**Hearing in the Matter of California Department of Water Resources and United States Bureau of Reclamation**

# Request for Change in Point of Diversion for California WaterFix

**Testimony of Arve Sjovold on Behalf of C-WIN**

I, Arve Sjovold, do hereby declare:

## I. INTRODUCTION

I am a retired research scientist. I have a Bachelor's of Arts degree in Physics from the University of California (1956) and have 41 years of experience as a practicing research scientist in the fields of rocket engine development, systems engineering, systems analysis, operations research, cost analysis, cost estimation, model development, and model application. I retired with a position of Chief Cost Scientist from the company of my last employment. A copy of my statement of qualifications has been submitted as Exhibit C-WIN-201, which was previously submitted in to the record under Part 1 of these hearings and is included here by reference. In my testimony I establish the difficulty in balancing water requirements for restoring the Delta against the demands for water for export as the public trust demands and how the California Waterfix is not a solution.

## II. OVERVIEW OF TESTIMONY

The California WaterFix is premised on the notion that Delta restoration is simply a hydraulic problem in getting water across the Delta without inducing reverse flows and killing fish. My testimony shows that there is insufficient water entering the Delta to support the dual goals of restoration and more reliable export deliveries. Delta restoration has the immediate objective of eliminating reverse flows in Old River. Since the California WaterFix solution will still require cross-delta transfers, my testimony shows that without significant inflows from the San Joaquin River there will be reverse flows. My testimony also shows that improved reliability in exports will only be possible when State Water system operations correctly deals with the fact that Sacramento River unimpaired flows in dry periods are not sufficient to support reliable exports at the levels generally assumed. The California WaterFix solution does not deal with this factor.

## III. C-WIN's FINDINGS

We have found that when there is cross-delta transport, flows in the San Joaquin River at Vernalis must exceed export flows by 3000 cfs to eliminate reverse flows in Old River. If pumping of cross-delta transport is desired at a level of 4300 cfs (the permitted level of the CVP pumps) then flows at Vernalis must be over 7000 cfs, which can only be achieved by releases from the San Joaquin tributaries; San Joaquin proper, Merced, Tuolumne, and the Stanislaus. This is several times the existing releases. These findings were developed with the

average winter flows for the months of Dec., Jan., Feb., and Mar. Releases during dry periods will be difficult at these levels.

We have also found that the hydrologic record for both the Sacramento River and the San Joaquin River show extensive dry periods that make it impossible to maintain export levels. Winter pumping during these dry periods must be restricted and new operations criteria must be developed for the projects with a requirement of developing year-to-year carry over storage in project reservoirs.

Executed on the 27th of November, 2017 in Santa Barbara, California

Arve R. Sjovold

Aaron Budgor