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Rebuttal:

Dale C. Bugenig and Mary L. Tumbusch Report
"Analysis in Support of Protests to "Mitigation" Applications
81825, 82570, 82571, 82572 and 82573
and 81719, 81720 and 82269" dated September 13, 2013
Prepared for Eureka County, Nevada and Etcheverry Family Limited
Partnership"

Response by:

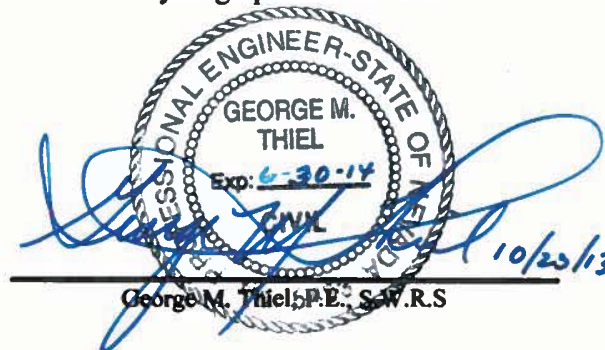
George M. Thiel, P.E., S.W.R.S
Principal Engineer
Thiel Engineering and Associates, Inc.

Prepared on the behalf of:

Daniel Venturacci

Concerning:

Applications 81825, 82570, 82571, 82572 and 82573,
Mitigation Filings, Diamond Valley, Nevada
Hydrographic Basin 153



September 26, 2013

This report was prepared by George M. Thiel, P.E., S.W.R.S., in response to the report written by Bugenig and Tumbusch on behalf of Eureka County and the Etcheverry Family Limited Partnership. The primary requisite in this analysis is the determination of two premises as brought forward in Basin Order 1226, those two items are summarized as follows:

1. The determination of the impact of senior water rights by junior water right appropriations;
2. The determination of the extent of evidence necessary to issue appropriations for mitigation of the senior water rights.

The Office of the State Engineer has the regulatory responsibility to protect senior water rights as a premise to one of their responsibilities to a water rights holder within the State of Nevada. As provided in NRS 533.085:

NRS 533.085 Vested rights to water not impaired.

1. Nothing contained in this chapter shall impair the vested right of any person to the use of water, nor shall the right of any person to take and use water be impaired or affected by any of the provisions of this chapter where appropriations have been initiated in accordance with law prior to March 22, 1913.

2. Any and all appropriations based upon applications and permits on file in the Office of the State Engineer on March 22, 1913, shall be perfected in accordance with the laws in force at the time of their filing.

The evidence is overwhelming within the records of the office of the State Engineer that the over appropriation and the continued overpumping within the groundwater basin has affected the springs and discharge sources of the ranches surrounding the playa area to the extent where the springs associated with the Thompson, Cox and Ranches no longer exist. For many years the senior water right appropriators have requested the protection of these resources and mostly, these cries for relief have not been responded to by the junior appropriators nor the office of the State Engineer.

There is no question that these spring sources are derived from groundwater sources that flow through the basin and historically discharged within this area, the gradient of flow and the determination of the discharge area has been estimated. Unfortunately, there has been a lack of data with regard to these discharge areas other than identification of some of the spring sources that discharge warm water within the northern part of the basin. The measurements on the Thompson Ranch have been limited to one point of measurement even though the source of supply for these measurements were derived from three points of discharge. Also many other springs and seeps existed on the ranch that were never inventoried that supplied water to a vast amount of acreage in the discharge area. The historical records are replete with evidence of culture, and as well aerial photographs provide evidence as to the extent of cultivation on the subject lands. Diamond Springs which was located near the Cox Ranch has long since gone dry even though the historical record recognized its existence. Several unnamed springs that watered the Ranch have also gone dry. The larger springs are clearly marked on historic topographic maps (1955 Quadrangle Map), Rectangular Surveys, and other historic records.

It was not until pumping had started and the initial Desert Land Entries (DLE's) were issued that notice was brought forth that the junior appropriators may have impact upon senior water right holders within the groundwater basin, unfortunately, to a great extent the warnings of the USGS went mostly ignored and appropriations were continued to be granted.

With regard to the protests by Eureka and the Etcheverry Family Limited Partnership, Eureka County did not request that the State Engineer deny application 81825, but requested that the permit

be *“issued subject to Eureka County’s protest points and only to supplement the yet to be established decline in flow.”* Etcheverry requested denial of the application. The rest of the filings by all parties requested denial of the other mitigation permit requests.

The following represents that review of the report prepared by Bugenig and Tumbusch (BT Report). It also appears that Mr. Tibbets with Eureka County will also provide his interpretation of Climate Change, although there is very little data within this report to support this preposition and his testimony is relatively unclear at this point.

In the following pages I have reviewed this report and provided clarification of the issue by providing responses to the various sections of their analysis.

In this section I had the opportunity to be present at the hearing held on January 23, 2013 and to review the BT Report. I found a contrast of findings prepared by Mr. Bugenig and his testimony of at the January hearing. At the time of the hearing, which was established by the office of the State Engineer, to receive testimony relative to order 1226, Mr. Bugenig provided testimony regarding the development of geothermal sources which was part of the proposed order, due to Mr. Bugenig's testimony or perhaps reasoning by the State Engineer removed the provision allowing appropriation for the development of the geothermal resource in Diamond Valley. In the testimony Mr. Bugenig qualified that geothermal waters are those that have temperatures within a certain range. Perhaps, Mr. Bugenig was unaware that the temperature variation he provided earmarked the spring sources within the discharge area under ownership by Mr. Venturacci have temperatures greater than 68 degrees, which was the low end of qualification. By either mistake or by direct assertion of his knowledge of the basin he stated that the groundwater sources to the north are directly impacted by pumping to the south of the basin, withdrawals that have a direct impact on senior vested water rights within the groundwater basin. Those excerpts and review are provided as follows:

Summary Review:

Testimony by Mr. Dale C. Bugenig at the January 23, 2013 Hearing held in Eureka County, concerning designation order 1226, commencing on page 54 of the official transcript:

Certain areas of the text has been highlighted for emphasis predicated upon previous testimony presented to be used in context of the report prepared by Mr. Bugenig and Ms. Tunbusch:

pg 54 and 55:

THE HEARING OFFICER: Okay. Are you for or against?

DALE BUGENIG: **I would say I am for the concept of the Order, and that is to deny any new groundwater appropriations.**

I do have some issues with the exception, and I appreciate some of the comments from Mr. King today because he's sort of given us insight into some of the details and thought processes behind these exceptions.

Pg 56:

DALE BUGENIG: My name is Dale Bugenig. I am a hydrogeologist in private practice with a residence and office in the town of Eureka. For the record, my comments represent my personal viewpoint and may not represent the views of my clients here in Eureka County. I am a Eureka County taxpayer, and the source of water supply to my residence comes from the Diamond Valley aquifer. As such, I am a stakeholder in the proper management of the water resources of the basin.

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DALE BUGENIG: For the past several years, my practice has focused on management of water resources of Eureka County, including Diamond Valley, and includes work related to the preparation of Eureka County water resources master plan.

My reviewing evaluations of many published and unpublished reports, data, and information, plus my own investigations, provides me with increments for professional knowledge of the basin's water resources.

This local knowledge is complimented by more than 35 years as a consulting hydrogeologist. Because I have a personal stake in a sustainable water supply to my Eureka residence, and because my professional ethos demands sustainable water resource development, I feel compelled to comment on the Proposed Order, in particular, the exception related to appropriations from the geothermal aquifer.

My professional experience includes firsthand involvement with the exploitation of low to moderate temperature geothermal aquifers, and these are aquifers that have temperatures of 68 to 302 degrees Fahrenheit. That's a definition that's out there in the literature. This work has been completed in Montana, Oregon, California, and Nevada,

(Note that the Taft/Thompson Springs including wells in the vicinity are within this temperature range and above 68 degrees)

Continuing on page 58:

going back more than 30 years.

In my experience, there is continuity between non-thermal and geothermal aquifers. In fact, it is often difficult to show any distinction, other than temperature, because it may simply represent a different facies, f-a-c-i-e-s, of a single flow system. As a result, exploitation of a geothermal resource has a real potential to impair a non-thermal resource and vice versa.

The geothermal industry often downplays this reality to their advantage, so I presented a paper at an international geothermal energy symposium in 1990 in an attempt to shed light on certain impediments to resource development arising from the interconnections of geothermal and non-thermal aquifers. The problem, as I see it, with the proposed geothermal exemption to do groundwater appropriations in

Diamond Valley arises from the fact that some of the ag wells already exploit what is correctly defined as a low to moderate temperature geothermal aquifer.

These geothermal ag wells in virtually every well west, east, and south of the playa are part of a hydrogeologic continuum and are clearly being influenced by the grossly over appropriated resource and the historical absence of serious efforts to promote a sustainable use of groundwater resources in the basin. The most obvious and negative impact is the observed water level decline. Wells in the basin are

Continuing on Page 59:

progressively being deepened at alarming cost to the appropriators. Unfortunately, many of the newer, deeper wells seem to indicate the effective bottom of the aquifer is shallower than many people had hoped.

A primary tenant of Nevada water law is the concept of perennial yield, and a sustainable water supply in the basin cannot consume more than the perennial yield. Numerous rulings by the Nevada State Engineer and opinions by the courts in Nevada describe the perennial yield of the basin as the amount of groundwater discharge that can effectively be captured by wells.

Unfortunately, the predecessors to the current State Engineer allowed the appropriation of vastly more groundwater rights in the valley than the estimate of perennial yield no more than 50 years ago. In effect, the Division of Water Resources facilitated the appropriation of the transitional storage of the basin without regard to the perennial yield. Perhaps this was a practical, good, short-term strategy because it accelerated the capture of the natural discharge from the groundwater flow system, which is the goal and end result of groundwater resource exploitation.

