STATE OF CALIFORNIA-THE RESOURCES AGENCY GRAY DAVIS, Governor

DEPARTMENT OF FISH AND GAME
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August 5, 2002

Division of Water Rights
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812-2000
Attn: Jean McCue

RE: American River "FAS" Hearing

Dear Ms. McCue:

Enclosed please find five copies of the CLOSING STATEMENT OF THE CALIFORNIA DEPARTMENT OF FISH AND GAME and Proof of Service in the above-referenced matter.

Please contact me at (916) 657-4091 if you have any questions.

Very Truly Yours,

HARLLEE BRANCH
Staff Counsel

Enclosures

cc: Mailing List

Banky Curtis, Regional Manager
Department of Fish and Game

Stephen Reynolds, California Department of Conservation

HB/hb

PROOF OF SERVICE

I hereby declare as follows:

I am employed in the County of Sacramento, State of California. I am eighteen years of age or older and am not a party to the within entitled action. My business address is 1416 Ninth Street, P. O. Box 944209, Sacramento, California 94244-2090. I am familiar with the business practice of the California Department of Fish and Game with regard to the collection and processing of documents for mailing with the United States Postal Service.

On August 5, 2002, I caused to be served the attached LETTER TO JEAN McCUE and CLOSING STATEMENT OF CALIFORNIA DEPARTMENT OF FISH AND GAME **by placing a true copy thereof in the manner set forth below and addressed as follows:**

Via Hand Delivery (5 copies):

Division of Water Rights
State Water Resources Control Board
P. O. Box 2000
Sacramento, California 95812-2000
Attn: Jean McCue

Via U.S. Mail by Depositing a Copy in a Sealed Envelope Via First Class Mail with the United States Postal Service with Postage Fully Paid Thereon To:

See Attached List

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct. Executed in Sacramento, California on August 5, 2002.

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STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

In the Matter of: PETITION OF THE SOUTHERN CALIFORNIA WATER COMPANY TO REVISE THE DECLARATION OF FULLY APPROPRIATED STREAM SYSTEMS REGARDING THE AMERICAN RIVER, SACRAMENTO COUNTY	**CLOSING STATEMENT OF CALIFORNIA DEPARTMENT OF FISH AND GAME**

I.

INTRODUCTION

The Fully Appropriated Stream Systems Declaration ("FAS Declaration") regarding the American River should not be revised to accept and process water right applications to appropriate treated groundwater discharged into the American River. The water that Aerojet-General Corporation ("Aerojet") pumps and discharges and that Southern California Water Company ("SCWC") seeks to appropriate is not truly "new" water because it was already taken into account when the river was declared fully appropriated. It is essentially re-circulated river water that provides no net increase in surface flows above those existing at the time of the original American River FAS Declaration.

DFG is sympathetic to municipal water users whose supply has been jeopardized by groundwater contamination and supports appropriate solutions to this unfortunate problem.

However, our agency does not believe that revising the FAS Declaration is the most suitable fix. DFG's primary concern is the negative impact on instream flows and aquatic species that may occur should treated groundwater be diverted from the river. However, other potential consequences also loom large. This petition would make SCWC capable of essentially obtaining a permit for groundwater extraction, jumping the gun on any possible future groundwater basin adjudication. The ultimate effectiveness of any such proceeding may consequently be compromised. This petition also threatens to establish a precedent for a backdoor mechanism to pump groundwater, recharacterize it as surface water, and obtain surface water rights. In light of evidence demonstrating that groundwater pumping is increasing the loss of surface flow from the American River, such a precedent may result in this condition being compounded by a widespread expansion of pumping to obtain "surface rights."

Again, DFG supports an appropriate solution to the loss of municipal water supply. SCWC's proposal, however, appears to provide a benefit for itself and its own users with potentially negative effects on a considerable number of other water users and interested parties who depend on the river and its interconnected groundwater aquifers. Based on both the policy concerns outlined above and the evidence discussed below, DFG respectfully advises that SCWC's petition be denied.

II.

THE PETITION SHOULD BE DENIED BECAUSE AEROJET'S TREATED GROUNDWATER OPERATIONS WILL NOT RESULT IN A NET INCREASE IN SURFACE FLOWS BEYOND THOSE EXISTING WHEN THE AMERICAN RIVER WAS DECLARED FULLY APPROPRIATED

Cause does not exist for revision of the FAS Declaration because the petitioner has failed to show a change in circumstances demonstrating the availability of truly "new" water in the American River. In fact, hydrologic data suggests a contrary conclusion – granting the petition would result in less available surface flow than that taken into account when the river was

originally declared fully appropriated. Under 23 California Code of Regulations § 871, SWRCB may adopt an order revising a FAS designation upon demonstration of a change in circumstances from those considered in a previous water right decision determining that no water remains available for appropriation. 23 CCR § 871(b). Logically, when more water becomes available in a stream system subject to an FAS designation, a change in circumstances exists. In essence, there should be a *net increase* in surface flow in the stream.

