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BEFORE THE
STATE WATER RESOURCES CONTROL BOARD

In the Matter of:
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 KEITHAL
DICK, DEPARTMENT OF WATER
RESOURCES WATERMASTER
(RETIRED)**

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

12 I am a retired employee of the California Department of Water Resources. I have worked
13 for the Department since 1952. My job duties have always involved measuring flows in
14 California streams, and through my long experience I have developed the ability to estimate flow
15 rates accurately in streams with as little as one cubic foot per second (cfs) of flow. I began
16 working as a Watermaster for the Department in 1980, and began working as a Watermaster on
17 the lower Shasta River (the portion below Dwinnell Reservoir) in about 1985 or 1986. I officially
18 retired in 1991, but continue to work for the Department as an annuitant. I served as a
19 Watermaster on the Shasta River every year from 1991 through about 2005, and sporadically
20 since then. I am very familiar with the conditions on the Shasta River, the diversions and the
21 operation of the Shasta River.

22 As a Department of Water Resources Watermaster, my job is to implement water decrees
23 or orders issued by a court or the State Water Resources Control Board. My principal duty as a
24 Watermaster is ensuring that each water user under the applicable decree takes only what the user
25 is entitled to divert. I do this by setting diversion rates at water diversion headgates and keeping
26 records of the amounts of water taken. My other duties include measuring water flow on creeks
27 subject to the water rights decree and helping to informally resolve disputes. I maintain a
28 detailed, daily log book of the flows I measure and the diversion adjustments I make. I visit

1 diversions along the Shasta River at least once a week during the irrigation season, (April 1
2 through October 31) and occasionally before and after the season as irrigation conditions may
3 require.

4 **OVERVIEW OF THE LOWER SHASTA RIVER**

5 On the portion of the Shasta River including the Points of Diversion for Permits 19164
6 and 19165, the applicable decree is the Shasta River Adjudication and Decree, No. 7035, entered
7 by the Siskiyou County Superior Court on December 30, 1932, and recorded in the County of
8 Siskiyou Judgment Book 12, page 189 (“water rights Decree” or “Decree”). The Decree governs
9 the distribution of water stored in Dwinnell Reservoir. Exhibit 47 is a map showing the portions
10 of the Lower Shasta River subject to the Decree in the vicinity of the points of diversion for
11 Permit Nos. 19164 and 19165.

12 As Watermaster for the lower Shasta River, I control the distribution of water to those
13 parties with rights adjudicated under the Decree. I also control the distribution of water to those
14 parties with post-Decree permitted rights, including Permit Nos. 19164 and 19165. I control and
15 operate the headgates and related facilities that release water from Dwinnell Reservoir into the
16 lower Shasta River. As a general rule, I also control and operate the individual diversion facilities
17 of adjudicated and permitted rights holders downstream. My operation of the Shasta River is
18 complicated in that the Watermaster does not control the diversion of water by riparian water
19 rights holders, because those rights were not adjudicated in the Decree.

20 One of my responsibilities as Watermaster on the lower Shasta River is to determine when
21 there is water which is “surplus” to the adjudicated water rights. As Watermaster, I must identify
22 surplus water in a manner consistent with the water rights Decree, but otherwise the
23 determination is at my discretion.

24 In general, surplus water in the lower Shasta River includes spring flow contributions to
25 the lower Shasta River, and water which is spilled from Dwinnell Reservoir (i.e., water which has
26 not been stored in Dwinnell Reservoir, but rather is released as soon as it enters the reservoir).
27 The exception is that, beginning in about May of each year, when the flow at the Shasta River
28 near Montague Gauge (“Montague Gauge”) is less than around 25 to 30 cfs, the spring flows and

1 spills from Dwinnell Reservoir may be needed to meet adjudicated water rights of users located
2 downstream of the Montague Gauge; in such circumstances these contributions are no longer
3 considered surplus water. The 25 to 30 cfs threshold for surplus water includes a 5 to 10 cfs
4 “safety margin” to ensure that downstream adjudicated water rights are protected. In other words,
5 the actual critical flow at the Montague Gauge is 20 cfs, but I generally use 25 to 30 cfs as the
6 criteria for surplus water because it can take about 24 to 30 hours for changes in releases from
7 Dwinnell Reservoir to be reflected in the flow at the Montague Gauge. The 5 to 10 cfs “cushion”
8 provides that the lead time will not affect downstream rights holders or other water uses.

9 In my experience, seepage from Dwinnell Reservoir appears to be a significant contributor
10 to springs located just below the dam, which are a source of surplus water in the Shasta River.
11 There are consistent and substantial discharges from springs, and therefore surplus water in the
12 river, whenever Dwinnell Reservoir is at or above about 65 percent of its full capacity. During
13 my tenure as Watermaster, surplus water has been available in most years, but not all years.
14 During those years when surplus water is available, it is usually available up through about June
15 15 at the latest.