Page 62:

DALE BUGENIG: So, you know, it would be nice if we could be real precise to call that what it is. It's -- let's talk about this. It's perhaps an interceptor well. But I don't think there's any reason to give them any kind of a new well, because the record clearly shows that all these wells in Diamond Valley, if you want to call those induction wells,

these are induction wells, too, because they're capturing the groundwater discharge.

Page 63:

JASON KING: Mr. Bugenig, so I heard you loud and clear about your concerns with geothermal. Would it be your — I guess, based on your experience and your expertise, that you could not appropriate any geothermal water in Diamond Valley with — without, I guess, inducing flows from the colder water source into that and having an impact on it?

DALE BUGENIG: Well, we're not aware of a geothermal aquifer in Diamond Valley that's not connected and not part of the hydrologic continuum which is the alluvial aquifer that's exploited by everyone in Diamond Valley. So, you know, if there were one and it could be demonstrated through peer-review science that it is, in fact, different and no impact to the alluvium, then, you know, like everything else, if you can demonstrate it, that's okay. But my concern is, is — is that these slightly elevated temperatures here in the valley constitute a geothermal aquifer that's already being used by the irrigators. So, to exempt — to exempt anyone else tapping that same resource, I don't — I think it's not in the spirit of the Order.

Comments:

In Mr. Bugenig's testimony, based upon his technical experience, review and vast knowledge of the basin testified the following:

1. "My professional experience includes firsthand involvement with the exploitation of low to moderate temperature geothermal aquifers, and these are aquifers that have temperatures of 68 to 302 degrees Fahrenheit."
2. "In my experience, there is continuity between non-thermal and geothermal aquifers. In fact, it is often difficult to show any distinction, other than temperature, because it may simply represent a different facies, f-a-c-i-e-s, of a single flow system. As a result, exploitation of a geothermal resource has a real potential to impair a non-thermal resource and vice versa."
3. "The problem, as I see it, with the proposed geothermal exemption to do groundwater appropriations in Diamond Valley arises from the fact that some of the ag wells already exploit what is correctly defined as a low to moderate temperature geothermal aquifer."
4. "These geothermal ag wells in virtually every well west, east, and south of the playa are part of a hydrogeologic continuum and are clearly being influenced by the grossly over

appropriated resource and the historical absence of serious efforts to promote a sustainable use of groundwater resources in the basin.”

5. “Unfortunately, the predecessors to the current State Engineer allowed the appropriation of vastly more groundwater rights in the valley than the estimate of perennial yield no more than 50 years ago. In effect, the Division of Water Resources facilitated the appropriation of the transitional storage of the basin without regard to the perennial yield. Perhaps this was a practical, good, short-term strategy because it accelerated the capture of the natural discharge from the groundwater flow system, which is the goal and end result of groundwater resource exploitation.”
6. “But I don't think there's any reason to give them any kind of a new well, because the record clearly shows that all these wells in Diamond Valley, if you want to call those induction wells, these are induction wells, too, because they're capturing the groundwater discharge.”
7. “Well, we're not aware of a geothermal aquifer in Diamond Valley that's not connected and not part of the hydrologic continuum which is the alluvial aquifer that's exploited by everyone in Diamond Valley.”
8. “But my concern is, is -- is that these slightly elevated temperatures here in the valley constitute a geothermal aquifer that's already being used by the irrigators. So, to exempt -- to exempt anyone else tapping that same resource, I don't -- I think it's not in the spirit of the Order.”

RESPONSE:

In all fairness, Mr. Bugenig was addressing the provision in Order 1226 regarding the exemption with regard to the development of a geothermal resource. Inadvertently he provided support to the order and the appropriations by Mr. Venturacci'. Summarizing Mr. Bugenig's testimony he states the appropriate response to the order, illustrating the requirement for the mitigation right, as provided in Order 1226 and supports the position that junior appropriators has a direct impact to the discharge area (as identified in Reconnaissance Report 6, USGS, and Bulletin 35, USGS and the associated springs subject of this hearing), summarizing his findings, based upon his research and knowledge his findings concluded the following:

1. The groundwater discharges of the Taft/Thompson, Cox and Ranches in the immediate area have temperatures associated in excess of 68 degrees (Recorded temperature for the Taft Springs is 69-75 degrees-Mifflin 1968) and therefore is a geothermal source per his testimony.
2. Geothermal sources and non-geothermal sources have a continuity.
3. He states that it is difficult to distinguish between the groundwater sources other than temperature.
4. Development of a geothermal resource has a real potential to impair a non-thermal resource and vice versa.
5. Agricultural wells, junior to the Venturacci vested rights “already exploit what is correctly defined as a low to moderate temperature geothermal aquifer.”

6. Mr. Bugenig admitted that the State Engineer has failed to regulate and manage the groundwater resources of the basin by the following statement: *“These geothermal ag wells in virtually every well west, east, and south of the playa are part of a hydrogeologic continuum and are clearly being influenced by the grossly over appropriated resource and the historical absence of serious efforts to promote a sustainable use of groundwater resources in the basin.”* Mr. Bugenig has previously stated that the groundwater source including the groundwater discharges of all of the springs associated with the Home, Cox and Willow ranches are influenced by the junior right pumping in the southern part of the basin by illustrating a continuity and interconnection related to the pumping within the groundwater basin. (See comments 5 and 6 above)
7. In comments 7 and 8 provided above, he states that the geothermal aquifer is exploited by everyone in the basin and that alluvial aquifer is exploited by everyone in the basin.
8. Taft/Johnson Springs, Cox Ranch, Willow Ranch and others were all part of the discharge area as provided in the respective USGS reports.
9. These Springs and Seeps are all part of the natural discharge and due to the overappropriation by the office of the state engineer and the accelerated pumping within the groundwater reservoir has depleted the natural discharge associated with those groundwater discharges.

SUMMARY OF PRIOR TESTIMONY BY Mr. Bugenig:

Mr. Bugenig, in his testimony before the office of the State Engineer found the same conclusions as those discussed within USGS reports on file with the office of the State Engineer and therefore public record, that the pumping of the groundwater resource has created a significant groundwater lowering that has impacted the vested rights held by Mr. Daniel Venturacci, under direct testimony with the office of the State Engineer on January 23, 2013. Therefore as an expert for Eureka County and the Etcheverry Family Trust Mr. Bugenig has acquiesced to the findings that an impact to the spring and seep discharge sources has occurred that has a direct correlation to the groundwater pumping far in excess of the perennial yield of the basin.

Based upon Mr. Bugenigs prior testimony it is essential to review the analysis prepared in conjunction with Ms. Tumbusch.

Tumbusch/Bugenig Report:

Reviewing the summary prepared by the BT Report the following is offered:

1.0 Summary (Responses):

1. The BT Report acknowledges a reduction of the spring flows in the groundwater discharge areas in the northern part of the basin, it should be noticed that when the springs go dry this is not a reduction, this assumes some water is still flowing which to an extent is correct. When the beneficial use of the water can no longer be used for irrigation, and stockwater and the only remaining use is a minimal domestic supply, this is beyond the definition of reduction it would be more representative of a cessation.

2. The BT Report refers to the Eakin USGS recon report number 6. On page 22 of the report Meadow and Pasture Grasses account for 5,600 acres of land, which excludes that part supplied by streamflow and direct precipitation. The report estimates that there is 4,600 acres with an estimated average annual groundwater use of 1.25 ft, and about 1000 acres of meadow which is normally flooded with water discharged by springs with an annual use of 3 feet. The vested rights and the applications for mitigation rights, described in the Place of Use support the estimate contained in Recon 6 and Bulletin 35. The estimated discharge was within the acreage noted by Eakin. Harrill, Bulletin 35 (Table 8); evapotranspiration of 4,500 acres for Meadowgrass, hay, 5400 acre feet (1.2 afa), and 1500 acres of meadow (3.0 afa-Wet Meadow, marsh, normally flooded, including alfalfa (Table 8)). The total estimated discharge is 29,000 acre feet in the northern portion of the basin.

The southern portion of the basin has an estimated discharge of 1,400 acre feet, rounded this equates to a total discharge of approximately 30,000 acre feet. These estimates are predicated on plant consumption through evapotranspiration only. The statement that Venturacci has doubled the amount estimated by Eakin in the 1960 era estimate is false.

It should be noted, (See Report supplied with Vested filings), that the meadow grasses were supplemented with various types of grasses per Crofut's oral history. Further input is provided by the office of the State Engineer, provided on the web site, illustrating consumptive use per crop type. Comparing the two documents it becomes evident that the authors in Report 6 underestimated crop consumption based upon cultivation and use of the meadow areas for crop production. Also provided into evidence is the Harrill memo to file illustrating the direct correlation between spring flow and pumping in the groundwater basin. Page 19 of the report is provided below:

water in this area. Springs also occur along the lower edge of the alluvial apron, principally in Tps. 23 and 24 N. on the west and east sides of the valley. Most of the larger springs, such as Shipley Hot Spring and the main spring at Thompson Ranch, have artesian heads. (See photographs 2 and 3). That artesian

conditions are operative in these areas is further supported by the flowing wells on the Romano Ranch. Discharge from the artesian springs and upward leakage in the vicinity has resulted in a shallow water table in the meadow areas down-gradient from the springs.

~~The water table generally increases in depth from the river area to~~
It should be noted that when the report was written, pumping was occurring in the southern end of diamond valley (See page 4, Fad Shaft pumping 8,500 acre feet between 1954-1958) and the development of 85 wells (page 5-approximately 5000 acre feet at the time of the report, estimated roughly).

Page 5, Recon 6:

Raising livestock has provided a continuing base for the economy of the valley for many years. Cattle have been fed principally on the range, supplemented by native hay from meadows and pastures. Meadows have been supplied mainly with water from spring discharge, the water being "developed" to the extent that ditches are used to distribute the water in the meadow area.