In the present case however, several factors rule out the required change in circumstances. First, hydrologic conditions indicate that Aerojet is pumping water from the American River through adjacent groundwater aquifers and discharging it back into the river again. Such an operation does not result in increased flow in the American River. Instead, it results in a static condition where water is essentially re-circulated. Second, the petitioner has failed to produce data indicating that Aerojet's groundwater treatment operations have resulted in a net increase in surface flows in the American River above those existing when the river was declared fully appropriated. Thus, the record contains only DFG's uncontroverted data analyses showing that cumulative surface flow in the American River has, in fact, been *steadily declining* over many years. Indications are that this trend will continue into the future. This decline is due, at least in part, to the American River losing surface water to adjacent groundwater aquifers. This has been occurring at an increasing rate over time. Since Aerojet's recirculation of American River water will not halt this decline in flows, nor return the American River to the mean flows existing at the time the river was declared fully appropriated, there is no change in circumstances as required by 23 CCR § 871. The petition must therefore be denied.

A. Aerojet's Treated Groundwater Operation Is Drawing Primarily American River Surface Flow Through Adjacent Aquifers And Discharging It Back To The River Again

Extraction well location maps indicate that the Aerojet wells at issue in this proceeding are located within aquifers adjacent to the American River. See eg. Aerojet General Corporation (AGC) Exhibits 1(c), 1(l). The sediments composing these aquifers are mostly sands and gravels with a high degree of permeability. DFG Exhibit 19B, pp. 7-9. This permeability is generally understood to facilitate an easy and rapid exchange of water between rivers and water-bearing sediments. DFG Exhibit 5, pp. 12-13; DFG Exhibit 29. DFG's analysis of several aquifer tests performed near the river on the Aerojet property corroborate this phenomenon. DFG Exhibits 17, 18, and 19 are aquifer test results showing a rate and magnitude of decline in groundwater levels indicating very high hydraulic conductivity adjacent to the river. Groundwater elevation contour lines for the Aerojet property deflect downstream. DFG Exhibit 8, Figures 2-8 and 2-9. Groundwater contour data for the Remedial Investigation and Feasibility Study ("RI/FS") confirm this pattern. DFG Exhibit 9, figures A-7, A-8, and A-9. This type of downstream pattern indicates a stream discharging water to a neighboring aquifer. DFG Exhibit 6, p. 23; DFG Exhibit 7, pp. 58-60. Thus, the American River appears to be recharging the aquifer on the south side of the river. SCWC witness Stephen Ross confirmed that the river recharges groundwater in approximately two-thirds of the American River Study Area – from Nimbus Dam to just below the Aerojet property. RT, p. 70, lines 23 to 71.

The groundwater in the aquifers adjacent to and beneath the American River is composed primarily of discharged American River surface flow. According to the State Water Resources Board's estimate in Bulletin 21, recharge to adjacent groundwater aquifers from the American River under ultimate development is 64,000 acre feet per year. DFG Exhibit 29, p. A-44.

Aerojet's primary witness, Thomas Johnson, estimated total yearly recharge of the aquifers from precipitation and surface runoff to be 2,285 acre feet. AGC Exhibit 1, p. 15. Comparing the two estimates regarding the main sources of groundwater recharge in the area at issue, the majority of groundwater appears to arise from river recharge. Groundwater pumped from these aquifers by Aerojet is then discharged through Buffalo Creek and back into the American River again. RT, p. 46, lines 7-10. Thus, groundwater is essentially re-circulated – resulting in static conditions that do not logically contribute to a net increase in surface flow.