16 Besides the flows at the Montague Gauge, I apply an additional criterion for determining
17 whether there is surplus water available for use at the Hole-in-the-Ground Ranch. Because that
18 Ranch is near the upstream end of the lower Shasta River, where flows are largely dependant on
19 the amount of water stored behind the dam and the related spring flows just below the dam, I do
20 not consider surplus water to be available for diversion by the Ranch when the flows at the lower
21 (downstream) of the Ranches’ two permitted diversion facilities drops below about 2 cfs.

22 The Watermaster season on the lower Shasta River is generally from around April 1
23 through October 30, but may begin earlier if a diversion is requested by a water user on the river.
24 I typically notify the water right holders early in the year of the probable availability of water in
25 the upcoming year, which assists the rights holders in planning their operations. In my
26 experience, Ranch operations along the lower Shasta River generally try to maximize use of
27 surplus water during the early portion of the irrigation season in order to preserve the adjudicated
28 water stored in Dwinnell Reservoir for use later in the year.

1 As a general rule, as the Watermaster, I control and operate all diversion works for those
2 with adjudicated or permitted water rights. The process of operating a diversion is typically
3 initiated by a water right holder contacting me and requesting that water be diverted. I then
4 evaluate the conditions on the River, and determine if the diversion can be made using surplus
5 water, or if the diversion will require the release of water from Dwinnell Reservoir. I then open
6 the rights holder's gates at the appropriate time to allow diversion of the surplus or released
7 water. As part of this process, I let the right holder know whether the delivery will be made using
8 stored water, surplus water, or a mix of stored and surplus water. This means that the water rights
9 holder is responsible to schedule his or her water stored in Dwinnell Reservoir to best meet their
10 water requirements for the year. If neither stored water nor surplus water is available, then I will
11 not divert water for the right holder.

12 When there is not enough surplus water to satisfy downstream rights, I make releases of
13 stored water from Dwinnell Reservoir through the Montague Water Conservation District canal
14 that originates at the Dam. About 100 feet downstream from the dam, I can make releases from
15 headgates located in Montague's canal into the "Cross Canal," which discharges into the Shasta
16 River above the Ranch's diversion points.

17 At the end of the diversion period, the water rights holder or I may close the diversion
18 headgate. If the water rights holder closes the diversion headgate, they typically notify me right
19 away. Regardless of who closes the diversion gate, I keep and maintain accurate records of the
20 adjudicated water released and remaining in each water right holder's allocation.

21 **OPERATION OF DIVERSIONS FOR THE HOLE-IN-THE-GROUND RANCH**

22 In my experience, the operation of the Hole-in-the-Ground Ranch ("Ranch") diversions is
23 similar to the operation of other irrigation diversions on the lower Shasta River. The one
24 complicating factor for the Ranch's diversions is that the same diversion facilities are used to
25 divert both stored water rights, and surplus water diverted under Permit Nos. 19164 and 19165. .
26 The diversion points for Permits Nos. 19164 and 19165 are, respectively, Diversions Nos. 165
27 and 166 under the Shasta River Decree. They are also sometimes respectively referred to as the
28 "upper" and "lower" diversions on the Hole in the Ground Ranch and also sometimes the

1 “gravity” diversion and the “pumped diversion.” During the time that I have worked on the lower
2 Shasta River, the Watermaster has always operated the gates for the Ranch diversions, and has
3 also measured and recorded information about the flows at these diversions.

4 Near the beginning of the diversion season, I typically inform the Ranch manager of the
5 expected availability of water, in order to allow the Ranch to plan its operations for the year. The
6 Ranch then contacts me to request that water be diverted, and I then determine if all or a portion
7 of the diversion request can be met with surplus water, and inform the Ranch manager of that
8 determination. As described above, my determination of the availability of surplus water to serve
9 the Ranch’s diversions depends both on a minimum of around 25 to 30 cfs flows at the Montague
10 Gauge, and a minimum of around 2 cfs flows past the Ranch’s lower diversion. Even if flows
11 were high at the Gauge, I would not allow diversion of surplus water if flows were not around 2
12 cfs or more at the Ranch’s lower diversion.

13 The Ranch has had a fairly consistent schedule of diversions during my time on the lower
14 Shasta River. The schedule is generally similar to other irrigators in the area, although the Ranch
15 tends to begin irrigation a little later than some others on the river.

16 As the diversion season continues, the Ranch will continue to contact me in order to
17 request releases from the dam and diversions at the Ranch. These requests are typically made at
18 least one day in advance, usually more. The advance notification of diversions is needed to allow
19 time for releases from Dwinnell Reservoir to reach the Ranch’s diversions. It takes about 12
20 hours for water released from Dwinnell Reservoir to reach the Ranch.