Photograph 3 within the report illustrates the pump located on the Main Spring Pool, this pump had a capacity of 1000gpm, a 50 gpm discharge could not sustain a 1000 gpm pump very long. This well pumped water into a ditch that follows the creek in the 1879 survey that supplied water to the Cox and Ranches with an estimated flow of 1 cfs. The report prepared by Eakin noted that about 56 acres of alfalfa was being irrigated by sprinklers from the main spring pool (page 29):

control and use of water. On the Thompson Ranch, about 56 acres of alfalfa are being irrigated by sprinklers, the water being pumped from the main spring pool.

What Eakin failed to recognize was that this well also pumped water to the remnants of this creek to the referenced ranches.

Page 28 Recon 6:

Prior to about 1940, development of ground water in Diamond Valley largely involved the utilization of spring discharge for the production of hay from meadows and pasture land. The larger springs so used are located on ranches near the east and west sides of Diamond Valley principally in Tps. 23 and 24 N.

Provided in my testimony is evidence of additional spring discharge rates associated with the Taft/Thompson springs. Crystal Springs, which is located on the Cox Ranch was evidenced in my reports, no measurements are available other than as found by Sir Richard Burton on October 9, 1960. This spring was referenced on the USGS Map of 1955.

No reference is found in the Eakin Report regarding the the limitation of spring flow nor in the Harrill Bulletin 35 report that there is a limitation of 60 acre feet per annum that could be supported by these spring flows.

The streams from the various canyons support very little flow with the majority of the stream discharge on the Thompson Ranch limited to runoff during the early spring discharge. To assume that there are substantial stream flows is purely conjecture, ephemeral by definition means short lived, transient, momentary brief or short. The springs and seeps were the major proponent of agricultural use on the subject properties.

The BT Report attempts to mislead the State Engineer in context with their statement under Section 1, Summary.

3. No adjudication is necessary, the state engineer is mandated under provisions of Nevada Revised Statutes (NRS) to protect vested rights, NRS does refer to Adjudicated water rights requiring protection (NRS533.085) the statute refers to Vested Rights, an adjudicated right would be part of a decree and therefore protected under the decree from impact and thus referred to in text differently. All junior groundwater rights issued for the irrigators in the Valley have been issued subject to prior rights in the permit terms.

The senior water right holders have been impacted by over development and mining of the groundwater reservoir causing a change in the gradient of flow, subsidence typical of a depleted and an over pumped groundwater system has been evidenced in subsequent reports.

The vested rights must be replaced either through the method proposed by the State Engineer or by cessation of all pumping within the groundwater basin in excess of the perennial yield, which must include sufficient water for the vested rights. If this was to occur there would be little water for groundwater pumping and the majority of the groundwater rights would have to be retired. In order to restore the discharge the recharge would have to flow into the basin, uninterrupted for many years to increase the static head sufficiently to allow the springs to flow once again. Due to subsidence within the basin the characteristic flow patterns may have been altered that may not allow the springs to return. In light of these thoughts the only other avenue that could occur is the same as what is proposed by Order 1226, replacement of the groundwater discharge to the springs by approval of wells.

Further evaluation and a development of a plan to reduce the pumping in the southern portion of the basin should follow.

NRS 533.085 Vested rights to water not impaired.

1. Nothing contained in this chapter shall impair the vested right of any person to the use of water, nor shall the right of any person to take and use water be impaired or affected by any of the provisions of this chapter where appropriations have been initiated in accordance with law prior to March 22, 1913.

2. Any and all appropriations based upon applications and permits on file in the Office of the State Engineer on March 22, 1913, shall be perfected in accordance with the laws in force at the time of their filing.

The summary only discusses the Taft Spring and does not discuss the spring complex that was all part of the Taft Spring discharge area, nor has there been completed, at least until now, an evaluation of the extent of irrigation that has occurred on the subject properties.

What must be considered is that these springs flowed continuously dependent upon the effects of discharge to the groundwater system in Diamond Valley. The effects of droughts and periods of low precipitation was dampened by the effects of discharge of a large groundwater reservoir. In order to simulate the effects of the head discharge the wells must be developed to allow for a higher pumping rate than found in the springs. This will allow for saturation of the soils at start up of the irrigation season that would allow wetting of the root zone that normally occurred due to the constant flow from the springs. The pumping rate is necessary to duplicate the efficiency of the spring discharge over the annualized discharge, even though the consumptive use would remain the same. The BT Report fails to realize this very important fact. The original claims by Taft did not include the other spring sources on the property nor did the original claims include property held by others at the time of vesting. The analysis for the well discharge was predicated upon the area of the land being irrigated, the wells are proposed to equalize the large amount of springs and seeps that existed on the property. USGS in their analysis referred to the high groundwater conditions being from the discharge of the spring sources in the area, in order to equalize the pumping rate to the spring discharge the diversion rates are greater to match the application rates to the ground being irrigated.

4. No comment, if the BT Report, in their last sentence, is anticipating drought or climate change as other factors, the does not purport to represent the effect of climate change, in fact

the last seminar I attended did discuss climate change which illustrates long term modeling (using a blunt instrument for precise measurement) illustrating that the northeastern Nevada (including Diamond Valley) will be prone to wetter and warmer climates. To try and use highly variable climate factors, precipitation etc., to determine a trend is a huge mistake with very little correlation of data trends. R values for lines of best fit have low values of correlation and therefore is not predictable and subject to high deviations (an ounce of observation is worth a pound of forecast).

5. Same issue as discussed previously.

Section 2.0 Introduction (BT Report):

- Ground Water appropriations = 130,748.33, Perennial Yield = 30,000 acre feet, Reference Bulletin 35 (State Engineers Web Site-Basin Summary)

Bulletin 35 states that there is actually 21,000 acre feet of perennial yield from precipitation, 9000 acre feet from Subsurface Inflow from Garden Valley (150 acre feet of inflow from Devils Gate was absorbed in the rounding). In actuality the amount of discharge from the adjacent valleys cannot be counted as being available for use in Diamond Valley as this water could be developed in the adjacent basins for appropriation, only the perennial yield should be calculated as this is the amount available for appropriation. Based upon this utilizing this figure, the basin has been overappropriated by a factor of 6 to 1.

The BT Report makes the point where the proposed mitigation permits account for 16,000 acre feet of appropriation to mitigate the water already admitted by Bugenig (January 23, 2013 testimony) as being used by junior water right holders. The reality of the situation is that the result of the declining water levels were caused by the junior water right holders and the office of the State Engineer that culminated in the cessation of spring discharges from the groundwater system (as testified by Bugenig) and the continued pumping in excess of the perennial yield will have no other affect then resulting in the continued decline of the groundwater table. The last statement in section 2 is per the following:

“Such and increase will only accelerated the declining water levels and adversely effect a very vibrant agri-business economy, and Eureka County’s local culture and custom.”

In response to this last statement the continued pumping from storage will continue to draw down the groundwater table to the point of which the level of decline will cause the exceedance of the economical pumping limit, which is an eventual circumstance regardless of the approval of these applications. Nevada Water Law must recognize the rights of the senior appropriator and do what is necessary to make these rights whole to the vested use established long before the development by the junior appropriators.

What is very interesting about this circumstance is that any vested right is protected under NRS 533.085 that existed prior to March 22, 1913 and one hundred years later an order was issued to ensure the protection of vested water rights within the Diamond Valley Hydrographic Basin.

Section 2.1 (BT Report):

V01115 is for water from Springs, and Seeps for the beneficial uses of Irrigation, Stockwater and Domestic uses. V01114 is from Horse Canyon Creek. Horse Canyon Creek is supplemental to the place of use filed under V01115. The BT Report, recognized these creeks as ephemeral streams, as pointed out previously these discharges, when and if they ever occur, are insignificant flows in comparison to the spring discharges. Horse Canyon Creek was vested after 1879 as depicted on the GLO plat for T23N, R54E, and became supplemental to the Taft ranch at some point after the survey was completed.

81825 is not filed to replace the water of Horse Canyon Creek but to use the water relied upon from the various spring sources on the Venturacci Ranch Properties with supplemental use by the canyon discharges, when and if they occur. All of the applications filed under 81825, 82570, 82571, 82572 and 82573 have surface water supplemental rights associated with the Canyon Discharges and the request does include the replacement of the canyon discharges but requests replacement of the spring sources that irrigated the subject lands that were lost due to overpumping the groundwater reservoir by junior water right holders. The creek rights flow on an occasional (Intermittent) basis and to the extent there is sufficient snow melt the water from the various creeks are used supplementally to augment the historic spring flows and will be used in the future to augment the underground pumping on the place of use of the Venturacci Ranches.

Eureka County did not file the protest requesting the denial of 81825.

Etcheverry et al made the same argument as to why their junior applications should have been denied (Etcheverry, Diamond Cattle Co., and Kenneth Benson), with the exception to #1:

1. The applications request water use for irrigation year round, from January 1 to December 31. A year round season of use is inconsistent with irrigation in the proposed location. Any permits issued on these applications should be limited to the applicable irrigation season of use.

Response: The springs flowed continuously on an annual basis, the mitigation appropriation should recognize the annualized vesting of the water rights.

2. The application seeks water from an aquifer that it admittedly acknowledges is being excessively pumped. See Application #12. The requested water is not available.

Response: The protestant is treating these water rights appropriations as if they do not exist. The protestant has predicated their entire response based upon these water rights as new appropriations and not to replace the water that has been diverted by junior appropriators to the detriment of the senior vested right holders. The water rights of the groundwater irrigators were issued subject to existing rights, and in accordance to NRS 533.085 no vested right should be impaired. The State Engineer issued water rights in far excess of the perennial yield by a factor of 6:1. If the determination was made properly by the precedent State Engineer, most of the underground water rights should not have been approved. The protestants water rights should be relinquished.

