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11 BEFORE THE CALIFORNIA STATE WATER RESOURCES CONTROL BOARD

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13 HEARING IN THE MATTER OF
14 CALIFORNIA DEPARTMENT OF WATER
RESOURCES AND UNITED STATES
15 BUREAU OF RECLAMATION REQUEST
FOR A CHANGE IN POINT OF
16 DIVERSION FOR CALIFORNIA WATER
FIX

**CALIFORNIA DEPARTMENT OF
WATER RESOURCES' RESPONSE
TO VARIOUS FILINGS OF
CALIFORNIA WATER RESEARCH**

17
18 California Department of Water Resources ("DWR") provides this response to the
19 various filings submitted by Deirdre Des Jardins ("Jardins") on behalf of California Water
20 Research ("CWR") to the State Water Resources Control Board ("Board") related to the
21 pending Petition before the Board and pre-hearing proceedings. The CWR filings
22 addressed in this Response include: (1) January 5, 2016; (2) February 4, 2016;
23 (3) March 10, 2016; (4) April 2, 2016; (5) June 9, 2016; (6) June 10, 2016; (7) June 20,
24 2016; (8) July 12, 2016; (9) July 19, 2016, and (10) July 29, 2016. DWR filed a separate
25 response on July 22, 2016 to CWR's July 12, 2016 Evaluation of Testimony on Modeling
26 Results.

1 **INTRODUCTION**

2 Between January 5, 2016 and July 29, 2016 CWR has submitted an unlimited
3 number of demands and questions to this Board in the 11 letters and submissions listed
4 above. (**Attachment A** is a table of all filings by CWR and summary responses).

5 It is clear from the progression of these letters, requests, and motions filed on
6 behalf of the CWR party that this hearing process is being utilized to do research.
7 Interestingly enough the requests are seemingly becoming more educated and CWR's
8 representative Des Jardins is learning how the Bay-Delta modeling programs work.
9 Unfortunately the process of educating this one party takes extensive effort and
10 resources. In the spirit of transparency this response will provide the details and
11 references/links that have been provided to assist this party and others in better
12 understanding the modeling processes, programs, and application to the Proposed
13 Project, the California Water Fix.

14
15 **BACKGROUND**

16 DWR has already responded to the following requests:

- 17 • On March 8, 2016 DWR provided Deidre Des Jardins through a Public Records Act
18 Request modeling data from CalSim II/DSM2 for California Water Fix Alternatives
19 2d, 4a, 5a and the NAA.
- 20 • On March 11, 2016 DWR provided additional information on the hydrologic
21 modeling used to support the CWF analyses and a complete list of the versions of
22 all computer models used in producing analyses for the Water Fix.¹
- 23 • On May 24, 2016 DWR provided Pacific Coast Federation of Fishermen's
24 Associations and Institute for Fisheries Resources ("PCFFA/IFR") through a Public

25
26
27 ¹ DWR also offered that, "[d]ue to the volume of data and the complexity of the associated models, the
28 Department has found it more user-friendly to work with the requestor to ensure they have the information needed to
utilize the data." To date these parties have not asked for technical assistance.

1 Records Act Request modeling data from CalSim II/DSM2 for H3 with Fall X2, H4
2 with Fall X2,
3 Boundary 1, with no Fall X2, Boundary 2, with no Fall X2, and No Action with Fall
4 X2.

- 5 • On May 25, 2016, DWR provided the updated model study packages: (1) No
6 Action Alternative containing Fall X2 at Early Long Term; (2) Boundary 1 with no
7 Fall X2 at Early Long Term; (3) Boundary 2 containing Fall X2 at Early Long Term;
8 (4) H3 containing Fall X2 at Early Long Term; and (5) H4 containing Fall X2 at
9 Early Long Term. The Board made these analyses available on its website on
10 May 27, 2016.
- 11 • On July 20, 2016, DWR copied the modeling packages in support of the
12 Administrative Draft Environmental Impact Report ("DEIR")/Environmental Impact
13 Statement ("DEIS"); DEIR/DEIS; Partially Recirculated DEIR/Supplemental DEIS;
14 and the Biological Assessment ("BA") onto a hard drive provided by counsel for
15 PCFFA/IFR.²

16 DWR has also formally responded to a Subpoena issued by attorney Stephan
17 Volker on behalf of PCFFA/IFR that mirrors CWR's requests. (A copy of DWR's
18 response is **Attachment B hereto.**)
19

20 SUMMARY OF INFORMATION PROVIDED

21 Below is a summary of the written responses to various questions asked of DWR
22 and referenced materials to assist these parties in understanding and accessing
23 modeling programs, assumptions, and results related to the Petition. (A list of
24 references/web links provided in response prior to this filing is **Attachment C hereto.**)
25

26
27 ² The CWR/Jardins have been coordinating with PCFFA and IRF through its attorney in obtaining modeling
28 results from DWR through July 9, 2016 Subpoena demands which mirrored the request of CWR/Jardin's letter to the
Board dated June 9, 2016.

1 As seen in the June 9, 2016 letter submitted to the Board by CWR, pages of
2 questions are still the focus of CWR's position. This comes after CWR and PCFFA/IFR
3 have received directly from DWR the modeling data requested, on March 8, 2016 and
4 May 24, 2016, respectively. It is apparent from the documents following the March 10,
5 2016, April 2, 2016, and June 9, 2016 filings in this hearing that CWR has the overbroad
6 information it seeks to prepare for cross examination. It is CWR's responsibility to
7 prepare its case in chief and employ the appropriate expert to advise it in these
8 proceedings. Nevertheless, DWR provided various explanations in an effort to assist the
9 parties. These include providing publicly available information by specific citations
10 and/or links to the reports/analysis. By way of example, in response to the duplicative
11 Subpoena from PCCFA, DWR provided short explanations:

12 **Regarding version control**: CalSim does not use version control software as
13 other models may. CalSim is built on: (1) Water Resources Engineering Simulation
14 Language (WRESL) and (2) WRIMS. WRESL, developed for solely for CalSim is a
15 language like English that allows modelers to express their desires on the way the water
16 system and its operations are depicted.

17 The CalSim user community has tried and uses version control standards on an
18 individual basis. Some projects choose to use standardized version control while other
19 projects choose to use the version control that is inherent with CalSim and the WRIMS
20 code language. The CalSim model code structure is arranged in a file-tree/directory
21 structure. The structure is easy to navigate and exploring the code is intuitive since it is
22 assembled in the same structure as seen in the Windows Explorer file browser. The
23 CalSim models are also relatively small in digital storage size and thus the full input and
24 code are easily shared. Model code changes are readily tracked by Differencing
25 software such as CS Diff. Thus the model versions are easily tracked using CS Diff.
26 BDCP/California Water Fix, and the BA used the inherent CalSim version control rather
27 than a standardized version.
28

1 **II. MODELING PROGRAMS HAVE LIMITATIONS AND REQUIRE THE**
2 **EXERCISE OF PROFESSIONAL JUDGMENT AND EXPERTISE TO BE**
3 **USEFUL**

4 In response to the requests for additional modeling information (often phrased as
5 foundation to the modeling analysis), DWR has referred parties to Appendix 5A of the
6 2013 Public Draft EIR/EIS that goes into extensive detail about the models, limitations,
7 assumptions, and use for BDCP alternatives. Following Appendix 5A is Appendix B
8 describing additional modeling results for the 2015 RDEIR/SDEIS California Water Fix
9 alternatives. Each of the appendices provides complex modeling information that may or
10 may not be clear to a layperson. All models have limitations and these are discussed in
11 the information provided in these appendices. Experts in this field agree that CalSim II is
12 typically more appropriate for modeling highly modified or new parameters, facilities,
13 regulatory requirements, or operational rules. Skillful use of models and interpretation of
14 model results in a complicated physical system, such as the Sacramento-San Joaquin
15 Bay-Delta System or its upstream watershed, requires a significant investment in training
16 and years of experience. CalSim II is currently the large scale operations model being
17 used in almost every major water supply project that affects the Delta. In fact, the Board
18 relies upon CalSim II as it did when it prepared its July 20, 2010 Draft Board Delta Flow
19 Criteria Report.

20 Modelers must exercise professional judgment in determining which models to
21 utilize and what parameters to include when insufficient historical data is available or
22 when forecasting future events. These are assumptions, and not actual data for
23 calibration. Like any planning model, CalSim II looks at the future and runs scenarios at
24 a specific level of development. These future-type analyses require the modelers to
25 make assumptions and justify the results by validating his/her conclusions. The
26 conclusions (i.e., output or analysis) are the product of professional judgment based on a
27 specialized field and expertise in the modeled physical environment, here the Bay-Delta.
28 As noted above, this takes a significant investment in training and years of experience.
CalSim II is applicable to the Bay-Delta region, the type of problems present there, and

1 the conditions under which the State Water Project and Central Valley Project operate.
2 Further, a robust local forum has developed among modelers here, because they are
3 experienced with this geographical area and subject matter.

