

BEFORE DEPARTMENT OF WATER RESOURCES

STATE OF IDAHO

IN THE MATTER OF
DISTRIBUTION OF WATER TO
WATER RIGHT NOS. 36-4103A, 36-
4103B and 36-7148 (Snake River
Farm)

(Over-the-Rim Mitigation Plan)

IN THE MATTER OF THE THIRD
MITIGATION PLAN (OVER-THE-
RIM) OF THE NORTH SNAKE AND
MAGIC VALLEY GROUND WATER
DISTRICTS TO PROVIDE
REPLACEMENT WATER FOR
CLEAR SPRINGS SNAKE RIVER
FARM

(Water District Nos. 130 and 140)

SUPPLEMENTAL DIRECT TESTIMONY OF TERRY SCANLAN, P.E., P.G.

SUBMITTED ON BEHALF OF:

**THE IDAHO GROUND WATER APPROPRIATORS, INC.
NORTH SNAKE GROUND WATER DISTRICT
MAGIC VALLEY GROUND WATER DISTRICT**

OCTOBER 21, 2009

LISTS OF SPONSORED EXHIBITS

2020	Resume of Terry Scanlan	
2021	Major Ion Chemistry (mg/L)	
2022	Major Ion Chemistry (meq/L)	
2023	Major Ion Chemistry (% of Total meq/L)	
2024	Trilinear Diagram	

1 **SUPPLEMENTAL DIRECT TESTIMONY OF TERRY SCANLAN**

2
3 **I. INTRODUCTION**
4

5 **Q STATE YOUR NAME, BUSINESS ADDRESS AND POSITION.**

6 A My name is Terry Scanlan and I am a Principal Engineer and Hydrogeologist with SPF
7 Water Engineering in Boise, Idaho. I am providing this Supplemental Direct Testimony
8 based on additional water quality testing results we have obtained from the water from
9 the wells proposed to be pumped and delivered to Clear Springs, Snake River Farm. I
10 am testifying as an expert witness on behalf of the Idaho Ground Water Appropriators,
11 Inc, (“IGWA”) North Snake Ground Water District and Magic Valley Ground Water
12 District (collectively “Ground Water Districts”). I have attached as **Exhibit 2020** a copy
13 of my resume.

14 **Q HAVE YOU PREVIOUSLY PROVIDED TESTIMONY IN THIS PROCEEDING?**

15
16 A Yes. I provided written Direct Testimony dated September 11, 2009.

17 **Q WHAT IS THE NATURE OF YOUR SUPPLEMENTAL TESTIMONY?**

18 A At the time that I provided previous testimony, results of laboratory analysis for major
19 ions for water samples from the wells and springs were not yet available. These results
20 are now available and have been analyzed to compare major ion chemistries of water
21 from these sources and also from the deeper aquifer that underlies the Snake River Farm
22 Over the Rim project area.

23 **Q CAN YOU SUMMARIZE YOUR CONCLUSIONS?**

24 A. The samples from the Over the Rim wells and the two spring sources plot in a tight
25 group, reflecting similar water chemistry characteristics and a common source in the

1 Quaternary-age basalt aquifer of the Snake River Group. I therefore conclude that the
2 Over the Rim wells and the springs that supply Clear Springs Snake River Farm draw
3 water from the same source.

4 **Q. CAN YOU EXPLAIN HOW YOU REACH THAT CONCLUSION?**

5 A Yes. **Exhibit 2021** presents a summary of water quality data collected for the Over the
6 Rim project. The data are analyses of groundwater from Over the Rim wells 1, 2, 4, 5, 6,
7 7, and 8, spring water from the Fred Nihart fountain along Clear Lakes Grade, and spring
8 water from the Clear Springs' Snake River Farm intake. Also included is water quality
9 data for a groundwater sample collected from the Clear Springs test well in 2006 by
10 Brockway Engineering. **Exhibit 2022** is a summary of the major ion data from **Exhibit**
11 **2021**, converted from milligrams per liter to milliequivalents per liter. **Exhibit 2023** is a
12 summary of major ion percentages.