3. Given the state of the Diamond Valley hydrographic basin, the State Engineer should require a study prior to granting additional withdrawals from this stressed aquifer.

Response: The studies have been completed:

- USGS Reconnaissance Report #6

- **USGS Bulletin 35**
- **“Irrigated Croplands, Estimated Pumpage, and Water Level Changes in Diamond Valley, Eureka and Elko Counties, Nevada, through 1990, USGS Open File Report 95-107”**
- **“Fact Sheet 97-03 University of Nevada, Alfalfa Production Costs, for the Diamond Valley, Nevada Area”**
- **“Hydrogeologic Framework and Ground Water in Basin Fill Deposits of the Diamond Valley Flow System, Central Nevada, Scientific Investigations Report 2006-5249”**
- **“Data Network, Collection, and Analysis in the Diamond Valley Flow System, Central Nevada, USGS Open File Report 2011-1089”**
- **EIS for the Mt Hope Project-USBLM**
- **Metamorphic “klippen” in the Diamond Mountains, Nevada and the Implications for Mesozoic Shortening and Cenozoic Extensions, Phyllis A. Camilleri, Department of Geology and Geography, Austin Peary State University, Clarksville, Tennessee**
- **Each of these reports have a bibliography that cite sufficient studies to make the determination as to the nature of the “continuity” of the springs and the overpumping as testified by his consultant on January 23, 2013.**

4. If the use is granted, this use will adversely affect the cost of water use for other holders of water in the hydrographic basin including the likelihood of increased pumping from lowered water table access depths.

- **The springs dried up, there is no water at all, their junior water right affected the Venturacci senior water rights, their water rights were issued subject to senior water rights. Drilling the wells by Venturacci dramatically increases the cost of placing water back to historical use far in excess of the impact to the junior water right holders.**

5. These applications are in conflict with and will be detrimental to the public interest as this stressed ground water table will suffer further draw down causing a strain on the over subscribed water resource in this hydrographic basin.

- **Just the opposite has occurred, the junior water right holders have impacted the senior water right holders in the groundwater basin. See NRS 533.085**

6. If granted for the uses proposed, the proposed application will be in conflict with existing water rights as well as existing domestic wells.

- **Just the opposite occurred, the junior water right holders have impacted the senior water right holders in the groundwater basin. See NRS 533.085**

7. There is no unappropriated water in the Diamond Valley hydrographic basin and thus the applications should be denied.

- **See NRS 533.085**

NOTE: #8 is missing in the protest

9. The additional wells would cause undue interference with existing wells (including possible cone of depression affect) in the already designated ground water basin.

- Cones of depression are already present in the groundwater aquifer caused by the overpumping by junior appropriators, the groundwater gradient has been reversed and the groundwater basin has subsided throughout the basin. See attached exhibits

10. The proposed use violates an order of the State Engineer designating the basin. See Order 815.

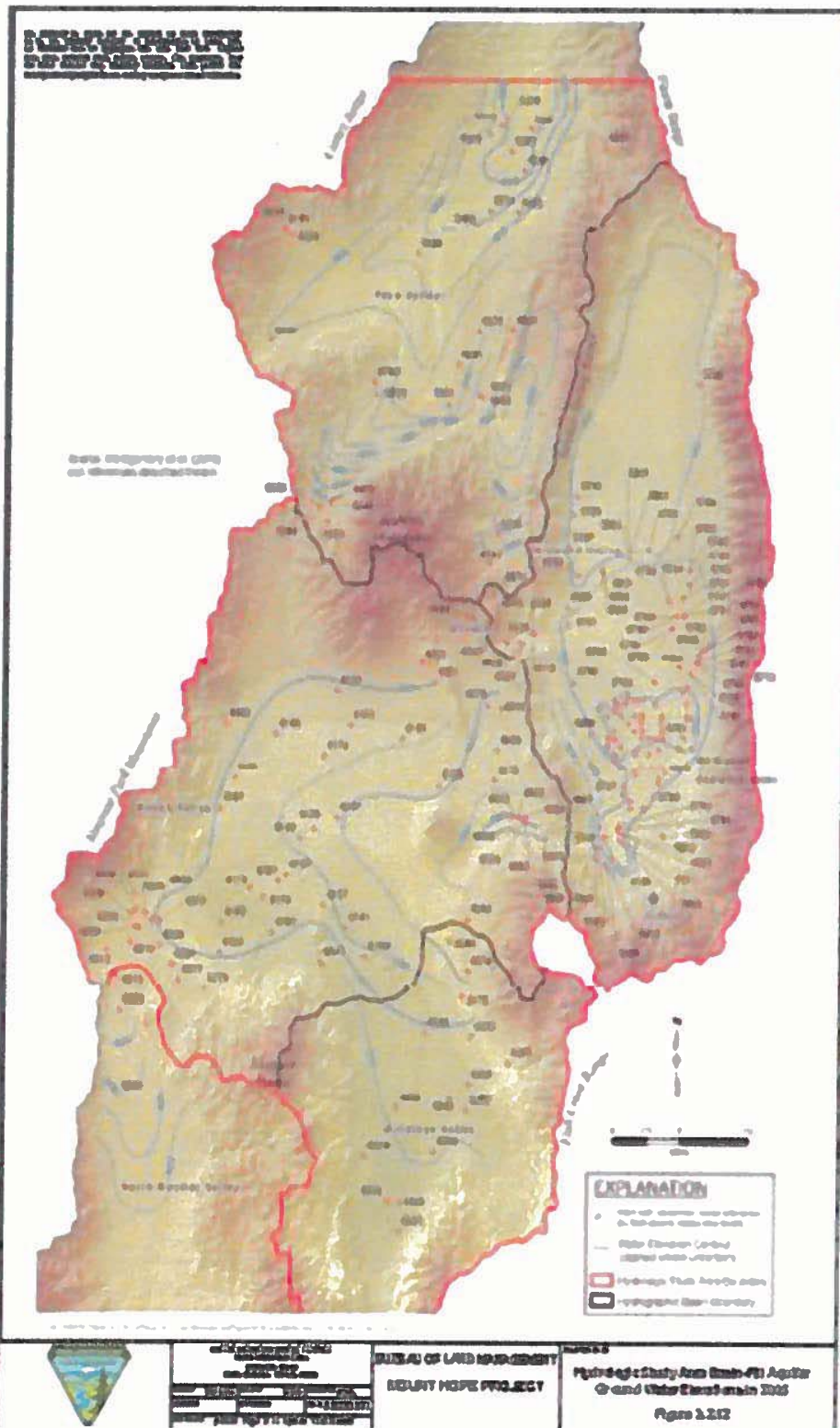
- See Order 1226

11. The type and place of use listed in the applications, is already subject to regulation by the State Engineer Order of designation and curtailment.

- See Order 1226

12. No water is available from the underground source except to exceed the perennial yield or safe yield that would create an aquifer mining situation.

- Mining of the groundwater resource is presently occurring by over appropriating the perennial yield by a factor of 6:1 to the detriment of the senior water right holder.



**Cones of Depression caused by Junior Water Rights
 Attachment to Protest Item 9**

Figure 1 of the BT Report report obviously blocks out the place of use of the subject water rights as the aerial photograph would illustrate areas of historical discharge.

Section 2.2 -The Issues:

While the County and Elcheverrys support valid, adjudicated vested water rights, they maintain that claims of vested water use must first be adjudicated in order for the State Engineer to administer the Diamond Valley Hydrographic Basin, including any administration to mitigate purported impacts to senior rights from junior pumping. The applications in question relate to unadjudicated vested claims. The adjudication process outlined in the Nevada Revised Statutes has yet to begin.

RESPONSE: NRS 533.085 has been cited previously, there is no requirement for an adjudication of the surface water source prior to the protection of the source.

Paragraph 2 section 2.2 page 5:

1. The BT Report, again, admits that the overappropriation has lead to basin wide declines, regardless of whose fault it was the situation caused the removal of a senior water right holder for the benefit of junior water right appropriator.

First Paragraph page 7:

A central issue regarding the applications is that information available from published scientific sources suggests that the Venturacci and Sadler Ranch LLC applications overstate the historical irrigation of land from spring sources. Quite simply, the goal of this report is to help prevent the NSE from making further assumptions that will exacerbate an already egregious water problem in the basin at the expense of the vibrant agricultural economy. At the request of the State Engineer, the water rights holders in the basin and Eureka County are presently actively working toward a strategy to effectively manage the water resources in the basin. For example, the County sponsored a study of the feasibility a General Improvement District to retire water rights. The County is also exploring alternative land uses that might reduce groundwater consumption while maintaining the agricultural economy and keeping the community largely intact.

No published scientific information is referenced for substantiation of this claim (First sentence). No reference is cited to support this claim within the body of the submittal.

Third Sentence.

The County proports that they are seeking remedy to the issue of the over appropriation of the groundwater basin, actively I might add, and yet the County refused to sponsor a 318 district that would have been used to retire groundwater rights. On March 19, 2009 the State Engineer addressed Eureka County and its citizens regarding the over appropriation of the groundwater basin (see Power Point presentation dated March 19, 2009, public records in the office of the State Engineer). Referring back to the January 23, 2013 transcript (page 27) the following is offered:

JASON KING: I do want to get on the record, though, that I do respectfully disagree with your opinion that we're declaring war on the irrigators of Diamond Valley. The State Engineer's office has been in Diamond Valley a handful of times over the past four or five decades, I believe, trying to work with the stakeholders, the irrigators in this valley, to

see what is best for the valley. And being very blunt, I believe that the State Engineer's office has been told, you know what, you don't need to be here in Diamond Valley. We're still making a living. We're willing to share in the declining water table. Why don't you just go away and leave us alone.

