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BEFORE THE  
  
STATE WATER RESOURCES CONTROL BOARD

In Re:  
  
Emmerson Investment Inc.  
  
Shasta River Tributary to Klamath River in  
Siskiyou County  
  
Proposed Revocation of Permits 19164 and  
19165 (Applications 26306 and 26307)

**WRITTEN TESTIMONY OF JULIE  
KELLEY, BIOLOGIST, EMMERSON  
INVESTMENT, INC.**

**DATE:** July 20, 2009  
**TIME:** 9:00 a.m.

I hold a bachelor's degree in Renewable Natural Resources from the University of California at Davis, California, which I was awarded in 1980. I have been employed by the Emmersons ("Emmerson") as a biologist for nearly 16 years. My duties have involved monitoring and assessing wildlife habitat on the extensive lands owned by Emmerson, including fish habitat in the streams that cross Emmerson property. The lower Shasta River below Dwinnell Reservoir crosses Emmerson's Hole-in-the-Ground Ranch ("Ranch"), and is within the scope of my duties.

As part of my duties and on behalf of Emmerson, I have been working cooperatively with the California Department of Fish and Game ("DFG") in developing Ranch-specific elements of a watershed-wide Coho salmon habitat program designed to improve Coho habitat and authorize Incidental Take Permits under the California and federal Endangered Species Act and to support a Streambed Alteration Agreement under California Fish and Game Code section 1600 requirements.

One aspect of this cooperative effort has been the improvement of fish passage at the Ranch's diversion points on the lower Shasta River. At the request of DFG, and with DFG funding through a grant to Montague Water Conservation District, the Ranch's diversion dams and orifice structures were replaced with rock weirs designed by DFG, which provide fish passage at points previously impeded by the diversion facilities. Documentation of DFG funding

1 of the rock weirs is presented in Exhibit 55. Exhibits 56 and 57 are DFG's design drawings of the  
2 rock weirs at the upper and lower Ranch diversions, respectively. The weirs were installed in  
3 2007 by Montague Water Conservation District personnel working with Pete Scala, the Ranch  
4 manager. To my knowledge, no "as-built" drawings were ever made. Exhibit 44 is a photograph  
5 of the rock weir at the Ranch's upper diversion, and Exhibit 46 is a photograph of the rock weir at  
6 the Ranch's lower point of diversion. Fish screens were installed to DFG specifications at each  
7 diversion point, as well, to allow an escape route for fish that become entrained in the diversions.

8 I have also, on behalf of the Ranch, been working with DFG on an irrigation efficiency  
9 study to optimize fish flows in the river while satisfying the Ranch's needs for irrigation water.  
10 That study is still on-going.

#### 11 **COMPUTATION OF DIVERSION OF SURPLUS WATER UNDER PERMITS**

12 In the course of the past several years, I have become familiar with the diversion records  
13 kept by the Watermaster for the lower Shasta River. I personally searched the Watermaster's  
14 offices and files for records of diversions prior to 2003; only those records submitted in this  
15 hearing as Exhibits 48, 49, 51, and 52 ("Watermaster's Records") could be located which have all  
16 of the information needed to compute the diversion of surplus water by the Ranch under the water  
17 right permits. I supervised the creation of spreadsheets, Exhibits 58, 59, and 60 that calculate the  
18 flow and diversion amounts for each diversion, by year, based on the measurements from the  
19 Watermaster's Records and methodology as described in the testimony of Keith Dick and Joe  
20 Scott. In summary, the calculations show that the Ranch has diverted as much as 607 afy under  
21 Permit 19164 (associated with the upper point of diversion) and as much as 674 afy under Permit  
22 19165 (associated with the lower point of diversion).

23 I understand that the Board staff needs records showing how much surplus water has been  
24 diverted at the Ranch's two permitted diversion points in order to issue a license for those rights.  
25 I further understand that those records are used both to confirm that full use of the water  
26 contemplated under the permits has been used, and to define the appropriate maximum diversion  
27 rate for a license.

28 Records developed by the Watermaster have been provided to the Board staff, but staff

1 have indicated that these records do not demonstrate the amounts of surplus water diverted under  
2 the permits. That position by the Board staff contradicts my understanding of those records,  
3 based on discussion with Watermaster personnel who have collected and recorded that data.  
4 Therefore, I have reviewed the available Watermaster records, in order to evaluate whether or not  
5 they document the Ranch's full use of water, and provide a basis to evaluate the maximum  
6 diversion rate. I have also analyzed the records for selected years in order to illustrate how they  
7 can be interpreted to yield the required information.