4
5 **CONCLUSION**

6 DWR requests that the various filings by Ms. Des Jardins on behalf of CWR be
7 disregarded. They are not valid objections to DWR's evidence, requests for official
8 notice, or submission of evidence in accordance with the Board's rulings. Instead, they
9 appear to be an attempt to either cast doubt on the validity of DWR's modeling work or to
10 learn how the Bay-Delta modeling programs work.

11 Dated: July 29, 2016

CALIFORNIA DEPARTMENT OF WATER
RESOURCES

12
13
14 

15 Robin McGinnis
16 Office of the Chief Counsel

ATTACHMENT A

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ATTACHMENT A TO DWR RESPONSE TO VARIOUS FILINGS				
No.	Date Filed	Type of Document	Main Points/Issues Raised	Response
1	1/5/2016	Comments on climate change modelling in the California Water Fix DEIR/SDEIS	The California Water Fix RDEIR/SDEIS does not use the best available science in modelling of climate change, and there are some significant omissions in the analysis.	This letter appears to challenge the CEQA analysis and use of modeling assumptions. As ruled by the Hearing Team, this hearing is not the forum to challenge the EIR/EIS or RDEIR/SDEIS.
2	2/4/2016	Letter is in response to DWR's and US Bureau of Reclamation's ("Reclamation's") February 2, 2016 letter.	Proposed operations of the new Point of Diversion are not in final form. "Preliminary and tentative" models and modelling data are clearly not in final form, and do not support any formal petition or proceeding, including the Change Petition. No list of modelling software versions was provided, nor was any indication made of the availability of the missing models for some alternatives, or the input data. There has not been a comprehensive external review of the new CALSIM II software versions, and the Petitioners assert that the No Action Alternative does not necessarily validate with historic operations.	This letter asserts the project description of the Proposed Project is not detailed and raises questions about modeling software versions and peer review. Both of these issues were addressed in DWR's Master Response to Objections submitted on July 20, 2016.
3	3/10/2016	Letter Regarding DWR/USBR response to request for modelling	Modelling Data has almost no documentation. I wanted to ask that you provide a basic README file with the data. Information should include the model version, short description of model	This is a response letter based on modeling data received by California Water Research ("CWR"). It includes tables that were prepared

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		information	assumptions and input data, as well as the locations of the input and output data. I do still need information about the different versions of the BDCP / WaterFix models, and availability of runs for different climate change scenarios and outflow scenarios. I also need information about the revision history of the models and differences between the various versions. I have created some draft tables of basic information on model versions, version comparisons, and model runs with different climate change and outflow assumptions. Please fill the tables out and send them to the WaterFix hearing service list. (see the letter for details)	and requests that DWR complete the tables. DWR has offered to assist members of the public in identifying where information can be found related to modeling data, results, assumptions, versions, etc. DWR is not obligated to complete work products for parties as suggested by this letter and others sent by CWR.
4	4/2/2016	Letter Regarding the request by the Petitioners to delay the hearing for 60 days, and by Protestants to dismiss the petition, or hold a second Pre-Hearing Conference.	<ol style="list-style-type: none"> 1. Petition Adequacy. 2. Board's assumption of relying on the WaterFix CEQA/NEPA information. 3. Question of CEQA/NEPA analysis for Change Petition. 4. Information supporting anti-degradation analysis. 5. Funding for the public trust analysis 	<p>This letter addressed to the Hearing Team raises issues again about the CEQA process and again challenges the use of modeling programs.</p> <p>These issues are addressed in DWR's Master Response to Objections dated July 20, 2016 as well as in detailed responses and links to websites where CWR can obtain the information requested.</p>

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5	6/9/2016	Incomplete or missing information on CALSIM II modeling in submitted evidence	<p>Preliminary examination of the modelling evidence submitted shows major omissions that make it difficult even to prepare objections. These omissions need to be rectified. CALSIM II:</p> <p>1. Peer review of modelling. Questions:</p> <p>a) What efforts have been made to do an in-depth peer review of the current CALSIM II model submitted in support of the petition? Or any of the BDCP / Waterfix modelling?</p> <p>b) What CALSIM II components (besides the San Joaquin River module in 2006) have ever had such an in-depth peer review?</p> <p>c) Can you make both the report and information submitted to the panel available to the hearing participants?</p> <p>d) Can you provide information on the changes made to any peer-reviewed components of the model to hearing participants?</p>	<p>This letter, addressed to the Hearing Team, asks for another 60 day extension; provides a list of CalSim II modeling information that has been provided already or is publicly available; and asks DWR and Reclamation to answer a list of at least 39 questions about Bay-Delta modeling programs.</p> <p>DWR has provided extensive materials including data, assumptions, analysis, outputs, and program web links where peer review reports can be downloaded.</p> <p>CWR is attempting to use various letters to obtain information that is publicly available. CWR is responsible for understanding what it is attempting to show at the hearing. DWR is not required to answer all questions posed</p>

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			<p>2. Technical Review of modelling. Questions:</p> <p>a) For what components of CALSIM II was this thorough technical analysis done? In what year and for what version of the CALSIM II model?</p> <p>b) For each of the technical analyses, was it internal or external?</p> <p>c) For each component, what information about the most recent technical analysis is available? Can you provide this information to all parties in the hearing?</p> <p>d) For each technical analysis, have the inputs, embedded parameters, or code changed for those components changed since that time? Can you provide this information to all parties in the hearing?</p> <p>3. Documentation of hydrologic inputs and embedded parameters. Questions:</p> <p>a) For what hydrologic, water demand, capacity and operational data was this documentation completed?</p> <p>b) In each case, was this documented for the current version of the model?</p> <p>c) If not, was it documented for prior versions?</p> <p>d) In each case, can you make the most recent version of the documentation</p>	<p>to best educate one party's understanding of Bay-Delta modeling.</p>

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			<p>available to all parties to the hearing, with a summary and guide to the information?</p> <p>4. Documentation of code and modelling assumptions, and any calibration. Questions:</p> <p>a) Was this documentation management system or something similar implemented?</p> <p>b) If so, is it still being maintained?</p> <p>c) If so, can you provide a list of the documentation in the documentation management system, along with the most recent documentation of all model components, to the parties in the WaterFix hearing?</p> <p>d) If not, why has it not been implemented or maintained?</p> <p>5. Version control: maintaining a version history. Questions:</p> <p>a) Is this version control system still being maintained?</p> <p>b) Was it maintained for the BDCP / WaterFix code versions?</p> <p>c) If so, can you make the complete version history of the BDCP / WaterFix model and any DRR versions they are derived from available to stakeholders, including all parties in the hearing?</p> <p>d) Was it maintained for the code version</p>	

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			<p>submitted for the WaterFix hearing?</p> <p>e) If so, can you make the complete version history of the BDCP / WaterFix model and any DRR versions they are derived from available to stakeholders, including all parties in the hearing?</p> <p>f) If not, why has it not been maintained?</p> <p>6. Quality control: model version testing and error checking. Questions:</p> <p>a) Are these quality control spreadsheets still being maintained?</p> <p>b) If so, have they been run on any of the BDCP/Waterfix CALSIM II model versions?</p> <p>c) If so, can you provide the information to the WaterFix hearing parties?</p> <p>d) If so, have they been run on the version submitted in support of the hearing?</p> <p>e) If so, can you provide the information to the WaterFix hearing parties?</p> <p>7. Model and data testing and quality improvement. Questions:</p> <p>a) Besides Contra Costa County, what efforts were made to involve local water agency and consulting experts in review of local representations and data?</p> <p>b) If so, who was involved, what was the year, and what modules were revised?</p> <p>c) What CALSIM II modules or embedded</p>	

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			<p>parameters were revised and tested in coordination with the BDCP Steering Committee?</p> <p>d) Can you make a list of the information from these reviews and revisions available to the hearing participants?</p>	
6	6/10/2016	Letter Regarding Evidentiary submission – CALSIM II model peer review reports and 2004 response.	CALSIM II modelling evidence (CALSIM II Peer Reviews and 2004 Response, Complete Final Report) submitted by the Petitioners may not be complete enough for the Protestants. Copies of peer review reports which document of the status of the external review and validation of the CALSIM II modelling evidence submitted for the hearing. (Linked to the documents provided in the letter).	<p>In this letter to the Hearing Team CWR is asking to submit into evidence before its case in chief evidence.</p> <p>As ruled by this Board all evidentiary motions/submissions will take place during the hearing. This letter does show that CWR is looking at the publicly available information on CalSim II.</p>
7	6/19/2016	Motion to Introduce Foundational Evidence Into the Hearing Record	<ol style="list-style-type: none"> 1. Reliability on computer modelling and model results. 2. Reliance on peer review, when reports from peer reviews were not submitted as exhibits (DWR-71, exhibit (DWR-507). 3. Petitioners have not arranged for adequate independent review of the modelling used for their Case in Chief. 4. CA Water Research Requests the following: <ol style="list-style-type: none"> a) Reports submitted to the Board on June 	<p>Framed as a “Motion to Introduce Foundational Evidence into the Hearing Record,” this filing appears to attempt to submit evidence outside of the hearing without appropriate foundation itself.</p> <p>It also appears duplicative of previous requests to the Hearing Team for admission of information prior to the commencement of the hearing and</p>