Certainly that was the feeling that I came away with in 2009, and I think our office has honored those wishes of the stakeholders here. So I respectfully disagree with that assertion.

Having said that, we have a job to do. We have 132,000 acre-feet of water committed in the basin. We're probably consuming close to 80,000 acre-feet every year and every perennial 30,000 acre-feet.

When we were here in 2009, again, it was made clear to me that everyone, it seemed, was happy with where they were in terms of their crops and the declining water table. And when we gave our presentation, we said, that's fine. But, I said that it's a real game changer. *It's an absolute game changer when we get a senior water right holder asserting impairment. And I made that clear in 2009 that that changes everything. And we're starting to see some of that. And just to be very candid, we're starting to see that with Shipley Springs. We're starting to see that with Thompson Springs.*

Okay. Trying to bring the focus back to this Order, and I know there's a lot of other things to talk about outside this Order, again, this Order is really just memorializing what our office has been doing for the last couple decades. (Emphasis added)

With this being said, the County failed to adopt a 318 district that funds the ability of the water users to move forward with their management plan, the County has had at least 20 years if not more to remedy the current situation and nothing has been done other than protest, delay and cause damages to the senior water right holders. Even after the discussion with the State Engineer's office in 2009 no steps have progressed forward to remedy the current conditions. Order 1226 is the first step in the process of remedying the State Engineers guidance on all of the junior water right users that their water right have been issued subject to existing rights. Mr. Turnipseed in February 6, 1992 offered suggestions to the board to help alleviate the issues associated with pumping in Diamond Valley under the provisions of NRS 534.035, the formation of the board failed due to the lack of funding.

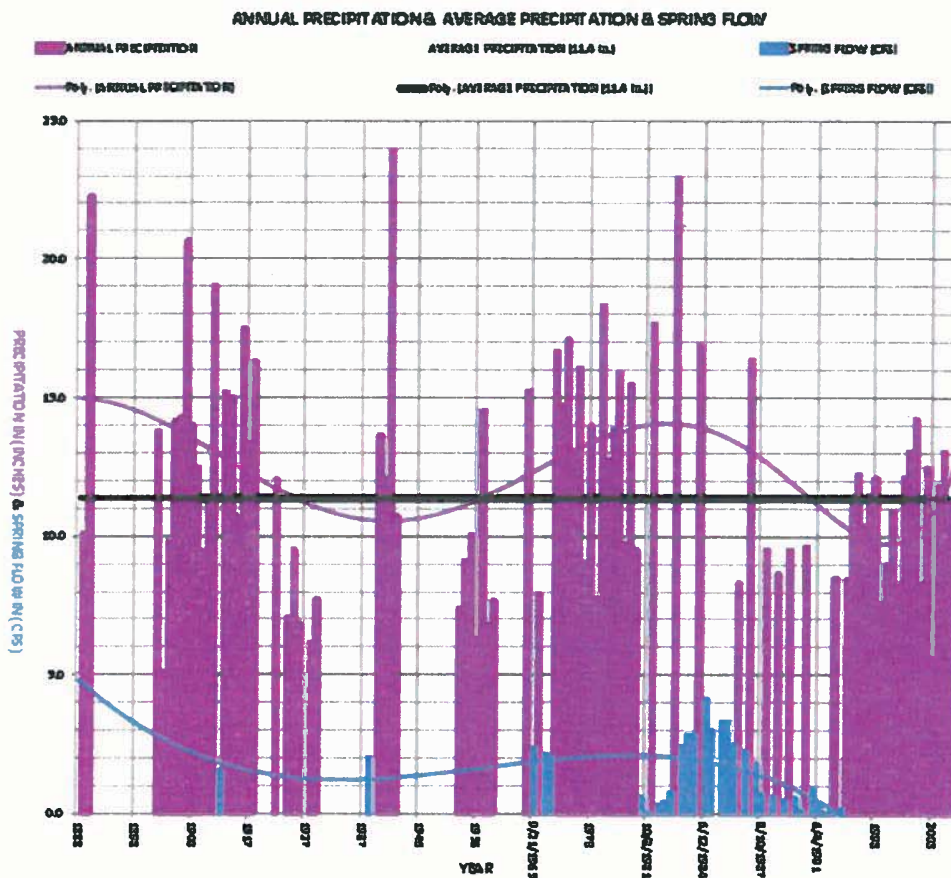
The senior water right holders have been waiting long enough, it is time to take action to remedy the impacts of overpumping by junior water rights that have impacted the senior water right holders in the basin, no action has happened for far too many years and the options have run out as well as the alternatives for mitigation.

Section 2.2.1 Likely Causes of the Decline in the Flow of the Springs:

The BT Report alludes to a statement provided in one report dated 2012, by Interflow Hydrology.

The BT Report is trying to deflect the real issue and this real issue is that the pumping by junior water right appropriators has harmed a senior water right holder, there is no way to get around this.

There could be all sorts of conditions associated with drought, during the years prior to 1937, the driest years on record, the spring flows existed:



Note that the period between 1932- 1937 are not illustrated as the complete record did not exist from the Town of Eureka-period during 1929 through 1934 was the longest drought record in history for California, this also was the same era as the dust bowl of the 1930's (Four western States ranked in the top ten for extensive drought in the 1930's NOAA, August 2013)

Section 2.2.1 (Continued)

The NSE must consider these factors when evaluating any applications for new groundwater appropriations in Diamond Valley, under Order 1226 with the purpose of mitigating the impacts from junior appropriators.

The state engineer must issue the mitigation right with the same priority as the vesting of the senior water rights otherwise this would not be a "mitigation" water right. In fact the senior water right holders are allowed to sink wells to develop the spring source without a permit to do so, similar to

why the junior water right holders are allowed to deepen their wells to meet the declining water levels. This type of action would be to capture the natural discharge of the spring which was from “deep circulating groundwater” as provided by the USGS.

When and if the State Engineer must curtail junior water rights will fall under the purview of his/her authority at the time of the occurrence of further regulation.

2.2.1.a Irrigation Pumping in Diamond Valley

Agricultural pumping in Diamond Valley has resulted in a decline in water levels in the basin and likely captured a portion of the natural groundwater discharge in the basin, including spring discharge, consistent with Nevada's Beneficial Use Doctrine. This capture of groundwater discharge would ultimately occur even if the basin was not over appropriated. Because the response of the basin to pumping is well documented, no further discussion of the pumping in the southern portion of the basin is provided.

The BT Report, again, attempts to deflect the discussion by stating that the issuance of groundwater rights is premised upon the cessation of phreatophytic consumption, which is true unless the phreatophytes have been replaced with actual cultivation of the land to beneficial use from the spring sources subject to prior right doctrine. The pumping caused the cessation of spring flows by depletion of the groundwater reservoir, decline in water tables and the reversing of the groundwater gradients. A certain amount of decline would occur to a point but not allow for continued depletion of the groundwater reservoir. The State Engineer must act to provide for the preservation of senior water right holders. You can not regulate a senior water right to the benefit of junior water right, this is the major premise of the prior appropriation doctrine.

2.2.1.b Climate Change

While the cause of climate change is a matter of debate, it is difficult to dispute that the Great Basin is undergoing changes in the climate. One clear indicator is illustrated in Figure 3, which documents the change in the freezing level elevations in the Ruby Mountains. What effect this change has had on groundwater recharge and spring discharge is unknown, but it is undeniable the climate is changing.

The BT Report has provided on page 8, Figure 3 Monthly freezing levels for various periods all for the months ending on September of 2012. This in its self is not indicative of climate change, no one can take climatological data and perform predictive tools to forecast weather accurately. Forecasts can be made through modeling, which has been done, yet these models indicate that the long term affect to climate change would result in higher rates of precipitation and a warmer climate for Diamond Valley. That is if there are no impedences to the upper atmosphere such as volcanic eruptions, particulate matter in the upper atmosphere, greenhouse gases being produced to the extent that the actual sunlight is reflected and the earth cools for example, one predictive tool is as good as another but no less accurate. Nevada has had wet periods and dry periods, that will continue in the future.

In Eureka County, there are several examples of spring discharge decline. A comparison of spring water use Certificates to current measurements of spring discharge evidence this decline. This evidence is confirmed by Eureka County's Natural Resource Manager, Jake Tibbitts who has compared many springs' flow with flows listed in certificated water rights and virtually all show a flow reduction (Jacob Tibbitts, 2013; personal communication). Table 1 provides a sampling of springs where the current measurements indicate a decrease in spring discharge. Most of the springs identified and evidenced in Table 1 are located above the valley floor, thus the springs are not expected to be influenced by pumping in the alluvial aquifer. Due to the springs relatively small catchment areas, they are more likely influenced by the vagaries of weather and climate.

Table 1.