13 Plotting of major ion distributions on trilinear diagrams can be useful for (1) aquifer
14 identification based on chemistry, (2) evaluation of chemical evolution along ground
15 water flow paths, or (3) evaluation of the mixing of waters from different aquifers or
16 sources. The trilinear diagram method was first developed by Piper (1944), and
17 compares equivalents per liter of major ions expressed as percentages of total equivalents.
18 In doing so, the method allows a large number of data points to be visually evaluated to
19 determine similarities and differences in chemical composition. Groundwater samples
20 collected from different aquifers often have different major ion chemistries. Differences
21 in major ion chemistries can often be attributed to groundwater residence times, chemical
22 evolution, and recharge sources. The data from **Exhibit 2023** are plotted on the attached
23 trilinear diagram **Exhibit 2024**.

1 This information further supports my conclusion and opinion that the Over the Rim wells
2 and the source of water at the springs for Clear Springs Snake River Farm are the same
3 and that the chemistry of the water from the wells is, on average, similar to or identical to
4 the chemistry of the water at the springs.

5 Reference: Piper, A.M. 1944. A graphic procedure in the geochemical interpretation of water analyses.
6 *Trans. Amer. Geophys. Union*, 25, pp. 914-923



Principal Engineer
and Hydrogeologist

Terry M. Scanlan, P.E., P.G.

Education

M.S., Geological Engineering
University of Idaho

B.S., Geological Engineering
University of Idaho

Professional Certification

Professional Engineer
Idaho No. 6266, 1990

Professional Geologist
Idaho No. 646, 1989

Oregon No. G1311, 1992

Certified Water Right Examiner
Idaho No. 10-129

Areas of Expertise

- Design, installation, and testing of high-capacity wells for irrigation, municipal, and industrial water supply
- Groundwater development studies
- Water rights

Experience Summary

Mr. Scanlan has more than 23 years of professional experience in water supply consulting as an engineer and hydrogeologist. He has particular expertise in water rights, well and pump design, public water systems, pressurized irrigation, and other water resource issues.

Mr. Scanlan's work experience has focused on well design and construction, surface water and ground water pump systems, aquifer and well testing, water development studies, and water rights. He also has experience in geothermal resource development, mining-related environmental studies, ground water drainage investigations, soils investigations, geologic mapping, and wastewater land application projects. He has served as Chairman of the Idaho Board of Registration for Professional Geologists. Mr. Scanlan is a Certified Water Right Examiner in Idaho.

SPF Water Engineering, LLC—2004 to present

Mr. Scanlan is currently a Principal Engineer with SPF Water Engineering, LLC. SPF Water Engineering, LLC, was formed from Scanlan Engineering in March 2004 to provide a wider range of water resource engineering services. Since joining SPF, Mr. Scanlan has continued his practice of water resource consulting and engineering, with additional emphasis on development of community water systems for subdivisions and planned communities in southwest Idaho.

Scanlan Engineering—1994 to 2004

Mr. Scanlan formed Scanlan Engineering in 1994 to provide engineering and hydrogeologic consulting to public and private clients. Scanlan Engineering provided water resource consulting services to more than 200 separate clients, primarily in southwest Idaho. Local clients included the City of Boise (Public Works Department, Parks Department), Micron Technology, J.R. Simplot Company, Capitol Water Corporation, United Water Idaho, Inc., Meridian School District, City of Eagle, Sorrento Lactalis, City of Nampa, Boise State University, Ada County Highway District, and the Idaho Water Resources Research Institute. Mr. Scanlan has served as a subconsultant on water supply projects for numerous engineering firms in Idaho, most recently including Montgomery Watson Harza, Toothman-Orton Engineering Company, Entranco, Secesh Engineering, Materials Testing, Inc., and Civil Survey Consultants.

Montgomery Watson—1986 to 1993

Prior to forming Scanlan Engineering in 1994, Mr. Scanlan worked as a supervising hydrogeologist for Montgomery Watson in Boise, Idaho. He

managed and conducted investigations related to ground water development and ground water contamination at locations throughout the western United States.

U.S. Geological Survey—1984 to 1986

Mr. Scanlan was employed by the U.S. Geological Survey as a field assistant in the geologic division prior to joining Montgomery Watson in 1986. Responsibilities included geologic mapping, landslide hazard evaluation, and mineral potential studies. Mr. Scanlan worked on the Challis and Hailey 2° Quadrangle CUSMAP programs.