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			<p>10, 2016, be accepted into evidence, per my request: (1) 2003 CalSim Strategic Review; (2) 2004 CalSim Peer Review Response; (3) 2006 CalSim II peer review of the San Joaquin River module.</p> <p>b) That the Board act on the request I made on June 20, 2016, submitting report (4) from the 2012 scientific and technical panel, called Analytical Tools for Evaluating Water Supply, Hydrodynamic and Hydropower Effects.</p> <p>c) That the Board act on the request I made on July 12, 2016, report (5) into evidence, entitled "35th Annual Progress Report to the State Water Resources Control Board".</p> <p>d) That the technical reference document served to the Board on July 12, 2016, be accepted into evidence, called "Department of Defense Instruction 5000.61 on Modeling and Simulation (M&S) Verification, Validation, and Accreditation (VV&A)."</p> <p>5. Procedural Issues with Acceptance of Submitted documents.</p> <p>6. Lack of Preliminary Hearing on Foundational Issues - Modeling</p>	<p>prior to the parties' time to submit evidence.</p> <p>It also requests that the Board respond to its previous requests.</p>

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			7. Request that the Board make a timely decision on CA Water Research's Motion on issues with foundational testimony to accept documents (1-6) into evidence.	
8	6/20/2016	Request to take Official Notice of the report of the 2012 Board Panel on Analytical Tools for Evaluating Water Supply, Hydrodynamic and Hydropower Effects	<p>1. 2012 Board Scientific Panel on Analytical Tools – Relevance.</p> <p>2. 2012 Board Scientific Panel on Analytical Tools – Near Term Recommendations (a) <i>Existing hydrodynamics, operations, planning, power, and economics models can provide insights and information, but must be documented and interpreted more thoughtfully and critically for each application.</i> (b) <i>Models and model results used in Board proceedings should be better documented and include a discussion of the strengths, weaknesses, and limitations for each application.</i></p> <p>Some Key Aspects in Calibrating and Testing a Delta Hydrodynamics Model. In the testing and calibration of a Delta hydrodynamic and water quality model, the panel suggests several key aspects to examine. These include:</p> <ul style="list-style-type: none"> • Matching point observations of Stage, Flow, Salinity (EC) on tidal and tidally 	<p>This is another letter to the Hearing Team asking it to take official notice of various documents.</p> <p>Again, submitting evidence in the record should take place when a party submits a case in chief or if used in cross-examination with the appropriate showing of relevance and other foundational issues.</p>

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			<p>averaged (net) basis</p> <ul style="list-style-type: none"> • Matching key interior net-flow splits: Sacramento River to Sutter and Steamboat Sloughs; Sacramento River to Delta Cross Channel and Georgianna Slough; San Joaquin River to Old River at Head; San Joaquin River to Old River and Middle River; net flows around Franks Tract; flow between the Sacramento River and San Joaquin through Threemile Slough • Representing gate/barrier operations: DCC, Suisun Marsh Salinity Control Gate, south Delta barriers, Clifton Court Gates • Representing Delta Island Consumptive Use • Representing Delta Exports • Representing low flow, high flow, and transition periods • Representing the yearly cycle of salt intrusion and flushing • Representing spring-neap tidal variation <p>3. Request from Hydrodynamics Modelers. Must be made with a high level of scientific transparency, proper verification and validation, adequate documentation, and rigorous peer review.</p> <p>4. Clean Water Act Section 401 Certification.</p>	

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9	7/12/2016	Letter Regarding Evaluation of testimony on the reliability of the methods used to produce CalSim and DSM2 model results	<p>1. The model results submitted in support of the Petition all rely on a hydrologic / water operations model, CalSim II. This model has never been validated, i.e., approved as reliable, for any use.</p> <p>2. Information on the calibration of the DSM2 model version used for the WaterFix hearing appears not to have been submitted, nor has there been peer review of the DSM2 model version or model version results. The August 2013 memo to Cathy Crothers (Exhibit DWR-511) does not substitute for calibration, validation, and peer review.</p>	<p>In this letter CWR submits the Department of Defense Instruction manual from 2003, but the purpose for doing so is unclear.</p> <p>CalSim II and DSM2 are not Defense models. The models (CalSimII and DSM2) were developed and are maintained for water planning specifically for the Bay-Delta. Although the Department of Defense may have good rules of general application, it is not a water-management regional model.</p>
10	7/12/2016	Letter Regarding Evidentiary submission – Bay-Delta Modeling 35th Annual Progress Report	Copy (link) provided of the 35th Annual Progress Report of the Bay-Delta Modeling Branch of the DWR to the SWRCB. The testimony of Armin Munevar (Exhibit DWR-71) refers to this report.	<p>In this letter to the Hearing Team, CWR requests that a report be posted on the SWRCB website for the California Water Fix because it is referenced in DWR’s testimony.</p> <p>Again, CWR needs to submit evidence at the appropriate times at hearing.</p>
11	7/29/2016	Response to DWR’s Objections to “Evaluation of Testimony on Reliability of the	Requests that the brief submitted on July 12, 2016, entitled “Evaluation of Testimony on the Reliability of the Modeling,” be accepted into the Hearing record. This brief is not intended to be testimony, and is limited to technical issues that are relevant	Submitting evidence in the record should take place when a party submits a case in chief or if used in cross-examination with the appropriate showing of relevance and other foundational issues.

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		Modeling and Motion to Accept Brief Into Hearing Record	to the consideration of objections to the modeling evidence. The Board's October 30, 2015 Notice of Petition and Hearing appears to preclude submission of the information during rebuttal. The problems were documented in the letter sent to the Board, the Petitioners' attorneys, and the Hearing parties on June 9, 2016, entitled "Incomplete or missing information on CALSIM II modeling in submitted evidence." CWR will be submitting yet another letter to correct the July 12, 2016 brief, and serve the evidentiary documents on the Hearing parties. CWR will also formally submit the Department of Defense "Instruction 5000.61 on DoD Modeling and Simulation (M&S) Verification, Validation, and Accreditation (VV&A)," into evidence.	<p>This filing promises additional repetitive, duplicative filings.</p> <p>In this letter CWR submits the Department of Defense Instruction manual from 2003, but the purpose for doing so is unclear.</p> <p>CalSim II and DSM2 are not Defense models. The models (CalSimII and DSM2) were developed and are maintained for water planning specifically for the Bay-Delta. Although the Department of Defense may have good rules of general application, it is not a water-management regional model.</p>

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**CALIFORNIA DEPARTMENT OF
WATER RESOURCES' OBJECTIONS
AND RESPONSES TO SUBPOENA
DUCES TECUM ISSUED BY PACIFIC
COAST FEDERATION OF
FISHERMEN'S ASSOCIATIONS AND
INSTITUTE FOR FISHERIES
RESOURCES**

14
15 California Department of Water Resources ("DWR") objects and responds as
16 follows to the Subpoena Duces Tecum issued by Pacific Coast Federation of
17 Fishermen's Associations and Institute for Fisheries Resources ("PCFFA/IFR") pursuant
18 to Water Code section 1080, Government Code section 11450.10, and California Code
19 of Regulations, title 23, section 649.6 subdivision (a) in the matter of DWR and U.S.
20 Bureau of Reclamation's ("Reclamation's") Request for a Change in Point of Diversion
21 for California Water Fix ("CPOD Hearing"). DWR reserves the right to provide additional
22 objections and responses.

23 **BACKGROUND**

24 DWR provides this background information to explain the context of these
25 objections and responses. On June 29, 2016, PCFFA/IFR requested that the State
26 Water Resources Control Board ("Board") issue a subpoena to DWR and Reclamation
27 for the production of documents concerning the CalSim II model. The Board declined to
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1 issue a subpoena and indicated that PCFFA/IFR's attorney could issue a subpoena
2 because they are parties to the Water Fix hearing. Counsel for PCFFA/IFR issued a
3 subpoena duces tecum to DWR's Person Most Knowledgeable on July 8, 2016. In order
4 to avoid filing a motion to quash or for protective order, DWR invited PCFFA/IFR to meet
5 and confer on issues raised by the subpoena. During a teleconference on July 15, 2016,
6 DWR agreed to transfer the requested modeling data to the extent it was available on
7 July 20, 2016 onto an external hard drive provided by PCFFA/IFR and to produce
8 responsive documents when they became available.

