands in the East Main Service Area in the absence of the Northwest Pipeline?

A. No. As I have discussed, operational data for 1999 shows that this was the first year in three years that the Hidden Hollow and Good Street reservoirs were maintained at minimally adequate levels. The new production from the Marden plant could not have achieved this result by itself. In the absence of supply from the Northwest Pipeline, reservoir levels would have been below minimally adequate levels. Recall that I previously mentioned the hydraulic analysis performed by UWID which showed that the necessary 2 MGD could not be transferred across the West Main Service Level from east to west even if it was available during peak use periods. The use of the extra capacity in the East Main Service Level and the east side of the West Main Service Level, plus the lack of adequate transmission capacity across the West Main Level is a double-whammy.

Q. Does that conclude your testimony?

A. Yes, it does.

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EXHIBIT TO ACCOMPANY

THE DIRECT TESTIMONY OF

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