### 8 **General Overview of Interpretation of Watermaster Records**

9 The Watermaster measures the amount of water diverted at the Ranch's upper and lower  
10 diversion points. The Shasta River water diverted by the Ranch is derived from three sources:

- 11 1. Up to 2.5 cfs of water from Clear Spring that discharges between the  
12 Ranch's upper and lower diversions and can be diverted from the lower  
13 diversion, which are covered by an existing water right license held by the  
14 Ranch;
- 15 2. The portion of the stored water released from Dwinnell Reservoir that is  
16 available to the Ranch under the Shasta River decree; and
- 17 3. Surplus water which can be diverted based on water right permits numbers  
18 19164 and 19165. This water is largely related to reservoir seepage that  
19 occurs when Dwinnell Reservoir is about two-thirds full.

20 I understand that the Board staff particularly needs to know the amount of surplus water  
21 diverted at each diversion point, since that is the water which is covered by the permits. The  
22 diversion of surplus water is determined by evaluating how much stored water was diverted at  
23 each diversion point, and how much licensed spring water was diverted at the lower diversion  
24 point. The rate of diversion remaining after subtracting the available stored water and licensed  
25 spring water from the total rate of diversion represents the rate at which surplus water was  
26 diverted. Therefore, in order to evaluate the amount of surplus water diverted by the Ranch, the  
27 Watermaster also measures and records the amount of water released from Dwinnell Reservoir to  
28 meet the Ranch's water needs, and estimates that the licensed spring supply available at the lower

1 diversion is a constant 2 cfs.

2 The interpretation of these records can be illustrated by considering some specific  
3 measurements in the 2003 Watermaster records (Exhibit 48). For example, on April 20, 2003, the  
4 water elevation in the Parshall flume at the lower, pumped diversion is shown to be 0.62 feet  
5 (shown in the "GHT" column (Gauge Height) for April, below the heading "Elect. Pumps"). This  
6 reflects the average water elevation for that date as shown on the continuous record from the  
7 Stevens recorder. That gauge height was then converted to an average flow rate of 3.8 cfs for that  
8 day, based on the rating curve for that Parshall flume (shown in the "cfs" column for April, below  
9 the heading "Elect. Pumps"). As stated at the bottom of the page, one of the sources of water for  
10 this diversion was the 2 cfs of spring discharge under a water right license held by the ranch.  
11 Subtracting the 2 cfs spring flow from the 3.8 cfs total diversion leaves 1.8 cfs which may have  
12 been derived from either adjudicated water released from Lake Shastina or from surplus water.  
13 As noted at the very bottom of the page, however, "no stored water was used in April and May."  
14 Stored water constitutes the adjudicated water right, and if no stored water is used then there was  
15 no diversion of adjudicated water at that time. Therefore, the 1.8 cfs was diverted from surplus  
16 flows which the Watermaster determined were available at that time.

17 The interpretation of the April 20, 2003 measurements at the upstream gravity diversion is  
18 similar. The 0.70 foot water level (gauge height) was based on the average water level from the  
19 Stevens recorder record, and a flow rate of 4.6 cfs was determined using the rating curve for that  
20 Parshall flume. This diversion is upstream of the licensed 2 cfs springs, so the diverted water can  
21 only have come from either stored water or surplus water. Because no stored water was used in  
22 April and May, the 4.6 cfs diversion could only have been derived from surplus flows which the  
23 Watermaster determined were available at that time.

24 The Watermaster records show that stored water was first released from Dwinnell  
25 Reservoir on June 26, 2003. Therefore, all of the diversions shown for the upper gravity  
26 diversion through June 25 were from surplus water, while all but the licensed 2 cfs of the  
27 diversions shown for the lower pumped diversion through June 25 were from surplus water.

28 The diversions on June 30 illustrate a situation in which the diversions for the Ranch

1 included the use of both stored water and surplus water. As shown for that date, the amount  
2 diverted at the lower pumped diversion was 8 cfs, and after accounting for the estimated 2 cfs of  
3 licensed springflow, the total diversion of stored water and surplus water at the lower diversion  
4 point was 6 cfs. The amount of stored water and surplus water diverted at the upper gravity  
5 diversion was 4.4 cfs. Therefore, the total amount of stored and surplus water diverted by the  
6 Ranch was 10.4 cfs. The amount of stored water released for the Ranch on that day was 6 cfs,  
7 and the amount of surplus water determined available to the Ranch by the Watermaster for both  
8 of its diversions was 4.4 cfs (i.e., the 10.4 cfs diversion of stored and surplus water less the 6 cfs  
9 of stored water use).