9 On July 20, 2016, DWR copied the modeling packages in support of the
10 Administrative Draft Environmental Impact Report ("DEIR")/Environmental Impact
11 Statement ("DEIS"); DEIR/DEIS; Partially Recirculated DEIR/Supplemental DEIS; and
12 the Biological Assessment ("BA") onto a hard drive provided by counsel for PCFFA/IFR.
13 DWR and PCFFA/IFR agreed that DWR would provide additional documents via DWR's
14 FTP site.

OBJECTIONS TO SUBPOENA DUCES TECUM

15 DWR objects to the subpoena, because it violates Government Code section
16 11450.30 and Title 23 California Code of Regulations, section 649.6. It did not request
17 documents in a reasonable time. The subpoena requested that DWR produce records
18 on July 18, 2016, which is 10 days after it was issued on July 8, 2016. Given the scope
19 of the requests, 10 days is not a reasonable amount of time in which to prepare
20 responses.
21

22 It is directed to both DWR and Reclamation. Although PCFFA/IFR issued separate
23 subpoenas to DWR and Reclamation, the addendum is directed to both of them and it is
24 unclear which requests are directed to which party.

25 It requests that DWR prepare an index in an Excel spreadsheet. Government Code
26 section 11450.30 and Title 23 California Code of Regulations, section 649.6 authorize
27 parties to issue subpoenas for attendance at a hearing and for production of documents,
28 but they do not authorize parties to demand that the recipient prepare documents.

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1 DWR objects to the subpoena, because production of documents in response to
2 the subpoena appears to be unnecessary. On page 2 of the addendum to the subpoena,
3 PCFFA/IFR indicate that PCFFA, IFR, and others "have requested modeling information
4 essential to the just and efficient adjudication of these proceedings from DWR and
5 Reclamation that has not been produced." Indeed, DWR has been responding to
6 requests from members of the public for modeling data related to California Water Fix
7 and its predecessors, the Delta Habitat Conservation and Conveyance Program and the
8 Bay Delta Conservation Plan, since it began working on these projects, including a
9 request from PCFFA/IFR on May 17, 2016 to which it responded on May 24, 2016.

10 DWR objects to some of the requests in the subpoena, because they are vague
11 and ambiguous as much of the information requested is not the type of information that
12 applies to CalSim modeling data.

13 DWR objects to the subpoena, because some of the requests seek information
14 duplicative of information already available through more convenient, less burdensome,
15 and less expensive methods; constitute an undue burden and expense on DWR; and
16 seek information irrelevant to the proceedings and not calculated to lead to the discovery
17 of admissible evidence.

RESPONSES TO REQUESTS FOR DOCUMENTS

18 Request Number 1: All reports, analyses, presentations, correspondence,
19 spreadsheets, notes, technical memoranda, and other information relating to
20 specification and review of the development of petitioners' CalSim II modeling for the
21 Bay Delta Conservation Plan ("BDGP") and WaterFix, including but not limited to the
22 following modeling phases:
23

24 a. Alternatives Screening, including the first and second screenings described in
25 Appendices 3A and 3I of the Draft Environmental Impact Report ("DEIR") /
26 Environmental Impact Statement ("DEIS"), particularly model runs relating to the Board's
27 2010 Flow Criteria and the Enhanced Spring Delta Outflow Approach initially
28 recommended by the Board;

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- 1 b. Preliminary Administrative DEIR/DEIS;
- 2 c. CS5 scenarios;
- 3 d. DEIR/DEIS;
- 4 e. Revised DEIR ("RDEIR") / Supplemental DEIS ("SDEIS");
- 5 f. Biological Assessment; and
- 6 g. WaterFix hearing.

7 **Response to Request Number 1:** DWR objects to this request, because it is
8 overbroad, seeks information duplicative of information already available through more
9 convenient, less burdensome, and less expensive methods, and constitutes an undue
10 burden and expense on DWR. Without waiving these objections, DWR provides the
11 following responses.

12 DWR produced responsive, non-privileged, non-duplicative documents in electronic
13 format on July 20, 2016. DWR provides the following additional responses to this
14 request:

15 CalSim does not use version control software as other models may. CalSim is built
16 on: (1) Water Resources Engineering Simulation Language (WRESL) and (2) WRIMS.
17 WRESL, developed solely for CalSim, is a language like English that allows modelers to
18 express their desires on the way the water system and its operations are depicted. The
19 English-like language along with comment lines in the code allows users and reviewers
20 of CalSim easy access to the core concepts and detailed steps of a coder's intent.
21 Another main feature of CalSim is the modular structure of the code. The modules are
22 arranged in different structures, with their operational rules and inter-relations. Both
23 WRESL and the modular structure of the model are the foundational devices for the
24 orderly arrangement of structures and their operations. A WRESL language reference
25 can be downloaded here:

26 [http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSim/Documentation/WreslLang
27 uageReference.pdf](http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSim/Documentation/WreslLanguageReference.pdf).

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1 All of the modeling documents and their analyses are contained in the various
2 associated reports and studies referenced in items 1.a – 1.e. The reports and studies
3 listed in 1.a – 1.e are publicly available for download and are linked on the Cal Water Fix
4 website: <https://www.californiawaterfix.com/>.

5 The material for the CPOD Hearing referenced in 1.f is located on the Board's
6 website:

7 [http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california](http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/water_right_petition.shtml)
8 [waterfix/water_right_petition.shtml](http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/water_right_petition.shtml) (see May 27, 2016 entry).

9 **Request Number 2:** CalSim II model version history, in the format of a complete
10 copy of the root directories of all version control repositories involved, including the
11 current repositories and any other repositories that were used in the past but have been
12 discontinued. For each repository, please provide an unabridged exact binary of the
13 entire recursive directory structure existing on the server, including all files, links, and
14 directories in and below the repository root, such that an installation of the version
15 control utility (e.g. Perforce, Git) would be able to access it as an intact repository in an
16 equivalent manner as it has been used by petitioners and their contractor, CH2M Hill.
17 Names and versions of the version control utilities should be provided, as well as any
18 administrative passwords required to access the repository files. These copies may be
19 provided using any standard archiving tools such as .tar or gzip. The suggested format is
20 one repository per .tar (or .taz) file. To the extent the repositories do not have the
21 following information, it is also requested:

22 a. modeling code, data, and metadata for the following versions that had external
23 review: the 2003 Historical Validation study version, the 2006 San Joaquin River review
24 version, and the 2008 Long-Term Operational Criteria and Plan ("OCAP") Biological
25 Assessment version;

26 b. modeling code, data, and metadata for all BDCP and WaterFix versions; and

27 c. full version history and revision information for the BDCP and WaterFix model
28 versions, both released and unreleased, Delivery Reliability Report ("DRR") versions,

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1 and Review versions, including all version notes, all revision notes, and all change logs
2 with associated comments, all whether linked or separate.

3 **Response to Request Number 2:** DWR objects to this request, because it is
4 overbroad, seeks information duplicative of information already available through more
5 convenient, less burdensome, and less expensive methods, and constitutes an undue
6 burden and expense on DWR. Without waiving these objections, DWR provides the
7 following responses.

8 DWR has provided the CalSim modeling for BDCP, California Water Fix, the BA,
9 and the CPOD Hearing upon request. The CalSim models that have been provided
10 include the full model input, full model code (WRESL), and the full model output. The
11 CalSim user community has tried and uses version control standards on an individual
12 basis. Some projects choose to use standardized version control while other projects
13 choose to use the version control that is inherent with CalSim and the WRIMS code
14 language. The CalSim model code structure is arranged in a file-tree/directory structure.
15 The structure is easy to navigate and exploring the code is intuitive since it is assembled
16 in the same structure as seen in the Windows Explorer file browser. The CalSim models
17 are also relatively small in digital storage size and thus the full input and code are easily
18 shared. Model code changes are readily tracked by Differencing software such as CS
19 Diff. Thus the model versions are easily tracked using CS Diff. BDCP/California Water
20 Fix, and the BA used the inherent CalSim version control rather than a standardized
21 version. The Delivery Capability Report, however, used GIT for version control and it can
22 be found here: https://github.com/CVWRSM/cvwrsm/tree/master/wrims_v2/wrims_v2.

23 The model calculation engine behind CalSim is called WRIMS. The WRIMS engine
24 also uses the GIT version control system. The WRIMS version control can be found at:
25 https://github.com/CVWRSM/cvwrsm/tree/master/wrims_v2/wrims_v2.