Springs in Eureka County Showing Decreased Spring Flow

Spring Name	Certificate	Historical Discharge ^a	Recent Discharge
Hash	1439	0.059 cfs (26.5 gpm)	Water present, no measurable flow ^b 0 cfs ^c
Railroad	1440	0.059 cfs (26.5 gpm)	Water present, no measurable flow ^b 0 cfs ^c
Trap Corral	1441	0.05 cfs (22.4 gpm)	Water present, no measurable flow ^b 0 cfs ^c
Mud (located in the alluvium)	5880	0.015 cfs (6.7 gpm)	Water present, no measurable flow ^b 0 cfs ^c
Unnamed Spring No.3 (Diamond Springs Ranch)	14028	0.0713 cfs (320.0 gpm)	0.529 cfs (237.4 gpm) ^b
Notes: a. Discharge documented on the Certificate of Appropriation approved by the NSE or watermap.water.nv.gov/data/permit b. SRX, 2007 c. http://register.nv.gov/databases/corflow, 2013 measurement			

Eureka contends that through these measurements and the records of the State Engineer that there has been a decline in spring flow above the impacts of groundwater recharge, lets evaluate these records and review that data:

Hash Spring Certificate 1439-Application/Permit 8183-filed for 0.2 cfs for Stockwatering. Certificate issued for 22.21 gpm. In this case the application was for 8000 head of sheep and 300 head of cattle. The permit was granted for 0.2 cfs as this was the requested amount. The beneficial use was predicated upon the same 8000 head of sheep and 300 head of cattle. If you were to take the number of sheep and the number of cattle this would equate to 8000 sheep x 4gpd/sheep = 32,000 gpd, 300 cows x 20gpd/cow = 6000 gpd the total would equal 38,000 gpd. 1000 gpd = 1.12 acre feet/annum, therefore this equates to 20.16 acre feet per annum. The diversion rate expanded to 24 hours per day would be 1440 minutes per day x 22.21 gpm = 31,982.4 gpd demand approximates supply, conclusion:

- Diversion rate is based upon the number of livestock

This is what was collected from the State Engineers Web site-it does not appear that there was no imeasureable flow but the flow could not be measured, there is a difference:

Measure Date	Discharge	Method	Comments
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06/20/2013	0 (CFS)	ponded
03/05/2013	0 (CFS)	frozen
12/19/2012	0 (CFS)	site frozen
09/18/2012	0 (CFS)	ponded
05/21/2012	0 (CFS)	ponded water
02/28/2012	0 (CFS)	no access
11/08/2011	0 (CFS)	ponded; much snow
09/14/2011	0 (CFS)	ponded
05/17/2011	0 (CFS)	ponded
03/01/2011	0 (CFS)	interference from snow-melt
10/26/2010	0 (CFS)	ponded

Railroad Spring Certificate 1440, Permit-Same as the previous permit total duty = 20.16 acre feet, same flow rate, same amount requested under the appropriation. The flow rates in this instance have nothing to do with actual flow measurements, these are the rates necessary to serve the number of cattle on an annualized basis.

- Diversion rate is based upon the number of livestock

Measure Date	Discharge	Method	Comments
03/06/2013	0 (CFS)		frozen

Trap Corral Certificate 1441, Permit 8185-Same

Measure Date	Discharge	Method	Comments
06/20/2013	0 (CFS)		not enough flow to measure
03/06/2013	0 (CFS)		not enough flow to measure
12/19/2012	0 (CFS)		site frozen
09/18/2012	0 (CFS)		ponded
05/21/2012	0 (CFS)		no flowing water
02/28/2012	0 (CFS)		no access
11/08/2011	0 (CFS)		small wet area
09/14/2011	0 (CFS)		ponded
05/17/2011	0 (CFS)		ponded
03/01/2011	0 (CFS)		ponded
10/26/2010	0 (CFS)		ponded

Mud Spring 5880, Permit 12748-(Description of Works-*This is a mud spring at which the livestock drink waters direct***)-500 head of cattle (10,000 gpd) = 11.2 acre feet, (5000 sheep 20,000 gpd) = 22.4 acre feet, 50 horses (1000 gpd) = 1.12 acre feet = 34.72 acre feet. 0.015 cfs = 6.7 gpm = 9648 gpd. This filing under the permit was the same as the other water rights filed earlier, the difference is that under the certificate the number of livestock changed. The amount requested under**

the permit was equal to 1 cfs, the amount granted by the State Engineer was equal to 0.0482 cfs = 24,662 gpd = approximately the number of livestock. A PBU was filed on 02/26/1965, at this time the flow rate from the spring was changed to a measured discharge rate. No data is provided by the office of the State Engineer on "Mud Spring". The "spring" is a seep that was dug out to impound water, the estimated rate of discharge was 6gpm, there is no supporting evidence otherwise.

Unnamed Spring No.3 Diamond Springs Ranch-Certificate 14026-Diversion Rate – 0.713 cfs, 61.82 acre feet annually. The BT Report claims that this was based upon a measured flow of 0.529 cfs in 2007, and also states that these springs are not in the zone subject to groundwater declines. In effect this would be predicated upon another source perhaps, perennial water, which would be subject to conditions of the time of the measurement as well as the precedent year precipitation, in 2006 the precipitation was below average, 7.6 inches of precipitation versus an annual average of approximately 11 inches. The Proof of Beneficial Use (PBU) for Unnamed Spring #3, Permit 50076 was filed on September 18, 1991, no date, as required in the was provided as required. According to the Field Investigation by the office of the State Engineer the spring supports 15 acres of meadow hay and possibly 40 acres in 1994. The timing of the measurement is important as it would be based upon perennial water and the available snow melt. To coincide these measurements with different periods of precipitation is not factual and would be based upon the conditions existing at the time of measurement and would be highly variable. Even the time of day could have an effect on the spring measurement.

In summary the spring flow data is based upon the type and number of livestock and is not predicated upon a measured flow rate of the spring source. Hash, Trap, and Railroad Springs are all established diversion rates predicated upon using the number of livestock served over an annual basis. Mud spring is a seep that was dug out to impound water with an estimated flow rate established, no greater flow existed at the time of filing the Proof of Beneficial Use then existed at the time of the application.

Climate change was, and continues to be, one of several explanations offered for water level declines in Kobah Valley, southwest of Shipley Hot Springs (Interflow Hydrology, 2012). Historical data for Shipley Hot Springs shows substantial variability in the spring discharge, confirming the relationship of flows to the vagaries of weather and climate. Because the exemption to Order 1226 that allows the applicants seek to mitigate the decline in spring flow arising from the pumping by junior appropriators, the NSE is obligated to separate out declines due to climate change, as well as other causes unrelated to groundwater pumping.

Perennial yield is based upon using the Maxey Eakin formulae as calculated from an average precipitation so the variability of precipitation events is accounted for predicated upon the Hardman Map of 1939, which provides precipitation by elevation zones from which the Maxey Eakin determination of recharge is predicated upon. The only difference here is that the water that would have been available in transient storage and average annual perennial yield has been depleted and removed by the junior water right holders.

The period of available data of precipitation measurement is from 1888 to present for the Eureka monitoring site. The extent of measurement and the high variability of precipitation does not present correlation of data to become predictive. Perhaps, in perspective with the ice age or with measurements during the Pleistocene it might be predictable to illustrate a drying or warming trend from that frame of reference, but not for the period of the last 125 years. Obviously the submittal of the Eureka County evidence indicates no proof of climate change through the use of the spring flows provided. Other administrative actions by the State Engineer is more likely the affect of the

climate change reported in this section as well as lack of rainfall events during the period that the measurements were captured.

2.2.1.c Self-inflicted impacts

In the Sedler Ranch LLC instance, it is possible that pumping by Sedler Ranch LLC and their predecessors caused some of the observed decline in spring discharge. This impact is discussed in detail in a later section.

RESPONSE: No Comment

2.2.2 The Requested Annual Duty

Both applicants request an annual duty of 4.0 acre-feet per acre. Analysis of pumping in Diamond Valley by the NSE (NSE, 2009) indicates that an annual duty of closer to three acre-feet is more appropriate and consistent with irrigation of the crops that are grown in the basin. The available data indicate spring flows were insufficient to provide a source capable of providing 4.0 acre-feet of water per acre. This is discussed in subsequent sections.

The claims of vested water use show that a large portion of the land irrigated was pasture, not highly managed crops. Data from the NSE show the net irrigation water requirement for pasture grass in Diamond Valley ranges between 2 and 2.5 feet of water (<http://water.nv.gov/et>).

On behalf of Daniel Venturacci, the applicant has not stated the annual duty of the water rights being proposed by the applicant, although it is typical that the duty has been issued to the junior water right holders at 4.0 acre feet per acre, whereas the net consumptive use is predicated upon crop type. There is no limitation by the State Engineer with regard to what crop a irrigator is relegated to use, only that the use of the water shall not exceed an annual duty.

The 4 acre feet per acre is representative of the application rate whereas the actual ET is predicated upon the crop type. For example the same argument could be made with regard to the junior appropriators with an alfalfa field that has a duty of 4 acre feet per acre, whereas the duty could be limited to 3.2 acre feet per acre based upon the State Engineers consumptive use analysis for the groundwater basin. Grass Hay has a net consumptive use of 3.0 acre feet per acre which is more typical of the type of cultivation that occurred on the ranches, which is not the same as the duty associated with the what is diverted by the source. There is no requirement to restrict the type of cultivation based upon the authority of the state engineer:

Basin 153 - Diamond Valley

Region: Central Region

Reference ETos (ft): 4.1

	ET Actual (ft)	NIWR (ft)
Alfalfa (ft)	3.2	2.5
Highly Managed Pasture Grass	3.1	2.5
Low Managed Pasture Grass	2.5	2
Grass Hay	3	2.4
Turf Grass	2.9	2.4
Shallow Open Water	4.3	3.5

With regard to the type of beneficial use established at the time of vesting the types of crops listed on the vested right applications were broken into various categories of crop type, this is not to be construed as a limitation to the ability to use different crops on the property as allowed to the junior appropriators.

3.0 EVIDENCE IN SUPPORT OF THE PROTESTS Page 11

The authors in Paragraph 2 substantiate that the causative impact to the spring sources was from the Groundwater pumping.

Paragrahp 3:

In a groundwater appraisal of Diamond Valley, Eakin (1962) noted that groundwater discharge on the northwest side of Diamond Valley appeared to be relatively large considering the limited drainage area westward to the topographic divide from the drainage area of Garden Valley. He attributed a large portion of groundwater discharge in the springs to interbasin flow (approximately 6,800 acre feet per year) from Garden Valley through the Sulphur Springs Range to Diamond Valley. If correct, underflow from Garden Valley is a major contributor to recharge in northern Diamond Valley.