21 In addition to the adjudicated rights and the surplus rights under Permit Nos. 19164 and
22 19165, the Ranch also holds a licensed appropriative right to as much as 2.5 cfs to Clear Springs,
23 which drain into the Shasta River below the upper diversion, early in the season, generally during
24 the same period in which surplus water is available. During such periods, I credit the Ranch’s
25 lower diversion with 2 or 2.5 cfs of flow to reflect the contribution from these springs to the
26 Shasta River.

27 In operating the lower Shasta River, I evaluate the availability of surplus water on a
28 frequent basis, not just when the diversion gates are operated. I periodically check the stream

1 flow and diversion rates at the Ranch's diversions. Based on the conditions at the Montague
2 Gauge and at the Ranch's diversions, I make a judgment if additional stored water needs to be
3 released to support those diversions. Typically, as the irrigation season continues, surplus water
4 declines over time, so that the releases of stored water need to be increased to maintain a given
5 diversion rate. The relationship between the total diversion amount by the Ranch and the release
6 of stored water provides a measure of the use of surplus water.

7 Based on my long experience in operating the lower Shasta River, I have a good general
8 understanding of when surplus water is typically available, and what conditions contribute to that
9 availability. The main influence on the amount of surplus water in the uppermost reaches of the
10 Shasta River is the level of Dwinnell Reservoir. When the Lake is about 65% full or more, there
11 are typically large flows in the nearby springs below Dwinnell Dam and plentiful surplus water.
12 When Dwinnell Reservoir drops below that level, the surplus water can drop off quickly. Also in
13 my experience, surplus water occurs from March to June, and is not available later in the year.

14 When at the Ranch's diversions, I also have the opportunity to observe the facilities used
15 to check the water levels for the diversion. These facilities have changed significantly over the
16 time that I have been involved with these diversions. When I first arrived, the diversion dam or
17 "check" was an earthen dam with pipes that allowed the Shasta River flows to pass through the
18 diversion dam. Flashboards were placed vertically over the pipe discharging through the dam,
19 with bypass flows occurring in spaces between the boards. In my experience, the gaps between
20 the vertical flashboards, combined with the general seepage from the diversion facilities, always
21 maintained at least one cfs bypass flows at the diversion facilities.

22 Later, the Ranch's diversions were converted to using horizontal flash boards instead of
23 the vertical ones, and featured a cut notch to ensure bypass of at least one cfs. While not
24 technically part of my official duties as Watermaster, I would check that the notch was not
25 plugged when I visited these diversions, and I impressed on the Ranch staff that they also needed
26 to check for obstructions and clear them if necessary. Based on my experience in observing and
27 measuring flows, the cut notch in the horizontal flashboard, combined with the general seepage
28 from the diversion facilities, always maintained at least one cfs bypass flows at the diversion

1 facilities.

2 **FLOW MEASUREMENTS AND RECORD KEEPING**

3 When I began work on the lower Shasta River around 1985 or 1986, the Parshall flumes
4 used to measure diversions at the Ranch were already in place. Provision was also already made
5 at each diversion for installation of a recorder for the flume. In my experience, Stevens f-
6 recorders were installed each year, in order to provide the records of diversion by the Ranch
7 which we understood were required for under the permits for surplus water.

8 The Stevens recorder produces a record of water levels at the flume. Those water levels
9 can then be related to the flow through the flume, using standard rating tables published by the
10 U.S. Bureau of Reclamation. In addition to information on the daily diversion rates, the records I
11 maintained included information about releases of stored water from Dwinnell Reservoir to the
12 Shasta River, which is used to define whether the diversions by the Ranch are of adjudicated
13 water, surplus water, or a combination of both.

14 I have been aware of the need for records to document diversions for the Ranch at each
15 diversion point as part of the Ranch water rights permits since about 1991, and that those records
16 need to document how much of the water diverted was surplus water. From the time that I first
17 became aware of this specific record-keeping need, a Stevens recorder has been used to develop a
18 continuous record for both of the Ranches diversions. Those records have been used to document
19 the daily average diversion rates at each diversion. I also maintained a daily record of the stored
20 water released from storage to serve the Ranch. The amount of surplus water used by the ranch
21 on a daily basis can then be computed from those records by:

- 22 1. Determining the total amount of water diverted at the two Ranch
23 diversions;
- 24 2. Subtracting the amount of water released from storage for delivery to the
25 Ranch; and
- 26 3. If there was surplus water available to the Ranch, subtracting 2 or 2.5 cfs
27 to account for the Seldom Seen spring flow rights held by the Ranch,
28 which is diverted at the lower pumped diversion.

27 The resulting amount is the amount of surplus water delivered that day.

28 These records were collected and recorded in the same manner throughout this period, and

1 are maintained in the same way today. However, I have been unable to locate any of those
2 records for 2002 or earlier years.

3 The handwritten records I prepared for 2003 (attached as Exhibit 48) were the earliest
4 records that I was able to locate. Also, Exhibit 49 contains a spreadsheet showing the summary
5 of the diversion records for 2005.

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