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1 For 2.a:

2 DWR. CalSim II Simulation of Historical SWP-CVP Operations, Technical
3 Memorandum Report. November 2003

4 (http://baydeltaoffice.water.ca.gov/swpreliability/HistoricalSimulationReport_111203.pdf).

5 CALFED Science Program – California Water and Environmental Modeling Forum.

6 Review Panel Report, San Joaquin River Valley CalSim II Model Review. January 12,

7 2006 (http://science.calwater.ca.gov/pdf/calsim/calsim_II_final_report_011206.pdf); see

8 also the San Joaquin module described in the CalSim-II San Joaquin River Peer Review

9 Response, January 17, 2007, available at

10 http://www.usbr.gov/mp/mp700/modeling/calsim/calsim_rpt.pdf).

11 U.S. Department of the Interior (“DOI”). Central Valley Project and State Water

12 Project Operations Criteria and Plan Biological Assessment. May 2008. (available at:

13 http://www.usbr.gov/mp/cvo/OCAP/docs/OCAP_BA_2008.pdf).

14 See also the publications of the California Environmental and Water Modeling

15 Forum, available at <http://www.cwemf.org/Pubs/index.htm>.

16 For 2.b:

17 The modeling data provided on a hard drive on July 20, 2016 includes all of the
18 model data input and output for all the alternatives in the EIR/EIS, RDEIR/SDEIS, and
19 the BA. Model data input and output for the CPOD Hearing were provided to PCFFA/IFR
20 on May 24, 2016 and are available on the Board’s website:

21 [http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california](http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/water_right_petition.shtml)
22 [waterfix/water_right_petition.shtml](http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/water_right_petition.shtml) (see May 27, 2016 entry).

23 For 2.c:

24 BDCP version history was provided with the material provided in 2.b of this
25 request.

26 DCR (replaces DRR) version history is included at the following GitHub repository.

27 [<https://github.com/CalSimCallite>].

28

1 **Request Number 3:** BDCP and WaterFix CalSim II model run information relating
 2 to the specification of BDCP and WaterFix model runs, including all documentation,
 3 reports, analyses, presentations, notes, technical memoranda, and correspondence
 4 concerning model runs that were performed for each version, including:

- 5 a. current and future levels of development;
- 6 b. different assumptions of shifts in hydrology due to climate change;
- 7 c. different assumptions of sea level rise;
- 8 d. different regulatory assumptions;
- 9 e. different outflow assumptions, including West Delta, Spring, and Fall X2; and
- 10 f. different project operations assumptions, including different assumptions of
- 11 bypass flows at Hood, and flows at Vernalis.

12 To the extent copies of the model runs are not already provided in the copy of the
 13 root of the version control repositories, please also provide such copies.

14 **Response to Request Number 3:** DWR objects to this request, because it is
 15 overbroad, seeks information duplicative of information already available through more
 16 convenient, less burdensome, and less expensive methods, and constitutes an undue
 17 burden and expense on DWR. Without waiving these objections, DWR provides the
 18 following responses.

19 The information for BDCP and Water Fix is provided in the various draft and final
 20 documents. The modeling data provided on a hard drive on July 20, 2016 includes all of
 21 the model data input and output for all the alternatives in the EIR/EIS, RDEIR/SDEIS,
 22 and the BA. Model data input and output for the CPOD Hearing were provided to
 23 PCFFA/IFR on May 24, 2016 and are available on the Board's website:

24 [http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california](http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/water_right_petition.shtml)
 25 [waterfix/water_right_petition.shtml](http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/water_right_petition.shtml) (see May 27, 2016 entry).

26 **Request Number 4:** BDCP and WaterFix model version and model run
 27 comparison information, including, for each version and any model version it is derived
 28 from:

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- 1 a. all documentation, reports, notes, correspondence, and technical memoranda
2 relating to the specification of sensitivity analyses or output comparisons
3 between model versions and model runs, including quality assurance/quality
4 control comparisons; and
- 5 b. all spreadsheets, analyses, or other documents with results of sensitivity
6 analyses and output comparisons performed between different model versions
7 or model runs.

8 **Response to Request Number 4:** DWR incorporates the objections and
9 responses to Request Number 3 above as though fully set forth here.

10 **Request Number 5:** Relevant information on all hydrologic data inputs, water
11 demand data inputs and parameters, and operational parameters, including the most
12 recent documentation on hydrologic inputs and parameters for the CalSim II base model
13 versions used for production of CEQA/NEPA and Biological Assessment documents,
14 including but not limited to the following:

15 a. all documentation, analyses, spreadsheets, notes, technical memoranda, and
16 other information relating to the development and testing of hydrologic input for CalSim II
17 without climate change, including reservoir inflows and tributary stream flows through
18 2003 without climate change (with any analyses or comparisons with historical data) and
19 any input data developed for years since 2003 (with any analyses or comparisons with
20 historical data) (The same information for the climate change scenarios petitioners
21 apparently considered is requested in item 6 below.);

22 b. all documentation, analyses, notes, technical memoranda, and other information
23 relating to delivery logic, allocation modules, and export demand modeling, as well as
24 version history, testing and sensitivity analysis, and documentation of assumptions for
25 Central Valley Project ("CVP") Water Supply Index ("WSI") Demand Index ("DI") curves,
26 CVP delivery logic and Delivery-Carryover curve, State Water Project ("SWP") WSI-DI
27 curve, and SWP delivery logic and Delivery-Carryover curve;

28

1 c. version history, testing and sensitivity analyses, notes, technical memoranda,
2 and other information relating to model version values for all operational parameters
3 setting operations of the major reservoirs, including the Shasta, Trinity, Folsom, Oroville,
4 and San Luis rule curves, and assumed Trinity minimum flows;

5 d. spreadsheets and related information used by the CVP and SWP system
6 operators when setting actual deliveries and operations; and

7 e. optimization function version history, testing and sensitivity analyses, and
8 documentation of assumptions for the weight table on demand nodes and weights for
9 storage target zones on reservoirs.

10 To the extent that operating parameters were changed in the CalSim II operations
11 simulation presented for the WaterFix hearing, please provide all of the above for that
12 changed hearing version. Version history information included in version control systems
13 need only be provided once.

14 **Response to Request Number 5:** DWR incorporates the objections and
15 responses to Request Number 3 above as though fully set forth here.

16 **Request Number 6:** All reports, analyses, spreadsheets, presentations, technical
17 memoranda, notes, and other information relating to the detailed development of the
18 hydro logic input to CalSim II from the Q1-Q5 climate change scenarios, including
19 documentation of the assumptions of, and testing and sensitivity analyses for, the
20 downscaling algorithm and Variable Infiltration Capacity ("VIC") model used to develop
21 reservoir inflows.

22 **Response to Request Number 6:** DWR objects to this request, because it is
23 overbroad, seeks information duplicative of information already available through more
24 convenient, less burdensome, and less expensive methods, and constitutes an undue
25 burden and expense on DWR. Without waiving these objections, DWR provides the
26 following responses.

27
28

1 The information relating to the development of the hydrologic input to CalSim-II for
2 Q1-Q5 climate change scenarios is provided in the documents for the various draft and
3 final documents for BDCP and Water Fix. DWR will produce the VIC models.

4 **Request Number 7:** Other CalSim model documentation. A complete copy of all
5 documentation databases involved in the CalSim model must be provided, such that an
6 installation of the database utility would be able to access the database in an equivalent
7 manner as it is being used to conduct the modeling upon which petitioners rely. Names
8 and versions of the database utilities should be provided, as well as any administrative
9 passwords required to access the database files. The suggested format is as provided in
10 item 2, above. If the database utility is proprietary, a copy of that utility is also requested.
11 To the extent these databases do not contain all documents and information relating to
12 the CalSim II version used as a basis for the model results developed for the WaterFix
13 hearing, such documents and information are also requested. If complete information is
14 not available for that version, all relevant information is requested, including that for prior
15 versions. This includes, but is not limited to, the following components:

- 16 a. basic documentation such as variable tables, current node maps, and any mass
17 balance evaluation and error corrections, including those proposed for model
18 revisions;
- 19 b. documentation and notes for the simulation protocol and any scripts associated
20 with the simulation protocol, as well as copies of the scripts;
- 21 c. calibration, testing, field data, notes, analyses, error assessments and proposed
22 corrections, and documentation of the assumptions used for Sacramento Valley
23 Depletion Analysis Regions for diversions (including assumed demands for
24 each region by settlement contractors, agricultural users ("AG"), and
25 municipal/industrial users ("M&I") and the project/non-project split for each
26 demand), return flow calculations (including basin inefficiencies, non-
27 recoverable losses, and surface runoff), and groundwater (including assumed
28

- 1 demand, Central Valley Groundwater-Surface Water Model calibration
 2 information, and testing information);
- 3 d. refuge diversions (level 2 and level 4) and assumed return flows;
- 4 e. version history, documentation of assumptions, notes, field data, technical
 5 memoranda, and calibration information for Freeport, including the demands of
 6 the East Bay Municipal Utility District, the Contra Costa Water District, and
 7 Sacramento County; and
- 8 f. version history, calibration and testing information, field data, and
 9 documentation of assumptions for interior Delta flow splits, including the
 10 Sacramento River to Sutter and Steamboat Sloughs, and the Delta Cross
 11 Channel and Georgiana Slough, the San Joaquin River to Old and Middle
 12 River, and flow through Three Mile Slough, as well as Delta Island consumptive
 13 use;
- 14 g. version history, calibration and testing, field data, technical review, and
 15 documentation of assumptions for the most recent DSM2 model version used in
 16 calibration of the Delta salinity artificial neural network (including calibration at
 17 Jersey Point, Rock Slough, Emmaton, and Collinville); and
- 18 h. version history, calibration and testing information, field data, and
 19 documentation of assumptions for the Delta salinity artificial neural network and
 20 the X2 artificial neural network (including field data).