10 The amount of surplus water diverted at each diversion cannot be segregated from the  
11 total diversion amount at that point of diversion (i.e., there is no measurement that the  
12 Watermaster can make which would identify how much of the surplus water is used at each  
13 diversion). Therefore, the split between each point of diversion should be based on reasonable  
14 assumptions as to the proper amount.

15 Finally, the diversions on September 15 illustrate a situation late in the diversion season,  
16 when surplus water is generally no longer present. The total diversion for the Ranch on that date  
17 was 8.8 cfs. After deducting the estimated licensed springflow of 2 cfs, the total diversion for the  
18 Ranch of stored water and surplus water was 6.8 cfs. The 6.8 cfs diversion of stored water and  
19 surplus water is less than the 8 cfs release of stored water, which shows that no surplus water was  
20 diverted on that date.

## 21 **EVALUATION OF WATERMASTER RECORDS FOR SELECTED YEARS**

22 In order to further evaluate the Ranch's use of water under the permits, I computed the  
23 Ranch's diversion of surplus water on a daily basis for years 2003, 2005, and 2007, based on the  
24 available Watermaster records. The Watermaster records used are for 2003 (Exhibit 48), 2005  
25 (Exhibit 49), and 2007 (Exhibit 52). The records for each of these years include the daily rate of  
26 diversion at both the upper and lower diversion points. The records for 2003 and 2007 also  
27 include the daily rate of release of stored water for the Ranch, while the record for 2005 defines  
28 the days early in the season during which no stored water was released.

1 The records were evaluated using a spreadsheet analysis for each year considered, which  
2 were developed under my supervision. The analysis for 2003 is presented in Exhibit 58, the  
3 analysis for 2005 is presented in Exhibit59, and the analysis for 2007 is presented in Exhibit 60.  
4 The sources of data and the specific computations used in the spreadsheet are documented on the  
5 last page of each exhibit. Those equations supplement the written description of the spreadsheet  
6 analysis provided in this testimony.

7 While the evaluation of the records can at times be complicated, for most days of the  
8 diversion season the evaluation is relatively simple. In years in which surplus water is available,  
9 stored water is generally not released until mid- to late-June, and prior to that time all of the water  
10 diverted at the upper diversion is often surplus water, and at the lower diversion all but the 2 cfs  
11 provided from the licenses springflow is surplus water. By July and later, there is generally not  
12 significant amounts of surplus water available, so that essentially all of the water diverted at both  
13 the upper and lower diversions during those months is stored water. This pattern of diversion  
14 benefits the Ranch by preserving its stored water for use later in the season, when surplus water is  
15 not available.

16 Although not tested scientifically, the preservation of stored water in Dwinnell Reservoir  
17 may also benefit the fishery. Maintaining storage in Dwinnell Reservoir helps to preserve flows  
18 in the Shasta River in the late summer. Also, the greater storage in the late summer should result  
19 in cooler water available later into the irrigation season.

20 **MONTHLY DIVERSION OF SURPLUS WATER WITHIN MAXIMUM PERMITTED**  
21 **DIVERSION RATE**

22 The cumulative monthly diversions of surplus water within the maximum permit diversion  
23 rates for 2003, 2005, and 2007 are summarized in the tabulation below. It shows that the full use  
24 was made of surplus water for the upper diversions in both 2003 and 2005, where the 560 and 607  
25 acre-foot diversion amounts exceed the permit “face value” amount of 400 acre-feet per year. At  
26 the lower point of diversion, substantial diversion of supplemental water has been made in 2003  
27 (674 acre-feet, more than 75 percent of the 800 acre-foot “face value” for the permit), and in 2005  
28 (404 acre-feet).

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Cumulative Monthly Diversion of Surplus Water Within the Permits in Acre-Feet

Month	2003		2005		2007	
	Lower Diversion	Upper Diversion	Lower Diversion	Upper Diversion	Lower Diversion	Upper Diversion
April	134	164	74	161	41	0
May	260	341	288	373	94	1
June	613	560	404	607	94	1
July	619	560	404	607	94	1
August	642	560	404	607	94	1
September	674	560	404	607	94	1
Permit Face Value	800	400	800	400	800	400