Both Aerojet and SCWC proffered contradicted or uncorroborated theories attempting to discount a significant connection between surface flow and groundwater. First, SCWC alleged that the sediments underlying the river are "likely" in an unsaturated state and thus a hindrance to recharge. See eg. SCWC Exhibit 9, p.4, lines 7-10. This statement, however, is based on conjecture. Neither SCWC nor Aerojet have sample data from below the river to confirm whether the sediments are actually saturated, and if so, the degree of saturation. RT, p. 75, lines 3-9. Second, Aerojet claimed that clay layers underground act as "aquitards," restricting the interaction of the river with deeper aquifers. AGC Exhibit 1, p. 11. However, drill logs analyzed by DFG's expert, Stephen Reynolds, demonstrate otherwise. These logs were from water supply, monitoring, and extraction wells. A vast majority of these wells are constructed with large-diameter surface casings, smaller-diameter single well casings having multiple perforated segments, and gravel packs extending from the ultimate depth of the well to the surface. The average depth of the wells was 225 feet. For reference, the bottom of the lowermost aquifer represented in Aerojet's evidence (represented as Aquifer D) appears to be a maximum of 300 feet below the surface of the ground. See eg. AGC Exhibit 1(e). Thus, numerous wells in the area have been drilled so as to perforate the aquitards. Gravel packs allow groundwater to move

through these perforations. Mr. Reynolds found a 30% failure rate when he evaluated the integrity of interaquifer seals for several of Aerojet's multiple completion monitoring wells, indicating leakage and interconnection between aquifers. RT p. 231-232. These wells are apparently still in existence. Id at 232, lines 5-6. Wells installed in this area throughout the 1990's were constructed in a similar manner. The degree of inter-aquifer connection allows the American River to recharge as far as the deepest aquifer. Therefore, any groundwater extraction in the vicinity of the Aerojet property, regardless of its depth of origin, may include water drawn from the river.

SCWC attempted to support its theory that there is little or no connection between surface flow and groundwater by claiming that the American River is not a recharge boundary for wells in the aquifers in the study area. RT pp. 212-218, 318. However, aquifer tests performed in this area demonstrate the opposite – that the river is at least a partial recharge boundary. If a well draws solely from an aquifer, an aquifer test result graph will show a curve that continues to slope upwards over time – indicating increased drawdown. If a well is drawing from a recharge boundary, the test result curve will eventually flatten and remain flat throughout the test – indicating that drawdown becomes static. The aquifer test result curve for extraction well 4325 (drilled to a depth of 98 feet) begins to flatten at approximately 100 minutes, indicating the time that recharge begins. DFG Exhibit 17. The aquifer test result curves for extraction well 4330 and 4335 show similar results. DFG Exhibits 18 and 19. Based on these test curves, DFG believes that the major recharge source within the influence of this pumped well is the American River. Delayed yield from the aquifers would not produce such results. Such a phenomenon would likely be dissipated within the first few minutes of the test due to the highly permeable aquifer materials. Recharge observed several hours into the test would not arise from this source.

SCWC made a lengthy attempt to demonstrate on cross-examination of Mr. Reynolds that a stream cannot be a recharge boundary if well tests demonstrate drawdown on both sides of a stream – citing to DFG Exhibit 6. See RT, pp. 214-215. While this exhibit did state that drawdown will not occur on both sides of a stream if it is a recharge boundary, the exhibit also assumed both a homogenous aquifer without interspersed aquitards and a surface stream equal to the full depth of the aquifer – as demonstrated in the illustration on the top left of p. 46 of the exhibit. While the general principals in DFG Exhibit 6 remain true, certain details will alter the functioning of the system. As discussed earlier, the American River study area encompasses several aquifers interspersed with aquitards. In addition, the river depth does not equal the depth of these aquifers. Thus, it is possible that there is a combination of recharge both from the aquifers and the river. Noting that the drawdown on the south side of the river was *four times* the drawdown on the north side in at least one sample (Well 4325), it appears that the river is providing the most substantial amount of recharge. AGC Exhibit 4, Table 2-3, "American River Study Area Aquifer Pumping Test Summary"; RT, p. 178, lines 1-25.

Finally, Aerojet claimed that the amount of river water recharging the study area is small. AGC Exhibit 1, p. 16. However, this claim is not backed by specific data in the record and cannot be given credence.

B. Surface Flows In The American River Have Steadily Declined Since The American River Was Declared Fully Appropriated

The evidence produced in this proceeding does not include any data demonstrating that its treated groundwater operation have produced a net increase in American River surface flows beyond those existing at the time of the FAS Declaration. The only analysis of surface flows was conducted by DFG, and the results suggest the opposite -- a *net decline*. Since this decline cannot

be considered a change in circumstances allowing for revision of the FAS Declaration under 23 CCR §871, the petition should be denied.