21 Version history information included in a version control system need only be
 22 provided once.

23 **Response to Request Number 7:** DWR objects to this request, because it is
 24 overbroad, seeks information duplicative of information already available through more
 25 convenient, less burdensome, and less expensive methods, and constitutes an undue
 26 burden and expense on DWR. Without waiving these objections, DWR provides the
 27 following responses.

28 The other CalSim-II model documentation links are:

- 1 1. DWR. Benchmark Studies Assumptions. CALFED/DWR/USBR Technical
2 Coordination Team. September 30, 2002. (available at
3 [http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSi](http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSim/Downloads/CalSi)
4 [mDownloads/CalSim-](http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSim/Downloads/CalSi)
5 [IIStudies/SWPReliability2002/Benchmark%20Assumptions%20and%20Appendi](http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSim/Downloads/CalSi)
6 [ces_100102.zip](http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSim/Downloads/CalSi)); see also the CalSim-II Benchmark Studies Downloads
7 website (available at
8 [http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSi](http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSim/Downloads/CalSi)
9 [mDownloads/CalSim-IIStudies/Benchmark/index.cfm](http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSim/Downloads/CalSi)).
- 10 2. DWR. CalSim-II SWP/CVP Supply and Operations Studies Downloads website
11 with studies dated 2002- 2015 (available at
12 [http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSi](http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSim/Downloads/CalSi)
13 [mDownloads/CalSim-IIStudies/index.cfm](http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSim/Downloads/CalSi)).
- 14 3. DWR. State Water Project Final Delivery Capability Report 2015. July 1, 2015.
15 (available at <https://msb.water.ca.gov/documents/86800/144575dd-0be1-4d2d->
16 [aeff-8d7a2a7b21e4](https://msb.water.ca.gov/documents/86800/144575dd-0be1-4d2d-)).
- 17 4. Draper, A. J., et al. (2004). CalSim: Generalized model for reservoir system
18 analysis. J. Water Resour. Plann. Manage., 130(6), 480–489 (copy will be
19 produced).
- 20 5. Islam, N., et al. (2010). CalLite: California Central Valley Water Management
21 Screening Model. J. Water Resour. Plann. Manage., 137(1), 123-133 (copy will
22 be produced).
- 23 6. California Bay Delta Authority Science Program, Association of Bay
24 Governments. A Strategic Review of CALSIM II and Its Use for Water Planning,
25 Management, and Operations in Central California. December 4, 2003
26 (available at
27 http://www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/daviswoodland/daviswoodland_cspa_es9.pdf).
- 28

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- 1 7. DWR. CalSim II Simulation of Historical SWP/CVP Operations, Technical
2 Memorandum Report. November 2003 (available at
3 http://baydeltaoffice.water.ca.gov/swpreliability/HistoricalSimulationReport_111
4 [203.pdf](http://baydeltaoffice.water.ca.gov/swpreliability/HistoricalSimulationReport_111)).
- 5 8. DWR. CalSim-II Model Sensitivity Analysis, Technical Memorandum Report.
6 October 2005 (available at
7 <http://baydeltaoffice.water.ca.gov/announcement/SensitivityStudyReport.pdf>).
- 8 9. DWR and Reclamation. Peer Review Response: A Report by
9 DWR/Reclamation in Reply to the Peer Review of the CalSim-II Model
10 Sponsored by the CALFED Science Program In December 2003. August 2004.
11 (available at
12 <http://baydeltaoffice.water.ca.gov/modeling/hydrology/Peer%20Review%20Res>
13 [ponse%20\(August%202004\).pdf](http://baydeltaoffice.water.ca.gov/modeling/hydrology/Peer%20Review%20Res)).
- 14 10. DOI. Central Valley Project and State Water Project Operations Criteria and
15 Plan Biological Assessment. May 2008 (available at
16 http://www.usbr.gov/mp/cvo/OCAP/docs/OCAP_BA_2008.pdf); see also
17 Appendix W to the BA, Sensitivity and Uncertainty Analysis (available at
18 http://www.usbr.gov/mp/cvo/OCAP/sep08_docs/Appendix_W.pdf).
- 19 11. Publications of the California Environmental and Water Modeling Forum, see
20 <http://www.cwemf.org/Pubs/index.htm>.
- 21 12. CalSim Documentation:
22 <http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSim/Documentation/in>
23 [dex.cfm](http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSim/Documentation/in); and
24 <http://baydeltaoffice.water.ca.gov/modeling/deltamodeling/models/dsm2/dsm2.c>
25 [fm](http://baydeltaoffice.water.ca.gov/modeling/deltamodeling/models/dsm2/dsm2.c) (see Version 8.0.4).

26 **Request Number 8:** Information on Reclamation Temperature Models that
27 includes:
28

- 1 a. all reports, technical memoranda, and CEQA document appendices listed in the
- 2 "References" section of Appendix H of the August 2008 OCAP Biological
- 3 Assessment;
- 4 b. all documentation for the Reclamation Temperature models and the
- 5 Sacramento River Water Quality Model ("SRWQM");
- 6 c. the validation data set for the SRWQM and all associated documentation,
- 7 reports, analyses, spreadsheets, presentations and technical memoranda, to
- 8 the extent they have not already been provided under parts a and/or b of this
- 9 section; and
- 10 d. the testing and calibration data sets for the Reclamation Temperature models
- 11 for Shasta, Keswick, and the upper Sacramento River, and all associated
- 12 documentation, reports, analyses, spreadsheets, presentations and technical
- 13 memoranda, to the extent they have not already been provided under parts a
- 14 and/or b of this section.

15 Also fish life cycle model development information that includes:

- 16 a. all information relating to development of petitioners' fish life cycle models for
- 17 the BDCP and WaterFix processes, including all data, spreadsheets, analyses,
- 18 notes, technical comments and other information relating to specification and
- 19 review of the models, including the modeling phases specified in item 1;
- 20 b. fish life cycle model version histories, in the same format as that specified in
- 21 item 2;
- 22 c. fish life cycle model run information, in particular all documents relating to the
- 23 specification of BDCP and WaterFix fish life cycle model runs, including
- 24 documents and correspondence relating to model runs that were performed for
- 25 each version, as well as copies of all model runs that are not included in item 9;
- 26 d. fish life cycle model version and model run comparison information, including all
- 27 sensitivity analyses and output comparisons between versions as specified in
- 28 item 4; and

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- 1 e. all available documentation, reports, and analyses of fish life cycle models,
2 including documentation of all model assumptions, scientific research, expert
3 opinion, testing, and field data used in the development of the models.

4 **Response to Request Number 8:** DWR objects to this request, because it is
5 overbroad, seeks information duplicative of information already available through more
6 convenient, less burdensome, and less expensive methods, and constitutes an undue
7 burden and expense on DWR. Without waiving these objections, DWR provides the
8 following responses.

9 DWR plans to produce responsive, non-privileged documents.

10 **Request Number 9:** Documents and other information regarding petitioners'
11 management of CalSim code development and maintenance, including current
12 information on DWR and Reclamation processes for the development and maintenance
13 of CalSim model versions and associated documentation, version control, quality
14 assurance / quality control, and testing and calibration information (both within the
15 agencies and with contractors). Please produce all documents which address the
16 following:

- 17 a. how source code is maintained, including the version control system;
18 b. what software and/or spreadsheets for viewing the model data are maintained,
19 and how they are maintained;
20 c. what notes are maintained, both linked to the code and separately, and how it is
21 maintained;
22 d. what information on model testing and calibration is maintained, both linked to
23 the code and separately, and how it is maintained;
24 e. what quality assurance and quality control information is maintained, and how it
25 is maintained; and
26 f. what information on known model errors and "bugs" is maintained, and how it is
27 maintained.
28

1 **Response to Request Number 9:** DWR incorporates the objections and
2 responses to Request Number 7 above as though fully set forth here.