Reconnaissance Report #6 states the following:

It was noted, however, that the ground-water discharge on the west side of the valley in Tps. 23 and 24 N. appeared to be relatively large, considering the relatively limited drainage area westward to the topographic divide of the Sulphur Springs Range. Recharge in this part of Diamond Valley in part may be supplied from areas beyond the topographic divide; that is, from the upper part of the drainage area of Garden Valley. However, there are no data to confirm this and at best it can be only a hypothesis until a more detailed investigation can be made.

Bulletin 35 provides the detail of recharge occurring in the basin, the northern part of Diamond Valley indicates 9,000 acre feet was attributed from Precipitation, whereas 12,000 acre feet was attributed to the southern portion of recharge attributed to precipitation. 9,000 acre feet is attributable to basin interflow from Garden Valley (Note that the System Yield is 30,000 acre feet with 16,324.28 acre feet of appropriations).

Of importance is the consumption associated with discharge within the Diamond Valley Basin, with the southern portion discharging 1,400 acre feet per annum and the northern portion of the Basin discharging 29,000 acre feet of groundwater. Rounded the total equals 30,000 acre feet. Simplictically it may be concluded, as found in Bulletin 35, that the springs within the northern part of the basin rely not only on the interbasin flow from Garden Valley (Shipley Springs) but also the groundwater discharge from precipitation from the groundwater basin (21,000 acre feet) minus the 1,400 acre feet associated with groundwater consumption in the southern portion of the basin. The probability of the discharge from Garden Valley east of the Sulpher Mountains discharging across the lake playa is extremely minimal. Therefore Thompson Springs relied on the head of groundwater pushing its way to discharge in the southern end of the basin, both to Shipley and Thompson Springs.

The Thompson Springs discharge water from a "deep circulating source" and perennial waters discharged from groundwater movement from the north end of the basin to the discharging south end of the groundwater basin. This is evident by both the temperature of the water and the chemistry of the water predicated upon not being entirely derived from a carbonate source.

Page 11 Last Paragraph:

Prior to development, the hydrologic system of the valley-fill reservoir was in dynamic equilibrium (Harrill, 1968). Harrill used well data from the years prior to 1960 to illustrate pre-development direction of groundwater flow gradients. Groundwater flow in southern Diamond Valley was from the valley margins toward the valley axis and northward towards the large groundwater discharge area in the northern part of the valley. Once groundwater development began, water levels declined beneath the irrigated areas in southern Diamond Valley. The configuration of the water level altitudes changed, most markedly around pumping centers and with the degree of groundwater drawdown over time. The dynamic equilibrium of the flow system was disrupted and a transient nature was established, resulting in water level declines and a reversal of ground water flow gradients (Tumbusch and Plume, 2006). Lower than normal annual precipitation in the last decade combined with an increase in irrigated acreage has triggered increased groundwater withdrawal for agricultural purposes in the valley.

Page 24 of Recon 6:

water from the mountains on the west side of the valley also. Pumping during the irrigation season of 1961 has modified the natural contours to some extent as is suggested by the irregularity of some individual contours, such as the 5,860-foot contour. No attempt has been made in this investigation to determine the precise effect of the pumping. This would require instrumental leveling to obtain close altitude control for well-measuring points and more detailed information of conditions prior to the time of measurements in September 1961. However, it appears that effects of pumping in the vicinity of the pumped wells locally may have amounted to several feet. It is not known whether these effects represent a "permanent" lowering of water level in the specific areas or whether full recovery from the pumping season had not occurred at the time of measurement.

This is perhaps the reason why Harrill related the following conclusion on page 60 (Bulletin 35) of the report:

5. Pumping in the South Diamond subarea eventually should decrease the natural discharge from springs in the North Diamond subarea, which during the summer 1965 was largely being used beneficially. In time, the discharge from springs may have to be supplemented or replaced by pumping from wells. Although more costly, this procedure would salvage the large amount of water (about 6,000 acre-feet per year) now running to waste during the nongrowing season.

Looking back at this section of the report, the effects of pumping was beginning and was foreseeable, based upon the amount of water rights that were issued at the time of the report. (note also the dewatering of the Fad Shaft).

This statement by the BT Report is not supportable by the precipitation data provided in this report, there have been periods below average and periods above average, normally a groundwater discharge associated with the springs the effect of the drought cycle can take a long period of time to create any changes to the spring discharge, primarily due to the slow movement of the groundwater through the groundwater aquifer. The effects of faulting and fractured flow could create a more rapid response as provided in my previous analysis. Albeit the major impact has been due to the dramatic decline of the groundwater table and the immediate impacts created through over pumping of the groundwater resource resulting in the reversal of gradient to the southern end of the groundwater basin.

3.1 The Venturacci Applications Page 12

Paragraph 1 of this section:

Recon report 6 estimated the following (page 22):

Meadow and pasture grasses: 5,600 8,900

Mixed grasses, depth to water 0 to 5 feet. Largely irrigated by discharge from springs and shallow ground water. Excludes that part supplied by streamflow and direct precipitation. Includes about 4,600 acres with an estimated average annual ground-water use of about 1.25 feet, and about 1,000 acres of meadow, which normally is flooded with water discharged from springs. estimated average annual use of 3 feet.

Bulletin 35 Table 8 provided the following:

Table 8.--Estimated evapotranspiration of ground water

Dominant process of ground-water discharge	Phreatophyte	Areal density	Depth to water (feet)	Area (acres)	Annual Evapotranspiration	
					Acre-feet per acre	Acre-feet (rounded)
<u>North Diamond subarea</u>						
Evapotranspiration	Habitbrush, greasewood, sparse saltgrass	Moderate to low	3 to 20	46,000	0.3	14,000
Evapotranspiration in areas supported by spring discharge	Meadowgrass, hay, some saltgrass	--	4.5	4,500	1.2	5,400
Do.	Wet meadow, marsh, normally flooded; includes some acreage of alfalfa	--	4.5	1,500	3.0	4,500
Evaporation from bare soil (plays)	--	--	4.5	50,000	.1	5,000
				102,000		29,000
Subtotal (rounded)						

-29-

Based upon the meadow, alluded to in this section of the report, the wet meadow, marsh, etc., had 3.0 acre feet per acre for 1,500 acres and the Meadow Grass, hay, some saltgrass had a consumptive use of 1.2 acre feet per acre.

Bulletin 35 Table 16 also provided that the consumptive use for Alfalfa was 1.9 acre feet per annum.

Putting the consumptive use in the Bulletin into perspective the assumed rates of evapotranspiration of the hay, meadowgrass etc., would provide the following ratio:

1.2 acre feet (grasses) divided by 1.9 acre feet alfalfa = 63%

Using the permitted duty allowed by the state engineer this would equate to 2.52 acre feet per acre.

The total acreage was 6,000 acres, there was approximately 1,500 acres at 3.0 acre feet per acre. In comparison there was only 150 acres within the southern part of the groundwater basin. As stated previously there is only 1,400 acre feet of consumptive use in the southern portion that is not part of this total.

As supported in the proof data in the reports that I prepared, it can be seen that there was a flow to the north from the Taft Spring discharge, estimated in the 1879 survey notes, that irrigated lands north of the Thompson Ranch (Cox Ranch), also Diamond Spring, as referred to by early pioneers and as shown on the 1955 USGS Quadrangle map was north of the Thompson Ranch was one of the first springs to cease flowing. The ditch that intercepted multiple springs and discharges as illustrated in 1879 was found on the ranch as well as multiple ditches through aerial inspection and by field verification. Multiple capture points existed to redirect the groundwater discharges in the area and conveyed within the place of use. Rather than file for multiple points of diversion the two points of diversion are proposed.

Harrill supports this premise by his statement per the following:

Bulletin 35 page 30

In the North Diamond subarea there is one fairly large spring on the east side of the valley at Thompson Ranch, sec. 3, T. 23 N., R. 54 E. There, water flows from bedrock outcrops mapped as klippe of western facies rocks of Ordovician(?) age by Larsen and Riva (1963). The water is warm, and the spring is considered to be in a fault-controlled area of discharge of moderately deeply circulating ground water. Other small seepage areas are common along the east side of the subarea. The western margin of the subarea is characterized by a number of pond springs at altitudes of approximately 5,800 feet. All the springs discharge warm water and all are in alluvial material near the bases of alluvial fans or pediments.

Bulletin 35 Table 8 indicates a total acreage of 6,000 acres. Regardless of the duty associated with the various estimates of consumptive use associated with the office of the State Engineer and the USGS, the acreage remains the same. Shipley, according to their proofs of beneficial use total 1750 acres, Venturacci's applications total 2,172 acres, the total combined acreage equates to 3,922 acres, which is less than the 6,000 acres provided in Table 8.

Page 13 of the BT Report, notes that Table 9 provides is defined a major spring as a spring that discharges 38 gpm or at least 60 acre feet per annum. Harrill, could not measure a spring discharge that was submerged under water as there were 3 springs that discharged to the reservoir at the Thompson Ranch. Also, the USGS was interested in trends in the area and was not interested in finding and measuring all of the spring sources on all of the discharge areas. (Harrill, did state that the high groundwater conditions in the area were created by spring discharges). In all of the USGS reports there is no reference regarding where the spring flow measurements occurred and also by this time the overpumping in the Valley had affected the spring sources.

Referring to Table 9 the total discharge for the measured spring sources indicated a combined diversion rate of 11.64 cfs. The total discharge, according to Table 9 is 8,400 acre feet. Knowing that the total groundwater discharge in the northern part of the basin was equal to approximately 40 cfs that is not accounted for in the measurement of the discharge. Based upon this calculation there must be a number of springs, seeps and discharges that could only be accounted for by observation of the area of discharge, and not all spring sources were measured.