Relevant Water Supply Project Experience

- Ground water development projects at more than 100 sites in Idaho for public and private water utilities, subdivisions, schools, and industries, including production well and pump design, aquifer pumping tests, exploration drilling programs, and ground water development studies.
- Design, construction monitoring, and testing of four 1,000- to 1,200-foot, high-capacity, industrial water supply wells and pump systems for Micron Technology in Boise, Idaho.
- Lead consultant to Micron Technology for the Boise River water supply and aquifer recharge project. Mr. Scanlan provided consulting services involving water rights, a nominal 25,000-gpm pump station, 3 miles of 24-inch and 30-inch pipeline, an ultra-filtration membrane water treatment system, and a nominal 4-MGD injection well for recharge purposes.
- Irrigation well and pump system design, surface water pump system design, construction monitoring, and well testing at municipal parks in Boise, Idaho. These projects included work on approximately 80 well and pump systems, including design and construction of more than 25 well or surface water pumping systems.
- Design, permitting, and construction inspection of well pump systems and well houses for Capitol Water Corporation in Boise, Idaho. Mr. Scanlan also provided consulting services related to ASR and water rights.
- Design, construction, and testing of salt water production wells for large-scale aquarium projects in Guam and Taiwan.
- Evaluation of ground water potential for snowmaking supplies at Sun Valley and Bogus Basin ski areas and design and testing of the water supply well for the snowmaking system at Sun Valley.
- Evaluation and testing of infiltration galleries and Ranney Collectors at Sequim, Washington (horizontal gallery, Dungeness River), Irrigon, Oregon (four Ranney Collectors, Columbia River), and Boise, Idaho (three Ranney Collectors, Boise River).
- Ground water development studies, well construction, and aquifer testing for fish hatchery projects in the Columbia, Umatilla,

Walla Walla, Imnaha, and Grand Ronde river basins of Oregon for the Bonneville Power Administration. These projects included test well drilling and aquifer tests at ten locations, with well construction in alluvial and basalt aquifers.

- Production well design and testing at the Upper Pahsimeroi Fish Hatchery for Idaho Power Company.
- Design of the domestic supply, mine-pit dewatering, and industrial supply wells for the Beartrack mining project at Leesburg, Idaho.
- Resident geologist during drilling and completion of a 3,015-foot water supply well at Wright, Wyoming.
- Water master plan for the 3600-acre City of Boise Twenty Mile South Farm. The master plan included reconfiguration of water rights, development of additional irrigated lands, design of two large-capacity irrigation wells, and design of a 500-hp variable speed deep well turbine pump system.

Relevant Water Rights Experience

- Preparation of hundreds of water right applications (transfers, amendments, permits, claims) for public and private clients in Idaho. Since 2004, Mr. Scanlan and SPF staff have been involved in more than 150 projects involving water rights for more than 100 different clients.
- Evaluation of surface water and ground water interactions, well interference, irrigation development, and consumptive water use related to water right transfers in the Boise Valley, Wood River Valley, Mud Lake, Magic Valley, Big Lost River, and Little Lost River areas of Idaho.
- Evaluation and measurement of flow from springs involved in water right disputes along the Snake River near Twin Falls and Hagerman, Idaho.
- Investigations related to Snake River Basin Adjudication claims, including calculation of irrigation requirements and seepage losses, measurement of irrigation diversion rates, and determination of historically irrigated areas.
- Expert witness testimony regarding water use, well interference, and the interaction of surface water and ground water for numerous clients in southern and central Idaho.
- Evaluation of irrigation diversions, natural flow, return flow, and storage accounting on the Payette River system for the Payette Water Users Association.
- Evaluation of Federal and Tribal in-stream flow and spring claims in the Snake and Salmon River Basins.
- Preparation of mitigation plans to allow ground water diversions for irrigation and industrial use in moratorium areas or ground water management areas in the Boise and Snake River Basins.

Relevant Geothermal Resource Development Experience

- Construction monitoring for drilling and hydraulic fracturing of a 2,300-foot geothermal injection well for the Veterans Administration Medical Center in Boise, Idaho.
- Project manager for detailed study of the Boise Front Geothermal Aquifer for the city of Boise and Boise Warm Springs Water District. The study included computer modeling of hydraulic and thermal impacts of increased geothermal fluid production and spent fluid injection. Mr. Scanlan served as project manager for design, construction, and testing of a 3,200-foot geothermal injection well for the city.
- Aquifer testing and high-capacity variable-speed pump system design for deep geothermal space-heating wells at the College of Southern Idaho.
- Geothermal aquifer investigations, well testing, production well and pump design, and water level monitoring for J.R. Simplot Company at aquaculture facilities in Caldwell and Grand View, Idaho.

Professional Affiliations

Idaho Association of Professional Geologists

National Ground Water Association

Idaho Ground Water Association

Exhibit 2024