3 **Request Number 10:** All documents that address procurement of the modeling for
4 the BDCP and WaterFix planning and regulatory processes, including:

- 5 a. all Memorandums of Understanding and other agreements with BDCP parties
6 that govern the procurement of BDCP and Water Fix CEQA and NEPA
7 documents, Biological Assessment documents, and WaterFix Hearing
8 documents, and the development and review of any computer modeling for
9 these processes;
- 10 b. all contracts with consulting firms - including, but not limited to CH2M Hill, ICF
11 International, and RBI Consulting- for preparation of hydrologic and
12 hydrodynamic modeling and fish life cycle models for these CEQA, NEPA,
13 Biological Assessment, and WaterFix processes;
- 14 c. a list of all documents, data, and computer models provided to consulting firms
15 for use in developing or refining the hydrologic and fish life cycle models for
16 these CEQA, NEPA, and Biological Assessment documents, including field
17 data, analyses of field data, computer models, and any testing or calibration
18 reports, and copies of such documents, data, and models, to the extent they are
19 not included in items 1-9;
- 20 d. all related Task Orders and Notices to Proceed.

21 **Response to Request Number 10:** DWR objects to this request, because it is
22 overbroad, seeks information duplicative of information already available through more
23 convenient, less burdensome, and less expensive methods, and constitutes an undue
24 burden and expense on DWR. Without waiving these objections, DWR provides the
25 following responses.

26 DWR will produce responsive, non-privileged documents.

27 **Request Number 11:** Documents or other information regarding external peer
28 reviews, including all documents and correspondence relating to external peer reviews of

1 the CalSim and DSM2 model versions. Please include all documents which address the
2 following:

- 3 a. all lists or spreadsheets of external peer reviews for validation;
- 4 b. all discussions of the need for external peer review or validation;
- 5 c. all discussions and specification of information released for external peer
6 reviews;
- 7 d. all reports from external peer reviews; and
- 8 e. all information relating to responses to external peer review, including complete
9 specification of model changes and corrections.

10 **Response to Request Number 11:** DWR objects to this request, because it is
11 overbroad, seeks information duplicative of information already available through more
12 convenient, less burdensome, and less expensive methods, and constitutes an undue
13 burden and expense on DWR. Without waiving these objections, DWR provides the
14 following responses.

- 15 1. Draper, A. J., et al. (2004). CalSim: Generalized model for reservoir system
16 analysis. J. Water Resour. Plann. Manage., 130(6), 480–489 (copy will be
17 produced).
- 18 2. California Bay Delta Authority Science Program Association of Bay
19 Governments. A Strategic Review of CALSIM II and Its Use for Water Planning,
20 Management, and Operations in Central California. December 4, 2003.
21 (available at
22 http://www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/daviswoodland/daviswoodland_cspa_es9.pdf).
- 23 3. DWR and Reclamation. Peer Review Response: A Report by
24 DWR/Reclamation in Reply to the Peer Review of the CalSim-II Model
25 Sponsored by the CALFED Science Program In December 2003. August 2004.
26 (available at
27

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1 [http://baydeltaoffice.water.ca.gov/modeling/hydrology/Peer%20Review%20Res](http://baydeltaoffice.water.ca.gov/modeling/hydrology/Peer%20Review%20Response%20(August%202004).pdf)
2 [ponse%20\(August%202004\).pdf](http://baydeltaoffice.water.ca.gov/modeling/hydrology/Peer%20Review%20Response%20(August%202004).pdf)).

3 4. DWR and Reclamation. CalSim-II San Joaquin River Peer Review Response.
4 January 17, 2007 (the OCAP models reflect the San Joaquin module described
5 in the report) (available at
6 http://www.usbr.gov/mp/mp700/modeling/calsim/calsim_rpt.pdf).
7 (http://www.usbr.gov/mp/mp700/modeling/calsim/calsim_rpt.pdf).

8 5. The DSM2 User Group website shows presentations on calibration (available at
9 <http://baydeltaoffice.water.ca.gov/modeling/deltamodeling/dsm2usersgroup>.
10 [cfm](http://baydeltaoffice.water.ca.gov/modeling/deltamodeling/dsm2usersgroup)).

11 6. Saracino & Mount, LLC. Panel Review of the Draft Bay Delta Conservation
12 Plan: Prepared for the Nature Conservancy and American Rivers. September
13 2013 (copy will be produced).

14 7. Jay Lund, et al. Analytical Tools for Evaluating the Water Supply,
15 Hydrodynamic, and Hydropower Effects of the Bay-Delta Plan. October 26,
16 2012 (available at
17 http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/d
18 [ocs/comments111312/jay_lund.pdf](http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/d)).

19 **Request Number 12:** Documents or other information regarding other internal and
20 external technical reviews, including all documents and correspondence relating to
21 internal or external technical review of the Cal Sim II model and its components. This
22 includes the following:

- 23 a. any lists or spreadsheets of technical reviews that were performed;
24 b. the Common Model Assumptions Package Review;
25 c. DWR and Reclamation's technical review of the modeling for the BDCP and
26 Water Fix;
27 d. information produced for each technical review;
28

- 1 e. any reports, analyses, spreadsheets, presentations, correspondence, and
2 technical memoranda from each technical review; and
3 f. any response to each technical review, including detailed specifications of
4 model changes and corrections.

5 **Response to Request Number 12:** DWR incorporates the objections and
6 responses to Request Numbers 1, 2, 7, and 11 above as though fully set forth here.

7 **Request Number 13:** Distribution policy documents for the above modeling,
8 including documents and correspondence relating to the distribution of CalSim II model
9 versions, except information currently published on open access websites with working
10 hyperlinks, including all documents relating to the following:

- 11 a. the Transparency Policy, as referenced in DWR's initial response to California
12 Water Research's request for modeling information;
13 b. external access (i.e., access by any person who is not employed by DWR,
14 Reclamation, or the California Natural Resources Agency) to or release of
15 model source code;
16 c. external access to or release of software or spreadsheets for viewing model
17 data;
18 d. external access to or release of model documentation;
19 e. external access to or release of model version control information;
20 f. external access to or release of model quality assurance and quality control
21 information; and
22 g. external access to or release of model testing and calibration information.

23 **Response to Request Number 13:** DWR objects to this request, because it is
24 overbroad, seeks information duplicative of information already available through more
25 convenient, less burdensome, and less expensive methods, and constitutes an undue
26 burden and expense on DWR. Without waiving these objections, DWR provides the
27 following responses.

28 CalSim does not have an official User Group.

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- 1. DWR. Annual Progress Reports to State Water Resources Control Board (available at <http://baydeltaoffice.water.ca.gov/modeling/deltamodeling/annualreports.cfm>).
- 2. DWR. DSM2 Users' Group. (available at <http://baydeltaoffice.water.ca.gov/modeling/deltamodeling/models/dsm2/dsm2.cfm>).

Request Number 14:

All documents which address the CVP/SWP Biological Opinion mandated revision of Reclamation's temperature model, including all documents which address the following:

- a. model errors and/or the need for revision of the model;
- b. all proposed revisions;
- c. the timeline for implementation of such revisions; and
- d. the timeline for release of the model.

Response to Request Number 14: DWR objects to this request, because it is overbroad, seeks information duplicative of information already available through more convenient, less burdensome, and less expensive methods, and constitutes an undue burden and expense on DWR. Without waiving these objections, DWR provides the following responses.

DWR will produce responsive, non-privileged documents.

Dated: July 29, 2016

CALIFORNIA DEPARTMENT OF WATER RESOURCES



Robin McGinnis
Office of the Chief Counsel

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The modeling documents and their analyses are contained in the various associated reports and studies and are publicly available for download on the California Water Fix website: <https://www.californiawaterfix.com/>.

Documents or other information regarding external peer reviews, including all documents and correspondence relating to external peer reviews of the CalSim and DSM2 model versions:

1. Draper, A. J., et al. (2004). CalSim: Generalized model for reservoir system analysis. *J. Water Resour. Plann. Manage.*, 130(6), 480–489.
2. California Bay Delta Authority Science Program Association of Bay Governments. A Strategic Review of CALSIM II and Its Use for Water Planning, Management, and Operations in Central California. December 4, 2003. (available at http://www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/daviswoodland/daviswoodland_cspa_es9.pdf).
3. California Department of Water Resources (“DWR”) and U.S. Bureau of Reclamation (“Reclamation”). Peer Review Response: A Report by DWR/Reclamation in Reply to the Peer Review of the CalSim-II Model Sponsored by the CALFED Science Program In December 2003. August 2004. (available at [http://baydeltaoffice.water.ca.gov/modeling/hydrology/Peer%20Review%20Response%20\(August%202004\).pdf](http://baydeltaoffice.water.ca.gov/modeling/hydrology/Peer%20Review%20Response%20(August%202004).pdf)).
4. DWR and Reclamation. CalSim-II San Joaquin River Peer Review Response. January 17, 2007 (the OCAP models reflect the San Joaquin module described in the report) (available at http://www.usbr.gov/mp/mp700/modeling/calsim/calsim_rpt.pdf).
(http://www.usbr.gov/mp/mp700/modeling/calsim/calsim_rpt.pdf).