Table 9 lists the locations, names, discharges, and dates of measurements of the major springs. Slight decreases in discharge have occurred in both Shipley Hot Spring and Thompson Ranch spring. These changes are interpreted as adjustments to local development or as natural fluctuations, which may represent below-average precipitation in the 1950's, as indicated by Eakin and Lamke (1966, p. 19) for stations in the adjacent Humboldt River basin, rather than to pumping in the South Diamond subarea. Eventually, a gradual decrease of spring discharge in the North Diamond subarea should occur in response to pumping in the South Diamond subarea as sufficient water is removed from storage to induce subsurface flow from the spring areas toward the well field.

Page 14 of the BT Report:

Figure 5- The report concludes that the change in spring discharge cannot be correlated to precipitation from 1983-1986, one cannot discount the effect of the precipitation that fell in 1984 to almost double the amount of annual precipitation.

The authors make the remark that the change was due to an attempt to increase the capacity of the springs. They do recognize that the *"additional discharge is derived from storage in the aquifer and once the storage in the aquifer has ben depleted, the discharge is expected to taper off."* By correlation one can conclude that if the aquifer is depleted by pumping than the discharge will cease, this is the obvious result.

The author alludes to the spring discharge being not supportable as the model for the Mount Hope mine was technically sound and supported groundwater appropriations for the Mount Hope Project. Modeling has been accurately portrayed as using a blunt instrument used for a delicate operation, I assume, like any model, the discharges were input into the cell data, this estimate had to be based upon and estimate by the modeler. If the modeler assumes a lower discharge value, by not portraying accurately the discharge within an area, the model will only determine the general

hydrology based upon the effects of inaccurate data and predict gradient patterns erroneously. Models are very inaccurate in portraying the hydrology of of geothermal gradients, or fractured (faulting) within a groundwater basin. Typically the boundary conditions have to be assumed prior to the start of the model and therein lies the inaccuracy.

I have not reviewed this model but I have reviewed enough of them and prepared some, to know that they are crude instruments that may provide some detail into the hydrology within a groundwater basin, but they are not like OZ, all powerful and all knowing. These models cannot be used for predictions of fractured flow and are therefore highly inaccurate for flow conditions on the western portion of the Valley. For example, I had the opportunity to work with the USGS on a groundwater model where they were analyzing 26 connecting groundwater basins, ultimately they came to the discharge portion of the model and calculated the spring discharge and added the consumption of the discharge to the modeling results, this changed the groundwater flow direction substantially as they “double dipped” the actual discharge by adding a + b and coming up with c, in this case the modeler should have only counted either a or b as one was the resultant of the other.

With regard to the issue, as to whether or not all of the discharges were captured and diverted, all one has to do is look at the map, provided in the proofs of appropriation, illustrating all of the network of ditches to recognize that the water was diverted from the source and conveyed within the place of use, according to Milt Thompson, at the time of my field investigation, there were over 200 springs on the property many of which are recognized as dips in the ground presently which were caused by subsidence within the place of use, it would not have been cost effective to explore all of these sources and would not provide any additional benefit to the knowledge provided in this hearing.

3.1.1 Application 81825

We admit that the springs are the primary sources of water on the ranches and that the flows from the canyons are intermittent at best and only occur during periods of high snow pack and rapid snow melt, but nevertheless they are supplemental to the spring rights and the vested rights have been filed to indicate the same.

Page 15 of the report provides:

various seasons of the year. Later measurements (4.23 cfs in July 1983 and 4.08 cfs in March 1984) further show seasonal variability in the discharge from the spring. These two measurements were made during a very wet period when annual precipitation greatly exceeds normal during a time of flooding in many parts of Diamond Valley. Taken as a whole, these historical data cast some doubt regarding the claim of a continuous flow of 3.12 cfs in amended Proof V01115. It is plausible that the seasonal peak spring discharge might approach, or even exceed, 3.12 cfs, but the historical average annual spring discharge was likely something less.

Page 14 of the report provides:

The data in Figure 5 for the period late 1983 to 1986 show quite a bit more flow than the years before and after. While it is tempting to correlate this increase to variations in precipitation, the sudden increase suggests efforts to enhance the spring discharge. It is a fairly common practice to attempt to increase spring flow by excavating around the spring orifice. Reducing the elevation of the orifice has a tendency to increase the discharge, analogous to lowering the pump in a well, at least in the short term. However, most of the additional discharge is derived

The two statements are contradictions, the one on page 14 states that it was due to enhancing the springs whereas the one on page 15 states that it was due to precipitation. Both cannot be right.

Further on Page 15 the following is provided:

Historical flow measurement data from Taft Spring (also referred to as Thompson Ranch Spring) are available through work performed for General Moly, Inc. (Interflow Hydrology, *et al.*, 2008) in support of groundwater appropriations for the Mount Hope Project. Table 7 of the report (*ibid.*) shows three flow measurements from the 1980s taken from Harrill (1968): 1.14 cfs on 9/21/1985, 0.57 cfs on 4/1/1986 and 2.06 cfs on 10/19/1986.

Excerpt from the Environmental Report (EIS):

**EUREKA MOLY, LLC MOUNT HOPE PROJECT
FINAL ENVIRONMENTAL IMPACT STATEMENT:**

Thompson Ranch Spring (also known as Taft Spring, Spring 362): This spring is located on the east side of Diamond Valley along the western flanks of the Diamond Mountains and is reportedly associated with the Western Diamond Range fault zone (Harrill 1968). The recorded temperatures of the spring ranges from 69 to 75 degrees F (Mifflin 1968). Historical discharge measurements at Thompson Ranch Spring during the 1965 through 1990 time period ranged from 18 to 1,900 gpm (0.04 to 4.23 cfs). Montgomery et al. (2010) reported that the spring ceased flowing around 1990.

Page 16 of the BT report:

The report keeps bringing up the issue on the canyon flows as somehow involved with the request for additional mitigation water, to the extent those waters are available, if it all, will be used to supplement the mitigation groundwater appropriation permits and commingled on the place of use. There is not attempt by the applicant to seek mitigation of these “ephemeral” surface flows.

In previous testimony, I have provided evidence that contradict the findings in the report prepared by the authors and provided information as to the vesting of the water rights claims. No adjudication is necessary and if Eureka County so desires the resultant adjudication process could result in the cessation of almost all of the groundwater rights issued as junior priority water users.

The following section within the descriptions provided by the applicant are unfounded and do not make any sense to a reader of knowledge:

Table 9 of Water Resources Bulletin 35 (Harrill, 1982) lists only one major spring on the east side of Diamond Valley, i.e., Thompson Ranch Spring. It is incomprehensible that Jim Harrill, perhaps one of the most competent hydrogeologists of his generation, would have missed a major spring complex capable of irrigating 344.80 acres of land at a rate of 4.0 acre-feet per acre (totaling 1,379 acre-feet per year), particularly one so close to Thompson Ranch Spring. While some seasonal irrigation from surface water originating from Telegraph and Cox Canyons may have occurred in the past, it is difficult to believe that valley floor springs flowing at several cubic feet per second ever existed at the Cox Ranch and provided a significant source of irrigation supply.

In my reports I have provided testimony regarding the proofs of appropriation filed on behalf of Daniel Venturacce. Rather than go through each of the BT Reports arguments on each of the applications I have deferred to previous testimony regarding this matter.

In summary I offer the following:

1. Harrill stated that there were multiple springs along the 5800 foot elevation along the northeasterly edge of the groundwater basin.
2. Diamond springs dried up earlier than the Taft Springs based upon pumping.
3. The vested use was predicated upon the diversion of the various spring sources with multiple ditches that conveyed water within the place of use.
4. As provided in 1879 a conveyance was found diverting water to the north towards the Cox and ranches with a flow of 1 cfs.
5. A large ditch was surveyed in the 1879 GLO survey as existing, that ran for over two miles from the spring complexes.
6. There were multiple "settlers" within the place of use that did not file for a vested right on part of the lands that make up the original filing in 1912.
7. There is no requirement to file a vested claim until an adjudication takes place, short of an adjudication, which is not in the best interest of the junior appropriators, sufficient information and proof has been submitted to illustrate the vested use of Daniel Venturacci.
8. The BT Report agrees, and prior testimony corroborates this finding, that the pumping has reversed the groundwater gradient to the detriment of the senior appropriators.
9. As shown in the survey of 1879, as an example, the water from Horse Canyon was diverted and discharged south of the Taft Ranch, the multiple settlers in the area relied on the springs within for cultivation of grazing land, hay and stockwater within the place of use. The 1879 map illustrates that the diversion of the Horse Canyon Discharge occurred after 1879 and became supplemental to the spring discharge area.
10. Regardless of drought or declines due to climate warming etc., it cannot be construed any other way other than the pumping has affected senior water right holders. Whatever the circumstance the senior water right holder should be made whole in this process in the first step to mitigate the loss of the vested groundwater discharges.

11. The Ephemeral discharges are not requested to be mitigated, they are supplemental to the place of use and water will continue to be used in the same manner as it always has, no mitigation request been made upon these water rights.
12. Tax records support that the Taft Ranch, and Cox ranches were fully utilized with hay being removed and grazing occurring on the subject lands, Eureka County assessed these taxes and received revenue from these improvements until the springs dried up from over pumping of the groundwater basin.
13. The BT Report provides spring flow data with out correlating the same to groundwater pumping and precipitation, if they would have spent the time to do so, they would have gained further insite to the affect of the groundwater withdrawals from the junior appropriators to the vested sources.
14. **As provided in Bulletin 35, the continued pumping of the groundwater reservoir at the same rate would require mitigation of the spring discharges from Thompson Spring, little did he realize that in the following years from 1968 forward the State Engineer would exacerbate this problem by allowing more permits that accelerated the decline.**