DFG analyzed nearly one hundred years of American River streamflow data taken near the Aerojet property at the U.S. Geological Survey's (USGS) gage Number 11446500, otherwise known as the Fair Oaks Gage. This analysis suggests that surface flows have declined since the river was originally declared fully appropriated. DFG's expert, Stephen Reynolds, conducted a cumulative departure analysis of Fair Oaks Gage streamflow data based on the mean flow value used by SWRCB in reaching the original 1958 American River FAS Declaration in D-893. The mean flow in 1958 was derived from Fair Oaks Gage data for 1934 through 1954.[1] Between 1905 and 1930, cumulative flows exceeded the mean. Since 1930, however, flows have fallen consistently below the mean, with the exception of a short period during the floods of the mid-1980's. DFG Exhibit 22A. The trend line for the streamflow measurements is represented by the descending red line on the chart. RT, p. 195, lines 12-13. Mr. Reynolds testified that the orientation of this trend line indicates a steady decline in cumulative surface flow. Id at lines 13-15. In addition, a second cumulative departure analysis, depicted in DFG Exhibit 22B, was performed using a mean value derived from the full range of Fair Oaks Gage measurements from 1905 to 1999. The general character of this graph is similar to that in DFG Exhibit 22A.The trend lines on both graphs are also quite similar. Thus, flows are shown to be in steady and continual decline. DFG Exhibits 22A and 22B demonstrate that American River flows have consistently failed to achieve a net increase above the mean flow in the FAS. The petitioner has not demonstrated that the pumping and discharge of treated groundwater by Aerojet will change this trend.

The trend of decreasing surface flow is compounded by steadily declining groundwater levels. Mr. Reynolds analyzed Department of Water Resources ("DWR") records of

approximately 20 production wells, located north and south of the American River in the vicinity of Aerojet. DFG Exhibits 10-14 are graphs of DWR's measurements of water levels in five representative wells, from a period of between 24 and 50 years. Groundwater level elevation is indicated on the Y axis and time is indicated on the X axis (shown as "Measurement No."). The red line on each graph is the trend line obtained by doing a linear regression analysis of the data. This trend line demonstrates a steady and continual decline -- resulting in an increased head differential between the river and groundwater augmenting the driving force drawing water into the aquifer. The end result is a steady increase in the loss of surface flow. A cumulative departure analysis of long-term groundwater level trends confirms this idea. DFG Exhibit 15 indicates that prior to 1958, groundwater levels hovered near the mean. Groundwater usage was consequently in balance with the natural infiltration rate from the American River. However, since 1958, a cumulative decline in groundwater elevation levels has occurred. As more groundwater is pumped, more water is removed from the river, and surface flows decrease. See generally DFG Exhibit 7, pp. 58-60.

III.

THE PETITION SHOULD BE DENIED BECAUSE THE WATER NOW EXTRACTED BY AEROJET WAS CONSIDERED IN THE WATER BALANCE IN DECISION 893, WHICH DECLARED THE AMERICAN RIVER FULLY APPROPRIATED

The Board originally declared the American River fully appropriated in Decision 893 (D-893). In that decision, it was aware that the river recharged the underlying aquifers and took this into account in the water balance underlying its analysis. The evidentiary record from D-893 includes numerous technical discussions about the importance of the river in recharging groundwater. See DFG Exhibit 23, pp. 5-8; DFG Exhibit 24, p. 49; DFG Exhibit 25, p. 1; DFG Exhibit 26, pp. 3-4; DFG Exhibit 29, p. A-

[1] See State Water Rights Board, D-893 (1958), p. 27

43. The "Watershed" discussion in D-893 (pp.25-46) refers primarily to USGS Water Supply Paper No. 1345 (DFG Exhibit 30) and State Water Resources Board Bulletin 21 (DFG Exhibits 28, 29) as the technical basis for the water balance. It is explicit in this balance that American River surface flows recharge groundwater and must be sufficient to ensure future safe groundwater yield and downstream surface water rights. It is thus apparent that the Board has already considered the existence and source of the groundwater at issue in this proceeding, thus counseling against any finding that it is truly "new."

V.

CONCLUSION

The petitioner has not demonstrated that Aerojet's groundwater treatment operations have resulted in a net increase in surface flows in the American River beyond those existing when it was declared fully appropriated. Thus, SWRCB should not conclude that the water is "new," and thus subject to diversion by SCWC. SWRCB was aware of this water in 1958, when the original American River FAS Declaration was issued. While DFG is supportive of a positive remedy for the loss of municipal water supply as a result of groundwater contamination, our agency believes more appropriate solutions are possible that would be beneficial to all interested parties. In light of the evidence brought forth in this proceeding and the policy issues at stake, DFG respectfully suggests that the petition be denied and the FAS Declaration not be revised.

Dated: August 5, 2002

By: _____
Harllee Branch,
Staff Counsel