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5. The DSM2 User Group website shows presentations on calibration (available at <http://baydeltaoffice.water.ca.gov/modeling/deltamodeling/dsm2usersgroup.cfm>).
6. Saracino & Mount, LLC. Panel Review of the Draft Bay Delta Conservation Plan: Prepared for the Nature Conservancy and American Rivers. September 2013 (copy will be produced).
7. Jay Lund, et al. Analytical Tools for Evaluating the Water Supply, Hydrodynamic, and Hydropower Effects of the Bay-Delta Plan. October 26, 2012 (available at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/comments111312/jay_lund.pdf).
8. See also the publications of the California Environmental and Water Modeling Forum, available at <http://www.cwemf.org/Pubs/index.htm>.

Related distribution policy documents:

1. DWR. Annual Progress Reports to State Water Resources Control Board (available at <http://baydeltaoffice.water.ca.gov/modeling/deltamodeling/annualreports.cfm>).
2. DWR. DSM2 Users' Group. (available at <http://baydeltaoffice.water.ca.gov/modeling/deltamodeling/models/dsm2/dsm2.cfm>).
3. DWR. CalSim II Simulation of Historical SWP-CVP Operations, Technical Memorandum Report. November 2003 (http://baydeltaoffice.water.ca.gov/swpreliability/HistoricalSimulationReport_111203.pdf).
4. CALFED Science Program – California Water and Environmental Modeling Forum. Review Panel Report, San Joaquin River Valley CalSim II Model Review. January 12, 2006 (http://science.calwater.ca.gov/pdf/calsim/calsim_II_final_report_011206.pdf; see also the San Joaquin module described in the CalSim-II San Joaquin River Peer

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Review Response, January 17, 2007, available at

http://www.usbr.gov/mp/mp700/modeling/calsim/calsim_rpt.pdf).

A WRESL language reference can be downloaded here:

<http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSim/Documentation/WreslLanguageReference.pdf>.

Model data input and output in the matter of DWR and Reclamation's Request for a Change in Point of Diversion for California Water Fix ("CPOD Hearing") as described in the written testimony is located on the Board's website:

http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/water_right_petition.shtml (see May 27, 2016 entry).

DWR has provided the CalSim modeling for the Bay Delta Conservation Plan ("BDCP"), California Water Fix, the BA, and the CPOD Hearing upon request. The CalSim models that have been provided include the full model input, full model code (WRESL), and the full model output. The CalSim user community has tried and uses version control standards on an individual basis. Some projects choose to use standardized version control while other projects choose to use the version control that is inherent with CalSim and the WRIMS code language. The CalSim model code structure is arranged in a file-tree/directory structure. The structure is easy to navigate and exploring the code is intuitive since it is assembled in the same structure as seen in the Windows Explorer file browser. The CalSim models are also relatively small in digital storage size and thus the full input and code are easily shared. Model code changes are readily tracked by Differencing software such as CS Diff. Thus the model versions are easily tracked using CS Diff. BDCP/California Water Fix, and the BA used the inherent CalSim version control rather than a standardized version. The Delivery Capability Report, however, used GIT for version control and it can be found here:

https://github.com/CVWRSM/cvwrsm/tree/master/wrims_v2/wrims_v2.

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The model calculation engine behind CalSim is called WRIMS. The WRIMS engine also uses the GIT version control system. The WRIMS version control can be found at: https://github.com/CVWRSM/cvwrsm/tree/master/wrims_v2/wrims_v2.

DCR (replaces DRR) version history is included at the following GitHub repository. [<https://github.com/CalSimCalLite>].

The information relating to the development of the hydrologic input to CalSim-II for Q1-Q5 climate change scenarios is provided in the documents for the various draft and final documents for BDCP and Water Fix.

Other CalSim-II model documentation links are:

1. DWR. Benchmark Studies Assumptions. CALFED/DWR/USBR Technical Coordination Team. September 30, 2002. (available at http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSim/Downloads/CalSimDownloads/CalSim-IIStudies/SWPReliability2002/Benchmark%20Assumptions%20and%20Appendices_100102.zip); see also the CalSim-II Benchmark Studies Downloads website (available at <http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSim/Downloads/CalSimDownloads/CalSim-IIStudies/Benchmark/index.cfm>).
2. DWR. CalSim-II SWP/CVP Supply and Operations Studies Downloads website with studies dated 2002- 2015 (available at <http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSim/Downloads/CalSimDownloads/CalSim-IIStudies/index.cfm>).
3. DWR. State Water Project Final Delivery Capability Report 2015. July 1, 2015. (available at <https://msb.water.ca.gov/documents/86800/144575dd-0be1-4d2d-aeff-8d7a2a7b21e4>).

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4. Draper, A. J., et al. (2004). CalSim: Generalized model for reservoir system analysis. *J. Water Resour. Plann. Manage.*, 130(6), 480–489.
5. Islam, N., et al. (2010). CalLite: California Central Valley Water Management Screening Model. *J. Water Resour. Plann. Manage.*, 137(1), 123-133.
6. California Bay Delta Authority Science Program, Association of Bay Governments. A Strategic Review of CALSIM II and Its Use for Water Planning, Management, and Operations in Central California. December 4, 2003 (available at http://www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/davis_woodland/daviswoodland_cspa_es9.pdf).
7. DWR. CalSim II Simulation of Historical SWP/CVP Operations, Technical Memorandum Report. November 2003 (available at http://baydeltaoffice.water.ca.gov/swpreliability/HistoricalSimulationReport_111203.pdf).
8. DWR. CalSim-II Model Sensitivity Analysis, Technical Memorandum Report. October 2005 (available at <http://baydeltaoffice.water.ca.gov/announcement/SensitivityStudyReport.pdf>).
9. DWR and Reclamation. Peer Review Response: A Report by DWR/Reclamation in Reply to the Peer Review of the CalSim-II Model Sponsored by the CALFED Science Program In December 2003. August 2004. (available at [http://baydeltaoffice.water.ca.gov/modeling/hydrology/Peer%20Review%20Response%20\(August%202004\).pdf](http://baydeltaoffice.water.ca.gov/modeling/hydrology/Peer%20Review%20Response%20(August%202004).pdf)).
10. DOI. Central Valley Project and State Water Project Operations Criteria and Plan Biological Assessment. May 2008 (available at http://www.usbr.gov/mp/cvo/OCAP/docs/OCAP_BA_2008.pdf); see also Appendix W to the BA, Sensitivity and Uncertainty Analysis (available at http://www.usbr.gov/mp/cvo/OCAP/sep08_docs/Appendix_W.pdf).

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11. Publications of the California Environmental and Water Modeling Forum, see

<http://www.cwemf.org/Pubs/index.htm>.

12. CalSim Documentation:

<http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSim/Documentation/index.cfm>; and

<http://baydeltaoffice.water.ca.gov/modeling/deltamodeling/models/dsm2/dsm2.cfm>

(see Version 8.0.4).

STATEMENT OF SERVICE

**CALIFORNIA WATERFIX PETITION HEARING
Department of Water Resources and U.S. Bureau of Reclamation (Petitioners)**

I hereby certify that I have this day submitted to the State Water Resources Control Board and caused a true and correct copy of the following document(s):

DWR'S RESPONSE TO VARIOUS FILINGS OF CALIFORNIA WATER RESEARCH

to be served by **Electronic Mail** (email) upon the parties listed in Table 1 of the **Current Service List** for the California WaterFix Petition Hearing, dated July 25, 2016, posted by the State Water Resources Control Board at

http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/service_list.shtml:

Note: In the event that any emails to any parties on the Current Service List are undeliverable, you must attempt to effectuate service using another method of service, if necessary, and submit another statement of service that describes any changes to the date and method of service for those parties.

For Petitioners Only:

	I caused a true and correct hard copy of the document(s) to be served by the following method of service to Suzanne Womack & Sheldon Moore, Clifton Court, L.P., 3619 Land Park Drive, Sacramento, CA 95818:
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	Method of Service: <u>U.S. Postal</u>
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I certify that the foregoing is true and correct and that this document was executed on August 1, 2016

Date

Signature: _____



Name: Valentina German

Title: Legal Analyst

Party/Affiliation: DWR

Address: 1416 Ninth Street 1104

Sacramento, CA 95814